Utah Greater Sage-Grouse

Proposed Land Use Plan Amendment and Final Environmental Impact Statement

Volume V: Appendices I - X

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

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

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Appendix I

Detailed No Action Alternative

APPENDIX I
DETAILED NO ACTION ALTERNATIVE

Included in this appendix is a list of land use planning decisions included in existing BLM and Forest Service LUPs that could be amended as a result of decisions being considered within the range of alternatives included in this EIS. In general, land use planning decisions that are specific to GRSG would be entirely replaced by new decisions. For example, most land use plans include fluid minerals leasing decisions that place some restrictions on development in important seasonal GRSG habitats or in proximity to occupied leks. Under all action alternatives these decisions would be replaced by new fluid mineral leasing decisions.

Decisions that apply to all lands within a given planning area would not necessarily be replaced by decisions being considered in this EIS, because this EIS is only being used to amend decisions in occupied sage-grouse habitat. Rather than replacing these decisions, they may be modified to include more specific information regarding changes in management in sage-grouse habitat. For example, many vegetation, livestock grazing, and fire management decisions apply to an entire planning area. These decisions would not be amended except where there is overlap with sage-grouse habitat. As another example, many land use plan decisions include a list of areas where there are restrictions or prohibitions on certain allowable uses. The only modification to these decisions would be adding GRSG management areas to the list of areas where there would restrictions placed on specific uses.

CBGA AND PINYON

Habitat Restoration/Vegetation Management

Perform vegetation treatments in a mosaic pattern on 4,552 acres of important mule deer habitat, 10,549 acres of important antelope habitat (Indian Peak Allotment), of which 8,329 acres are important sage-grouse habitat.

Sage-grouse strutting grounds have changed from those protected under the existing categories. There are only 280 acres of the 820 present sage-grouse Category 2 lands that protect presently active sage-grouse strutting grounds. The balance of 540 acres protects abandoned sage-grouse strutting grounds because periodic shifting of strutting grounds occurs. The 2,240 acres of prairie dog towns would remain in Category 1 and could be subjected to exploration

and drilling which could cause collapse of burrows and suffocate young prairie dogs. About 1,700 acres around raptor nests would not be protected from disturbance that may preclude successful hatching of young birds.

Fluid Minerals – Unleased Federal Fluid Mineral Estate

Oil and Gas Category 2 (720 acres) Prohibiting drilling or exploration on sage-grouse strutting grounds from March 1 through May 15

Minerals – Action 1

Apply the revised oil, gas, and geothermal leasing Categories and stipulations as described in Minerals Table 1 and Minerals Map 1. This decision does not apply to geophysical exploration which is administered under the Notice of Intent Process (43 CFR 3045).

Category 2, Stipulations 7

In order to (minimize watershed damage, protect important seasonal wildlife habitat, etc.) exploration, drilling and other development activity will be allowed:

(1) Seasonally between May 1 and December 30 in critical big game winter ranges (NSO Jan. 1 – April 30.)

(2) Seasonally between May 2 and March 14 within sage-grouse strutting ground (NSO – ½ mile – March 15 – May 1).

(3) Seasonally between May 1 – October 31 in T&E – Bald Eagle roost and perch sites (NSO – ¼ mile – Nov. 1 – April 30).

In order to protect important sage-grouse strutting and nesting areas, exploration, drilling, and other development activity will be allowed only during the period from May 16 to February 28. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically authorized in writing by the District Manager, BLM.

Upon their renewal or initial granting, Seasonal stipulations will be placed upon geothermal leases for the protection of 3,919 acres of raptor and sage-grouse habitat. A no surface occupancy stipulation for the protection of 2,347 acres of Utah prairie dog habitat and three historical recreation sites will be placed upon geothermal leases in the planning unit. Unneeded seasonal stipulations on 15,360 acres will be dropped.

Lands and Realty

Lands – Action 2.4

Attach the following stipulations to ROWs for electrical transmission lines located within these corridors on lands administered by BLM: (1) Blasting and other surface disturbances would be prohibited within 500 feet of all live springs, reservoirs, or water wells. (2) During critical periods, transmission line construction would cease in deer, Greater sage-grouse, and bald eagle habitat along the transmission lines. Table Lands-2 lists habitat areas and crucial periods. (3) Following the advice of a qualified wildlife biologist as designated by the appropriate federal official, roads, railroads, towers, and other ground-disturbing activities would be located 200

yards from identified active dens, burrows, nests, or roosting sites to protect the species listed below (CBGA RMP):

Species	Concern	Critical Periods
Deer	Crucial Deer Winter Range	Jan 1 – April 30
Utah Prairie Dog	Town Sites	Year-round
Sage-grouse	Strutting Grounds	Mar 15 – May 1
Bald and Golden Eagle	Winter Roost Sites	Feb 15 – June 30

Comprehensive Travel and Transportation Management

Recreation – Action 3
Develop an OHV Management Plan and designate public lands as depicted on Recreation Map 1 into the following OHV categories by 1987: Open, 1,023,700, and limited to existing roads and trails, 47,700, including 14,200 acres of crucial deer winter range in the Cedar Planning Unit (seasonal limitation between January 1 to April 30), 11,100 acres of crucial Greater sage-grouse strutting grounds (seasonal limitation between March 15-May 1), 4,400 acres of nesting and roosting sites for bald and golden eagles (seasonal limitation between February 15 and June 301, 3,900 acres of critical prairie dog habitat (yearlong limitation), and 14,100 acres of riparian habitat (yearlong limitation) (CBGA RMP)

HOUSE RANGE

Livestock Grazing

Range Management – Action 2
Livestock grazing will remain as an allowable use on approximately 2,197,937 acres (98 percent of the total Federal range) within the resource area. Federal ranges will be closed to grazing only under the authority of emergency conditions or land withdrawals.

Range Management – Action 29
Conduct vegetation treatment projects on 31 priority 1 allotments. The following lists those allotments where vegetation treatment will be done in present priority order:

Range Management – Action 30
Plan seeding mixtures to emphasize watershed stabilization, herbaceous cover, establishment of wildlife browse species, and improved livestock grazing forage.

Wildlife
Manage wildlife habitat to favor a diversity of game and non-game species. Continue to provide forage for current big game numbers and prior stable or long-term management goal numbers should populations increase and habitat improvements occur. Improve habitat in poor and fair condition on crucial and high priority habitat. Protect crucial and high priority habitat from encroachment by incompatible uses. Improve riparian and fisheries habitat currently in poor or fair condition. Protect all T&E and sensitive species habitats.

Overall goals and objectives for wildlife are prioritized in the following order:

- Big Game
- Habitat Management Plans (HMPs)
- T&E Species
- Riparian
- Fence Modification
- Guzzler Development
- Well Modifications

Recreation and Visitor Services

Recreation – Action 7 to 13

ORV designations will be the top priority for the HRRA Recreation program. Specific actions, to be prepared in an implementation plan, are listed below in priority order.

Little Sahara Recreation Area and Vicinity

a. ORV use in the Little Sahara Recreation Area would continue to be limited (i.e., restricting ORV use to roads and limiting speeds within campgrounds) on 2,782 acres and closed on 9,604 acres (Rockwell Natural Area).

b. The remaining portions of Little Sahara Recreation Area and adjoining lands would be established as a competitive events area, subject to present management. Limitations on ORV use in these areas would be required during periods of livestock and wildlife use to protect rangeland, wildlife, and other values (i.e., adjust dates of events, locations, amount of use, etc.). Allotments affected would include Cherry Creek, Death Canyon, Desert Mountain, Maple Peak, Meadow Creek, Riverbed, Sheep, Sheeprock, Sugarville, and the portions of McIntyre and Shearing Allotments outside Little Sahara (415,630 acres). The locations and conditions of roads and trails would be inventoried and monitored.

c. Three- and four-wheel All-Terrain Vehicle (ATV) use would be allowed only on sand dune terrain, existing roads, and specially designated trails.

    - 30,700-acres of the Deep Creek Mountains would be closed and 64,969-acres limited to existing roads and trails would continue.
    - ORV use on Swasey Mountain (34,500 acres) would be limited to existing roads, ways, and trails.
    - The sand dunes between the DMAD Reservoir/Oak City would be established as an ORV use area with special emphasis on ATVs.
    - ORV use at Yuba Dam (1,650 Acres) would be limited to existing roads and trails.

Lands and Realty

Lands – Action 1

Prior to any adjustment in land tenure on the 2,245,314 acres of public land in the HRRA, conformance with the land use plan will be determined. Procedures to be followed will be as defined in the ELM Manual and regulations, in accordance with the type of land tenure adjustment.

Lands – Action 6 to 8

Section 503 of the Federal Land Policy and Management Act (FLPMA) states:

> ". . . Utilization of rights-of-way in common shall be required to the extent practical . . ." The utilization of existing corridors, whether designated or not, will be standard procedure. Rights-of-way will be processed on a case-by-case basis, generally in the order received. Existing major rights-of-way are designated as corridors (see Table 2-4). New rights-of-way will be restricted.

Fluid Minerals

Minerals – Action 1

Offer over-the-counter leases on all areas with the fluid mineral leasing Categories 1, 2, & 3 except for Known Geologic Resource Areas (KGRAs). Map 8 shows locations of geothermal resources.

Minerals – Action 2

Offer by competitive sealed bids, all unleased, cancelled, expired, or otherwise terminated lease areas within KGRAs.

Minerals – Action 3

Lease, by non-competitive procedures, all areas within fluid mineral leasing Category 1, 2, and 3. In the event that oil or gas resources are discovered within the resource area, leases could be issued on a competitive basis within established Known Geologic Structures (KGS s) in accordance with the leasing category system set forth in the plan. Map 9 shows oil and gas categories and locatable minerals. The following special management areas are protected by oil and gas leasing categories:

Locatable Minerals

Minerals – Action 4

The following areas are or will be segregated from all mineral entry: (Table 2-7)

Mineral Materials

Minerals – Action 6

The entire resource area will be open to mineral disposal on a case-by-case basis except for those areas identified as oil and gas leasing Categories 3 & 4.

BOX ELDER

Lands and Realty

Lands Program Decison1:
Retain a total of 1,003,221 acres of public land as defined by the Federal Land Policy and Management Act (FLPMA) of 1976 in Federal ownership. This land will be retained except for two specific kinds of *actions: (1) exchanges and (2) conveyances under the Recreation and Public Purposes Act of June 14, 1926 as amended (43 USC. 869 et seq.). Proposals for land exchanges shall meet one or more of the following criteria with a higher priority given to those proposals with the greatest net gain in public values:

(1) Acquire areas that have common property I&, not corners, with existing public land, and that increase the efficiency of public land management. The cumulative total of adjoining public lands that would result after acquisition must be at least 1,920 acres.

(2) Acquire areas where there is a net gain of the following values:

- Riparian and aquatic habitat including springs, streams and marshes.
- Public lands within or adjacent to Areas of Critical Environmental Concern and Visual Resource Management Class II and III areas.

(3) Dispose of areas with serious unauthorized use and boundary dispute problems, if every reasonable attempt under existing law has been made to resolve the problem without a suitable solution and the lands are not needed for any important resource value.

Lands Program Decision 3:
The utilization of rights-of-way in common shall be considered whenever possible. Rights-of-way will, to the maximum extent possible, avoid the following areas:

(1) lands within 0.5 mile of sage-grouse strutting grounds if the disturbance would adversely impact the effectiveness of the lek.

(2) lands within 600 feet of riparian/aquatic habitats.

(3) lands within VRM Class II and III areas.

(4) lands where an above-ground right-of-way would be an obvious visual or physical intrusion such as ridge tops or narrow drainages.

(5) lands with slopes greater than 30 percent.

Exceptions may be permitted based on considerations of the following criteria:

- type and need for facility proposed and economic impact of facility,
- conflicts with other resource values and uses, and
- availability of alternative routes and/or mitigation measures.

Lands Program - Acquired Lands Amendment - Decision 1:
Allow additional disposals/exchanges if following criteria are met:

(1) Land tenure adjustment (LTA) results in net gain of significant resource values such as important wildlife habitat. Including Threatened & Endangered species, cultural sites, riparian zones, live water, or would include a net gain of recreational opportunities;

(2) LTA results in improved accessibility of public lands;

(3) LTA improves manageability of public lands through consolidation of land ownership;

(4) Disposal of public lands which have lost all significant public values due to on site or adjacent uses;

(5) Lands acquired by exchanges, donation or other means, will be managed according to management objectives established for adjacent public lands

- Eliminates configuration and maximum acreage requirements for exchanges.
- All acquired lands available for exchange on a case by case basis if criteria are met.
- Acquired lands within the Public Shooting Grounds Wildlife Management Area (WMA) are exchangeable only with Utah Division of Wildlife Resources (UDWR).

Lands Program Decision 2
The following tracts of public land (see Table 1 and Figure 2) will be disposed: Tracts 1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 36, 37, 38, 41. They will be disposed of by any appropriate method under the law.

Tracts 5, 6, 7, 25 and 39 will be transferred to the adjoining Federal agency. If that agency indicates in writing that it does not wish to acquire the tract(s) or refuses to take the appropriate steps necessary to begin the acquisition of the tracts within 2 years of the agency being notified of the effective date of this plan, the tracts will be disposed of by any appropriate method under applicable laws.

Tracts 33, 34, 35 and 40 will be transferred to the adjoining Federal agency. If that agency indicates in writing that it does not wish to acquire the tract(s) or refuses to take the appropriate steps necessary to begin the acquisition of the tracts, they will be retained under BLM administration.

All of the above tracts total 8,572 acres.

Lands Program - Acquired Lands Amendment - Decision 2:
Dispose of an additional 5,615 acres. (Lucin, 494 acres and Roselle, 5,121 acres.)

These parcels are identified as suitable for disposal by any appropriate method under the law. See Appendix 2 for Description of these areas.

Lands Program Decision 4
Legal and physical access needs will be evaluated on a case-by-case basis depending on the nature of the access to be obtained, the priority in meeting management objectives, and the availability of sufficient funding.

Lands Program - Acquired Lands Amendment - Decision 5:
Upon acquisition of private, state, or other federal lands, the BLM will manage the lands according to the following criteria;

(1) Forage resources will be utilized to resolve livestock/wildlife conflicts and to improve the condition of watershed and riparian areas. The goal would be to reach objectives for the area based on recommendations of an interdisciplinary team. Animal Unit Months (AUM's) for livestock use would be issued as temporary non-renewable AUM's and permitted at a stocking level, class of livestock, and season of use, that is consistent with other resource objectives for the area. Permanent preference AUM's may be authorized in allotments where monitoring studies show that resource objectives within the allotment are being achieved and the lands are in proper functioning condition.

(2) Land acquisitions within, adjacent or contiguous to the existing or proposed boundaries of an existing Area of Critical Environmental Concern (ACEC) or other special designation areas, which have similar values, will be managed according to the goals and objectives of the existing management plan for the area and have the same restrictions or limitations to the use of those lands as described in the respective plan. Land acquisitions which meet the criteria for designation as ACEC's will be designated as such and a plan developed to direct management of the lands.

(3) Future land acquisitions will be managed in accordance with the Box Elder RMP and subsequent amendments. Land acquisitions will be managed according to the oil and gas categories, land withdrawals, Visual Resource Management (VRM) classifications, grazing season of use and class of livestock, OHV designations, and other authorized uses as described for the surrounding public lands as identified in the Box Elder RMP unless otherwise amended.

Fire and Fuels Management

Fire Management Program - Decision 1:
A fire suppression plan will be developed by an interdisciplinary team and will include the following:

(1) Full fire suppression will be implemented in areas:

- where wildfire may result in loss of life.
- where destruction of man-made facilities such as homes, hay yards and power substations could occur.
- where fire would damage important natural resource values, such as the salt desert shrub vegetative type.

(2) Limited suppression will be implemented in areas where:

- resource values may benefit or be increased by fire such as in the pinyon/juniper vegetative type.
- hazards to firefighters, including potential aircraft hazards, exist.
- terrain features cause extreme difficulty in fire suppression, leading to heavy damage of equipment.
- the cost of fire suppression exceeds the benefit.

(3) Prescribed fire will be implemented in areas where resource management objectives can be met by utilizing planned or unplanned ignitions. Within prescribed areas, both wildfires and prescribed fires must fall between predetermined parameters (prescription) including but not limited to weather conditions, fuel type and fire behavior. If these conditions are exceeded, appropriate suppression action will be taken.

(4) Areas of fire suppression responsibilities in Box Elder County will be negotiated among cooperating agencies in cooperative agreements.

Fire Management - Acquired Lands Amendment
Include acquired lands in existing fire suppression plan, in accordance with like area prescriptions (Continuation of existing decision).

Mineral Materials

Minerals Program Decision 1
Continue to process applications for the removal of common variety mineral materials including sand and gravel and leasable minerals other than fluid minerals on a case-by-case basis. Stipulations to protect important surface values will be required based on interdisciplinary review of each proposal.

Fluid Minerals – Unleased Federal Fluid Mineral Estate

Minerals Program Decision 3
Categorize the Federal mineral estate in Box Elder County for fluid mineral leasing in the least restrictive category which will adequately protect other resources and land uses, Lands would be placed in categories as follows (also see Figure 4):

Category 1: Open for leasing 800,732 acres

Category 2: Open with special stipulations 213,726 acres

In order to protect crucial sage-grouse breeding complexes, exploration, drilling and other development activity within 0.5 mile radius of the complexes will be allowed from June 16 to March 14 and not allowed from March 15 through June 15. This limitation does not apply to maintenance and operation of producing wells. This stipulation affects 23,680 acres.

If the lessee can demonstrate that operations can take place without impact to the resource being protected, an exemption to this stipulation may be granted, if approved in writing by the authorized officer in consultation with the Utah Division of Wildlife Resources.

Minerals Program - Acquired Lands Amendment - Decision 3
Establish fluid mineral leasing categories as follows:

(These acreages pertain to acquired lands only; existing acreages will be increased by these amounts) See Map 1 for locations.

Cl : Open; standard stipulations: 5,615 acres

* includes disposal lands

C2: Open w/special stipulations: 11,307 acres

*includes Keg Springs and Grouse Creek areas

In order to protect important wildlife species and habitat values from disturbance, seismic work, well development, rights-of-way, and other disturbance activities excluding maintenance activities would be restricted in the following areas and during the stated time periods.

(3) within 0.5 mile of sage-grouse strutting grounds (leks) between March 15 and June 15 each year or year-long if the disturbance would negatively impact the effectiveness of the lek.

Leased Federal Fluid Mineral Estate

Wildlife Decision 7
BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-ways and other disturbing activities excluding maintenance activities in the following areas and during the stated time periods:

(1) within mule deer winter range between December 1 and April 15 each year;

(2) within 0.5 mile of active raptor nest sites between March 1 and July 15 each year;

(3) within 0.5 mile of sage-grouse strutting grounds (leks) between March 1'5 and June 15 each year or year-long if the disturbance would negatively impact the effectiveness of the lek for more than an off-seasonal basis.

(4) within 600 feet of riparian/aquatic habitats yearlong, if the proposed activity could significantly affect water quality or productivity of the riparian/aquatic zone.

Specific exceptions to the above stated restrictions may be granted by BLM if it can be shown that the proposed activity Will not seriously disturb the wildlife habitat values being protected.

Comprehensive Travel and Transportation Management

Recreation Program Decision 1
Designate all public land in the planning area as open, limited, or closed to motorized vehicle use as follows (see Figure 8):

Open: 999,634 acres

Limited: 12,160 acres

Closed: 0 acres

Recreation Program - Acquired Lands Amendment Decision 1
With the exception of land acquisitions which are within fenced areas, or can be managed as separate units, the lands would be placed in OHV classifications based on the classification of surrounding public lands as described within the Box Elder RMP. Exceptions to this would be in wetlands or riparian areas which would be placed within the "Limited" or "Closed" designations.

Open to OHV use: 28,758 acres

Open to existing roads/trails (R/T): 22,981 acres

*includes crucial deer winter range, crucial sage-grouse habitat, riparian areas, the 90 acres fenced in the Sander's exchange and non-wetlands within the CPR and UPR grades

Open to designated R/T: 40 acres

*includes Lahontan trout habitat

Closed to OHV use: 11,970 acres

*includes riparian or wetland areas of the railroad grades, Salt Wells WHA, and Blue Springs WHA. In these areas, use of OHV's would be through permission of the authorized BLM official.

**Closures do not include County Roads.

Refer to Map 2. (These designations apply only to the acquired lands)

The existing roads and trails are as shown by the National Aerial Photography Program (NAPP) black and white photographs of 1993. The referenced aerial photographs are on file at the U.S. Department of Agriculture, Farm Service Agency.

The Donner/ Bettridge designated roads include the unimproved jeep trail which runs in an east/west direction bisecting the SW1/4SW1/4, Section 15, T. 4 N., R. 19 W., SLM.

Detailed OHV designations will be determined through completion of a BLM Activity Plan.

Livestock Grazing

Range Program Decision 4
Authorize the following initial forage use in the Box Elder Planning Area:

Cattle 29,850 AUMs

Sheep 15,539 AUMs

Domestic Horses 315 AUMs

The initial forage use is the current active preference level. Table 4 lists initial authorized use by allotment.

BLM will continue to monitor the allotments to assure that these levels are proper or determine if adjustments from active preference are needed.

On allotments with suspended non-use AUMs (i.e., active preference is below total preference), the suspended AUMs may be reinstated on a temporary, non-renewable basis to the level which current monitoring studies indicate. This temporary non-renewable reinstatement of suspended AUMs may be made permanent after being substantiated by a minimum of 5 years of monitoring data.

On Red Dome and Matlin Allotments, BLM will issue a temporary 60-percent increase in three increments of 20 percent: each. The increase would be in the form of temporary, nonrenewable AUMs and would be issued in the first, third, and fifth years of a 5-year period. If monitoring data support the increase, the increase would be made permanent.

On Peplin Allotment, BLM will grant a temporary, non-renewable increase of 10 percent (28 AUMs) in earlier livestock turn-out time or numbers of animals for 5 years. If 5 years of monitoring data support the increase, it may be made permanent.

After range improvements are accomplished, additional AUMs could be granted in some allotments. The AUMs would be granted on a temporary, non-renewable basis until monitoring data substantiate a permanent adjustment.

Range Program -Acquired Lands Amendment Decision 4:
Improve ecological condition while providing forage for livestock and wildlife.

Use interdisciplinary team to establish goals and objectives for acquired lands.

On the acquired lands, provide 1,124 temporary non-renewable animal unit months (TNR AUM's) consistent with other resource objectives for the area.

Cattle 881 TNR AUM's

Sheep 243 TNR AUM's

Domestic horses 0

Total 1,124 TNR AUM's

Allotments will be monitored so that proper stocking levels can be established, and may be modified from that listed above. Specific rangeland improvement projects will be determined through the development of specific management plans for each area. See Appendix 3 for listing of allotments and forage allocations for livestock.

Continue grazing in Blue Springs and East CPR grade on lands within the Connor Allotment (excluding riparian exclosures)

If grazing permits are relinquished with the Salt Wells WHA, Blue Springs WHA, or the wetland areas of the lands associated with the eastern and western portions of the CRP/UPR grades, then these areas would be closed to grazing to protect the wetland values. Grazing would then only be authorized if the grazing could be used to achieve management objectives.

Range Program Decision 5
Maintain the current livestock seasons-of use on 33 allotments. Change the current seasons-of-use on 25 allotments to better meet the requirements of key species. Table 5 shows the season-of use for all allotments in the planning area.

Range Program Decision 6
Physical access will be constructed, subject to available funds, on public lands within the following legal descriptions (also see Figure 4):

Description	Miles
1. T. 11N., R.13W. Sections 6, 7, 18:	3 miles
2. T. 11N., R.13W. Sections 14, 15, 16:	3 miles
3. T. 11N., R.13W. Section 1	
T.11N., R.12W. Section 6	
T.12N., R.12W. Sections 31, 32, 33, 34:	2 miles

Wildlife

Wildlife Program Decision 7
BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-ways and other disturbing activities excluding maintenance activities in the following areas and during the stated time periods:

(1) within mule deer winter range between December 1 and April 15 each year;

(2) within 0.5 mile of active raptor nest sites between March 1 and July 15 each year;

(3) within 0.5 mile of sage-grouse strutting grounds (leks) between March 1'5 and June 15 each year or year-long if the disturbance would negatively impact the effectiveness of the lek for more than an off-seasonal basis.

(4) within 600 feet of riparian/aquatic habitats yearlong, if the proposed activity could significantly affect water quality or productivity of the riparian/aquatic zone.

Specific exceptions to the above stated restrictions may be granted by BLM if it can be shown that the proposed activity Will not seriously disturb the wildlife habitat values being protected.

Recreation and Visitor Services

PONY EXPRESS

Lands and Realty

Lands Program – Decision 1

A total of 47 tracts totaling 8,924 acres, would be available for disposal. These are listed in Table 1 and 2 and shown in Figure 1. All parcels would be managed for disposal under all available authorities except tracts 13, 69, and 70, which would not be available for Section 203 sales.

Fourteen parcels would be available for disposal subject to certain restrictions on persons or purposes under which a disposal would occur. Table 3 identifies these parcels and applicable limitations.

Lands Program – Decision 2

The remaining public lands (1,581,962 acres) in the Pony Express Resource Area (including revoked withdrawals returned to BLM administration) are available for exchange.

In order to be considered, exchanges of public land in the Pony Express Resource Area must accomplish one or more of the following criteria:

(1) Increase public ownership within those areas of public land which are not available for disposal or any other transfer from Federal ownership and BLM management (see Table 4 and Figure 2).

(2) Result in a net gain of significant resource values on public land such as important wildlife habitat, cultural sites, riparian zones, live water, and threatened and endangered species.

(3) Improve the accessibility of the public lands.

(4) Contribute toward more efficient management of public lands through consolidation of ownership.

(5) Remove from Federal ownership public lands which have lost all significant public values due to on-site or adjacent uses.

Land exchanges will continue to be analyzed on a case-by-case basis. Resource values may be incorporated into the fair market value of the land.

Lands Program – Decision 4
Military exercises are discouraged because they tend to preclude multiple use activities and public access. Military activities that result in significant, adverse, long-term impacts or public safety hazards would not be allowed.

BLM will continue to approve military requests for casual use for which no formal authorization is required. Examples of these types of requests are temporary placement of communication equipment along existing roads, search and rescue training involving helicopters and foot patrols, and temporary observation posts.

BLM will continue to consider requests for long-term military uses involving construction or development of facilities. These uses are appropriately authorized under 43 CFR 2500 and include radar or microwave communications sites, and linear facilities, such as roads, power lines, and communication lines.

For requests made by the Utah' National Guard, BLM can issue a permit under 43 CF'R 2920. For uses such as a bivouac of troops and off-road travel, requests would be considered through the environmental assessment process to determine the significance of impacts. Public land will not be made available for inappropriate uses such as storage or use of hazardous materials (munitions, fuel, chemicals, etc.) and live artillery firing.

Locatable Minerals

Mineral Materials

Minerals Program – Decision 1
BLM will continue to process applications for the removal of common variety mineral materials, including sand and gravel, on a case-by-case basis as regulated under 43 CFR 3600. Stipulations to protect surface values will be required based on review of each proposal.

Fluid Minerals – Unleased Federal Fluid Mineral Estate

Minerals Program – Decision 2
Categorize the Federal mineral estate in the Pony Express Resource Area for fluid mineral leasing as follows:

	Acres:
Category 1 (open)	1,750.735
Category 2 (open with special stipulations)	245.857
Category 3 (no surface occupancy)	77,003
Category 4 (closed)	0

Table 5 describes the areas and/or resources included in the fluid mineral leasing categories. These areas are shown in Figure 5.

The following special stipulations used in Category 2 areas are in addition to the lease terms and standard stipulations, and are necessary to protect specific resource values on the lease area:

(3) In order to protect crucial sage-grouse breeding complexes, exploration, drilling and other development activity within 0.5 mile radius of the complexes will be allowed from June 16 to March 14 and not allowed from March 15 through June 15. This limitation does not apply to maintenance and operation of producing wells. This stipulation affects 16,900 acres.

Specific exceptions may be granted by the BLM if the proposed activity will not seriously disturb wildlife habitat values being protected. This determination will be made by a BLM wildlife biologist in coordination with the UDWR and, if appropriate, the USFWS. Such a determination may result if the sage-grouse complex has remained inactive over a period of years and it is determined by the BLM and DWR that the population no longer used the complex and no longer requires protection from disturbing activities for fluid mineral leasing and exploration.

Wildlife

Wildlife and Fisheries Program Decision 4

BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities in the following areas during the stated time periods:

(3) within 0.5 mile of sage-grouse strutting grounds (leks) and crucial sage-grouse nesting habitat between March 15 and June 15 each year and within winter crucial habitat areas December 1 through March 1.

(4) within 1200 feet of riparian habitats.

Specific exceptions may be granted by BLM if the proposed activity will not seriously disturb the wildlife habitat values being protected.

Wildlife and Fisheries Program Decision 5

BLM will improve crucial habitats of present wildlife populations where condition and trend indicate a decline of desirable plant communities. An appropriate wildlife habitat study will be conducted to determine the condition of these areas. This information will help guide BLM in planning improvement projects. Some of the crucial habitats that warrant further study include:

(3) sage-grouse crucial strutting and associated nesting habitat,

(4) sage-grouse crucial winter range,

On these ranges, grazing use will be reviewed for opportunities to reduce conflicts between livestock and wildlife, e.g., domestic and bighorn sheep would be incompatible as disease transmission potential is high. Change of livestock kind could help improve riparian areas when coupled with other measures.

Vegetation treatments such as burning, chaining, reseeding and all other manipulations within crucial ranges of wildlife species will be designed to maintain habitat for those wildlife species most threatened by the practice.

Wildlife and Fisheries Program Decision 10
BLM will continue, to encourage UDWR's proposed reintroduction/transplants of upland game birds (chukar partridge, sage-grouse, sharptailed grouse, ring-necked pheasants, etc.) onto suitable habitat within the Resource Area. Specifics for implementing any such proposed reintroduction/transplants shall be developed in the HMP for the habitat area.

Wildlife and Fisheries Program Decision 12
Rangeland watering facilities will allow for wildlife use. When practical, overflow ponds at water developments will be at least 100 yards from livestock watering sources to allow for a cleaner water source for wildlife. Location of future water developments should minimize conflicts between livestock and wildlife.

All livestock fencing projects will allow for movement of wildlife. Design and specifications will be dictated by terrain, kind of livestock and affected wildlife species.

Comprehensive Travel and Transportation Management

Transportation and Utility Corridors Decision 1
Future proposals for major rights-of-way such as pipelines, large power lines and permanent improved roads must utilize identified corridors as shown in Figure 10. Otherwise, a planning amendment and appropriate environmental analysis will be required. Proposals that are not considered major may be sited outside corridors after demonstrating that locating within a corridor is not viable. In all cases, the utilization of rights-of-way in common shall be considered whenever possible. Rights-of-way, whether within or outside a corridor, will avoid the following areas to the maximum extent possible:

(1) lands within 0.5 mile of sage-grouse strutting grounds if the disturbance would adversely impact the effectiveness of the lek.

(2) lands within 1200 feet of riparian/aquatic habitats.

Exceptions may be permitted based on consideration of the following criteria:

type and need for facility proposed and economic impact of facility,

conflicts with other resource values and uses, and

availability of alternative routes and/or mitigation measures.

Recreation and Visitor Services

Recreation Program Decision 2
Designate all public land in the Resource Area as either open, closed, or limited for off-road vehicle use as follows:

Open to ORV use: 1,649,267

Limited for ORV use: 363,439

Closed to ORV use: 0

Also see Table 8 and Figure 7 for specific resource values and areas designated.

Wild Horses and Burros

Wild Horse Program Decision 1
BLM will continue to manage the herd size of the Cedar Mountain Wild Horse Unit at 85 animals (1,020 AUMs) and the Onaqui Mountain Unit at 45 animals (540 AUMs).

Soil and Water

Soil, Water and Air Program Decision 5
BLM will manage riparian areas, wetlands, and other water sources for multiple use purposes such as wildlife, range, watershed and recreation. These areas will be managed to meet the following objectives:

- Each area will be identified and classified for present condition.
- Management intensity levels will be determined and objectives developed for each area based on desired condition.
- The areas will be prioritized for funding and preparation of activity plans. These could include watershed, allotment, habitat and multiple resource management plans.

Seek cooperative efforts with adjoining landowners and other resource management agencies.

Livestock Grazing

Range Program Decision 1
Total forage use by grazing users on public land in Tooele County will. continue to be:

Cattle	39,173 AUMs
Sheep	67,001 AUMs
Domestic Horses	125 AUMS
Wild Horses	1,560 AUMs

Range Program Decision 4
BLM will authorize livestock forage use as shown in Table 7 on six allotments in Utah county. Grazing permits on six small, isolated allotments with minimal or no actual livestock use will be cancelled. These allotments are Iso-tract Cook, Iso-tract Ludlow, Iso-tract Willis, Cherry Creek, Scofield, and Genola Hill. Mule deer and elk use will continue at current levels as determined by BLM and UDWR. No seasons-of-use for livestock will be changed. Total forage distribution on public land in Utah County would be as follows:

Cattle	495 AUMs
Sheep	1,820 AUMs

Fire and Fuels Management

Fire Management Program Decision 1

All wildfires on public land will receive some level of suppression. The authorized officer has the responsibility to determine the intensity of the suppression effort to meet the overall protection objective to put the fire out with minimum suppression cost and minimal losses, consistent with management objectives.

All facilities, structures or developments that are susceptible to fire damage will receive intensive suppression. The primary objective with this level of suppression is to prevent loss of life, property, or unacceptable resource damage. All other public lands in the Resource Area will be considered conditional suppression. On these lands the intensity of suppression actions is not fixed and will vary with the conditions occurring at the time of start. These conditional suppression areas will be managed on a least cost plus resource loss basis. In these areas, the full spectrum of intensities is to be considered and the determination on which intensity level to initiate suppression is based on the conditions at the time.

Objectives for fire management are planned results which can more than likely be attained and are categorized by vegetation type. Many factors influence these objectives including vegetation (fuel) type, rate of spread, travel distance involved with initial attack, historic fire occurrence, fire weather, and availability of fire suppression resources to name just a few. There are other opportunities to lessen the acres burned, but budget restraints have limited their implementation. They include green stripping, black lining, additional engines at all field stations, and the construction of an additional field station in southern Skull Valley. BLM will prepare vegetation modification plans for Skull Valley and Puddle Valley to reduce wildfire and attempt to stop or reverse the cheatgrass conversion cycle.

BLM can, however, expect some fire occurrence in the Resource Area and, due to current field station location and mix of equipment, anticipate some loss of vegetation. If the acres identified in the objectives are exceeded and resource damage occurs, the above mentioned methods to lessen acres burned may be implemented.

The following objectives are tied to vegetation types per fire occurrence and are common for all periods of the year:

(1) In the desert shrub/saltbush vegetation type confine fires to 100 acres.

(2) In the sagebrush/perennial grass vegetation type, including areas of juniper invasion, confine fires to 300 acres.

(3) In the juniper vegetation type, confine fires to 200 acres.

(4) In the annual vegetation type, confine fires to 300 acres.

(5) Under burning conditions which would threaten to sterilize soil, confine all tires in all vegetation types to 50 acres.

(6) Where T&E plants are present, design wildfire control measures to protect the species.

Five additional vegetation types are not covered by these objectives. Fire occurrence within these types has been minimal and should be evaluated on an individual basis by the resource advisor. Objective 5 would still apply to these vegetation types*

Prescribed fire will be used as a resource management tool. Figure 11 indicates the tire management and use areas in Tooele County. Prescribed burns within the areas will be used to alter vegetation for the benefit of watershed, livestock grazing and/or wildlife habitat. The areas selected for prescribed burning will have the potential for natural revegetation.

RANDOLPH

Lands and Realty

Range Management Decision 3.4
Dispose of 2,625 acres of public land to facilitate grazing management and administration as specified below. Priority for disposal of this land will be (1) state or private exchange under the provisions of Section 206 of the Federal Land Policy and Management Act of 1976 public sale under the provisions of Section 203 of the Federal Land Policy and Management Act.

1. Dispose of 867 acres outside of existing grazing allotments according to the following priority: (Refer to Decisions WL-1.6 & L-10.1)

2. Dispose of 637 acres in or near the Middle Ridge, Sessions and Big Creek Grazing Allotments (Refer to Decision L-10.1)

3. Dispose of all Public Land in the Middle Ridge Grazing Allotment (Refer to Decision L-10.1 Restrictions on disposals will be the same as in that decision).

Exchange is the preferred method for disposal of these lands unless otherwise indicated. Exchange of lands-with the State of Utah or private parties will generally result in no loss of Public Land in the county and will allow both BLM and the other party to the exchange to block their land ownership for better management. Should the BLM receive no viable exchange offers, the lands identified in this decision will, as a final resort, be sold at a public sale to the highest bidder.

Non-Energy Leasable Minerals

Minerals M-1.3
Issue prospecting permits and lease applications for phosphate in all of Rich County subject to site specific stipulations. Do not issue prospecting permits and leases in the Laketown Canyon ACEC.

Locatable Minerals

Minerals M-1.1

All of the Federal mineral estate administered by the BLM in Rich County currently open to mineral prospecting, location and development under the 1872 Mining Law will remain open for the present. Existing exclusions of mining on Federal mineral estate under the 1872 law will be reviewed over the next few years to determine if they are still proper.

Mineral Materials

Minerals M-1.2

All possible Federal mineral estate in Rich County will be open to oil and gas leasing and re-leasing subject to the standard lease provisions and the below listed special stipulations:

8. In order to protect sage-grouse strutting grounds, exploration, drilling, and other developmental activity will not be allowed between April 1 and June 15. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically authorized in writing by the District Engineer, U. S. Geological Survey with the occurrence of the District Manager, Bureau of Land Management. (Refer to Decision Wildlife 2.2).

Minerals M-1.4

Convert all existing material sites used by the Rich County Road Department into Free Use Permits during FY-80, and coordinate with the Rich County Commissioners and Maintenance Supervisor to determine which gravel pits are actively being mined and which ones are needed on a long-term basis.

Leased Federal Fluid Mineral Estate

Wildlife WL 2.2

Protect important wildlife habitat values on Public Lands as follows:

2. Protect sage-grouse strutting grounds from surface disturbing activities between April 1 and June 15 each year.

3. Restrict seismic work, well development, new road construction and other surface disturbing activities within 600 feet on either side of riparian zones if that activity could significantly affect water quality and productivity of riparian habitats.

Bear River East Amendment Oil & Gas Leasing (Special Stipulations)

In order to protect important seasonal wildlife habitat, exploration, drilling and other development activity will be allowed only during the period from April 16 to November 30. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically approved in writing by the authorized office of the BLM.

Bear River East Amendment Oil & Gas Leasing (Special Stipulations)
In order to protect important sage-grouse breeding and nesting habitat, exploration, drilling and other development activity within two miles of any strutting ground will be allowed only during the period from June 16 to February 28. This limitation does not apply to maintenance and operation of producing wells. There are no exceptions to this stipulation.

Bear River East Amendment Oil & Gas Leasing (Special Stipulations)
In order to protect important sage-grouse winter habitat, exploration, drilling and other development activity will be allowed only during the period from March 1 to November 30. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically approved in writing by the authorized office of the BLM.

Livestock Grazing

Range Management RM 1.1
Graze all areas in Rich County suitable for livestock grazing. Carrying capacities for each allotment will be based upon the forage production on suitable acreage in each allotment.

Range Management RM 1.2
Make adjustments in stocking rates and season of use and conduct range management activities in accordance with the decisions for each allotment as shown in the attached decision documents.

*Appendix B contains Decision Documents for every allotment within the Randolph MFP.

Range Management RM 1.3
Changes in class of livestock from cattle to sheep will be allowed and are encouraged in areas where sheep forage is available and other resource values are compatible with the change. Changes from sheep to cattle can only be allowed where the present range survey shows that cattle forage is available and all suspended non-use has been restored to cattle operators within the allotment. Conversion from horses to cattle will also be allowed and is encouraged. A conversion rate of one (1) horse animal unit for one and one-half (1%) cow animal units will be used.

These decisions concerning change of class of livestock on public lands will also apply to grazing exchange of use agreements for private lands within an allotment.

Range Management RM 2.1
Allotment Management Plans (AMP's) will be developed and implemented on allotments wherein approximately 2/3 or more of the permittees agree voluntarily to the AMP. Priority for development of AMPS will be as follows:

1. Eleven allotments which do not now have any type of grazing system: Bear Lake, Rabbit Creek, Dry Basin, Duck Creek, Laketown Canyon, Sage Creek, Kearl, New Canyon, Big Creek, Eastman and Stuart.

2. Do not develop AMPS on two allotments - South- Woodruff and Deseret until such time as the Public Lands within those allotments can be consolidated into manageable blocks by exchange. AMPS should be encouraged once this process is completed.

3. Do not develop AMPS on two allotments - Middle Ridge and Sessions. Continue custodial management of these allotments until such time as the Public Lands therein can be disposed of by exchange or public sale for management by the private sector.

Implementation of AMPS will be as funds and manpower permit. AMPS will be developed with multiple use objectives. The development of grazing systems will consider and provide for wildllfe, watershed, recreation and other resource needs as well as the needs of the livestock and the individual permittees within an allotment. A priority in AMP development will be to meet the permittees' need for early feed while also meeting the multiple use objectives established in the AMP. AMPS will be designed for individual allotments dependent upon on-the-ground conditions in each allotment. Key species, season of use, utilization levels and the grazing system will be determined on a case-by-case basis. AMPS will be developed in cooperation with the permittees, the U.S. Soil Conservation Service, the U. S. Forest Service Utah Division of Wildlife Resources, the Utah State University Extension Service, Salt Lake District – BLM Grazing Advisory Board, and Multiple Use Advisory Council and other agencies and groups as appropriate.

Additional AUMs of forage produced by the implementation of AMP grazing systems will be allocated to permittees only after the forage becomes available and a decision has been made allocating forage between competing uses in a formal Management Framework Plan Amendment. Where applicable, increases will be allocated to the permittees responsible for the increased production.

If at least 2/3 of the permittees in an allotment do not voluntarily agree to an AMP, it may be necessary to take some other actions to improve and maintain the vegetation, soil and water resources within the allotment on a sustain yield basis. Such actions will be based upon the results of future utilization and trend studies and will include implementation of grazing systems by decision and further reductions in season and numbers as appropriate.

Range Management RM 2.2

1. Evaluate the only operating AMP, Woodruff Pastures Allotment, as to whether it is meeting the objective of maintaining and improving the vegetation, soil and water resources on a sustained yield basis while allowing maximum possible livestock use. If it is found that this AMP is not meeting these objectives it should be altered according to the standards for AMPS as contained in RM-2.1.

2. Evaluate the effectiveness of existing grazing systems in the Twin Peaks, East Woodruff, and Meachum Canyon Allotments to see if they are meeting range management objectives. If the existing systems are adequately meeting the objectives, they will be incorporated into formal AMPS as in RM-2.1. If they are not effective, new grazing systems will be developed through the AMP process as outlined in RM-2.1.

Range Management RM 2.3

Increase the amount of desirable vegetation by removing undesirable species through land treatment practices, and make available for grazing use by wildlife or livestock additional Animal Unit Months -AUMS) of forage created by these treatments.

Range improvement, including land treatment, will be planned in Allotment Management Plans (AMPS), and budgeted as part of each year's Annual Work Plan (AWP). Priority for funding of land treatment will be:

1. Where a completed, signed, and fully accepted AMP exists on an allotment.

2. To provide early feed or solve other management problems.

3. On the most productive sites so the greatest benefit can be derived from the investment.

4. To restore suspended non-use.

Prior to initiating any land treatment the following will be agreed upon by the permittees:

1. Rest on seedings will be-one full year and an additional growing season. Rest on spraying areas will be for a full year and an additional growing season, however, exceptions may be made where conditions are acceptable as approved by the District Manager. Grazing use within an allotment during treatment rest periods will be adjusted to, the carrying-capacity for those portions of the allotment not being rested. This could result in some reductions in season of use and/or numbers during the rest period.

2. Cooperative agreements will set out maintenance responsibility in accordance with district policy and will be entered into before the project is programmed beginning in FY 1981

Specific criteria for selection of treatment areas and design and implementation of treatments will include:

1. Juniper stands will be left intact to provide cover for doe.

2. Comply with sage-grouse guidelines with the reasonable flexibility that is provided for in these guidelines.

3. Chemical spraying will conform to project design specifications as stated in the Randolph Grazing ES, however, deviations may be made on a case-by-case basis where additional environmental analysis indicates that impacts will not be significantly greater than stated for the proposal in the ES.

4. Consider wildlife food and cover requirements in the planning and design of all treatments. Insure that desirable forage species for wildlife are included in re-seeding where reasonably possible. Range management objectives should include maintaining or improving these species in the composition.

5. The completed Soil Conservation Service (SCS) soil survey will be considered in project design to determine sites with the best chance of success and the greatest long term productivity.

6. Roads will not be constructed to project areas. Exceptions may be approved by the District Manager.

7. Fence lines will not be cleared, with exceptions approved by the District Manager.

8. Water sources will be fenced.

9. Areas disturbed in water developments and other surface disturbance areas will be recontoured and seeded.

10. Project requirements and specifications as set out on pages 1-25 and A8 - 1 and 2 of the Randolph ES will be followed except in cases where additional environmental analysis shows that deviation will result in less impact.

These are the minimum standards, and exact design specifications for projects will be determined for each project on a case by case basis.

The overall objective of treatment design will be to create a mosaic effect which will provide a diversity in vegetative types.

Ultimate target compositions for projects in deer winter areas will be:

30-40% Shrubs

10% Forbs

50-60% Grass

Target composition in deer summer range will be:

20-30% Shrubs

10% Forbs

60-70X Grass

Future allocations will not be made until forage actually exists on the ground. When forage has been determined to be available, it will be allocated on a non-renewable basis. Only when range utilization, actual use and trend studies show forage production can be permanently sustained, will a permanent allocation be made.

The allocation between livestock and wildlife will be made when the forage is actually available based on the most realistic demand figures that exist at that time. Wildlife population demand will be consistent with the carrying capacity of private as well as Public Lands.

Range Management RM 3.3
Maintain or insure access on all existing roads crossing Public Land in Rich County to facilitate movement of livestock and maintenance of range improvements and other facilities in accordance with the access policy as stated in Decision Support 2.1. Maintain and/or reconstruct BLM roads as necessary to permit passage by vehicles and in such a manner as to reduce sedimentation and other environmental problems caused by those roads to an acceptable level.

Range Management RM 3.4
Dispose of 2,625 acres of public land to facilitate grazing management and administration as specified below. Priority for disposal of this land will be (1) state or private exchange under the provisions of Section 206 of the Federal Land Policy and Management Act of 1976 or I (2) public sale under the provisions of Section 203 of the Federal Land

Policy and Management Act.

1. Dispose of 867 acres outside of existing grazing allotments in T. 13 N., R. 6 E.; T. 13 N., R. 7 E.; and T. 14 N., R. 6 E., SLM according to the following priority: (Refer to Decisions WL-1.6 & L-10.1)

2. Dispose of 637 acres in or near the Middle Ridge, Sessions and Big Creek Grazing Allotments in T. 8 N., R. 5 E.; T. 8 N., R. 8 E.; and T. 9 N., R. 5 E., SLM. (Refer to Decision L-10.1)

3. Dispose of all Public Land in the Middle Ridge Grazing Allotment - T. 9 N., Rs. 5 & 6 E., SLM. (Refer to Decision L-10.1 Restrictions on disposals will be the same as in that decision).

Exchange is the preferred method for disposal of these lands unless otherwise indicated. Exchange of lands-with the State of Utah or private parties will generally result in no loss of Public Land in the county and will allow both BLM and the other party to the exchange to block their land ownership for better management. Should the BLM receive no viable exchange offers, the lands identified in this decision will, as a final resort, be sold at a public sale to the highest bidder.

Range Management RM 3.5
Eliminate the "drift" in the Laketown, Big Creek, New Canyon, Duck Creek and Sage Creek Grazing Allotments. In place of this trailing permitted livestock will be licensed at the full number for the full season of use for these allotments is specified in RM 1.2.

Range Management RM 3.6
Adjust existing and future Exchange-of-Use grazing agreements to grazing capacity, concurrent with adjustments in grazing preference, so that the grazing capacity corresponds with the range survey capacity for the land in Exchange-of-Use. Season of use must correspond with the season of use established in the grazing permit for the allotment.

Range Management RM 3.9
Grazing administration including use supervision, trespass control, and monitoring utilization and trend studies will receive top priority for funding within the Range Management program. If full

funding is not available for these activities, funds will be diverted from other range activities, e.g., SVIM inventory, etc.

Wildlife

Wildlife WL 1.1

Improve quality of aquatic-riparian stream habitat on 20.0 miles of Public Land. Accomplish this goal over the short term by fencing 7.4 miles of stream riparian zone to exclude livestock on Laketown Creek, Spring Creek, Big Creek, Randolph Creek and the Middle Fork of Otter Creek. Specific water actions are categorized and listed below:

-Exclude Livestock Grazing-

1. Laketown Creek will be fenced across both sides of the bottom of the canyon. Fence design is to be of a "let-down" type to accommodate wildlife movements. The "V" fence will prevent cattle access to the Laketown Creek riparian zone in the Laketown Allotment because of the extremely steep canyon sides (see overlay M3-WL-1). Stream excluded to cows = 1.7 miles.

2. Spring Creek will be fenced for the entire length of publicly owned land (see overlay M3-WL-1). Stream excluded to livestock = 0.75.miles.

3. Big Creek will be fenced for the entire length of publicly owned land located on Big Creek above the existing exclosure and road crossing (see overlay M3-WL-1). Stream excluded to livestock 0.75 miles.

Randolph Creek will be fenced on all three sections of Public Land (13, 14 and 18), and adequate distance will be left to ensure cattle watering access on-Public Lands (see overlay M3-WL-1). Stream excluded to livestock 2.9 miles.

Middle Fork Otter Creek will be fenced in two sections (3 and 4) on Public Land. On the upper portion fencing will be installed in a triangular shape to produce a mini-watershed for hydrologic investigation of water requirements of rejuvenating vegetation (see overlay M3-WL-1). Stream excluded to livestock = 1.3 miles.

-Spring Fencing-

North Fork Otter Creek will be fenced at three spring sources. Progressing from higher to lower in the watershed, springs located in Sections 2, 1 and 33 will be fenced with forest poles (see overlay M3-WL-1).

-Cattle Trespass-

The Salt Lake District fence maintenance policy shall be strictly enforced in the Laketown Creek area. Both Twin Peaks and Laketown Allotments shall be closely monitored to prevent any trespass cattle from damaging the riparian zone, Close adherence to the RM-3.1 decision is imperative.

-Further Study-

Further study will be conducted on the following streams: North Fork of Otter Creek (the uppermost meadow), North Fork of Otter Creek (the lowest spring to be considered for possible reservoir

development), lower Laketown Creek, Little Creek, South Branch of the Middle Fork of Otter Creek, and the South Fork of Otter Creek. This constitutes an additional 4.8 stream miles which may have potential for fisheries development. Various supplementary riparian portions bill be investigated to obtain use either by cooperative agreement, purchase or land exchange. These include spring sources for Laketown Creek, Spring Creek, and other areas such as Randolph Creek which would produce larger contiguous stream mileage.

-Improvement of Remaining Aquatic-Riparian Areas-

Improvement of other areas to be accomplished by designing livestock management systems which rotate, defer, or limit livestock access to riparian zones during the critical period of May 1 to August 30, and by non-riparian location of range improvements to draw livestock away from stream bottoms.

Wildlife WL 1.2

Improve habitat quality for wildlife on 12,704 acres of crested wheatgrass stands in the planning unit by using livestock as the principal management tool. Grazing management will be aimed at grazing these

seedings in a manner which will stimulate natural plant succession towards a mix of desired shrub-and forb species. Those seedings located in critical deer winter range will be managed to obtain a composition of 30 to 40 percent shrubs, 10 percent forbs, and 50 to 60 percent grass. Seasonal deer ranges containing crested wheatgrass seedings will be managed to obtain 20-30 percent shrubs, 10 percent forbs, and 60-70 percent grasses.

Interseeding may be used to obtain the needed mix of preferred species. These seedings will be initiated on an experimental basis to determine costs, and success rate of various plant species. The priority areas for any project which involves experimental interseeding will be Dry Basin and Longhill Pastures, located in the Woodruff Pastures Allotment.

Wildlife WL 1.3

Use prescribed fire as a habitat management tool to produce optimum benefits for wildlife. The use of fire will be coordinated with all other resource activities in order to minimize disruption of ongoing or planned activities.

Wildlife WL 1.4

Thin sagebrush stands and seed with a mix of grasses, forbs, and browse in order to enhance habitat quality for deer, antelope, elk, sage-grouse, and a variety of nongame species, Treatments will be located in priority areas outlined in decision Range Management 2.3. These will be as follows:

1) Allotments with signed allotment management plans.

2) Allotments where forage for wildlife and livestock is either lacking, in short supply, or is of poor quality to meet present demands.

3) Only those range sites with the greatest potential for maximum productivity and diversity will be treated.

In addition, treatments will be designed to meet wildlife habitat requirements on critical and seasonal deer ranges and important sage-grouse habitat. The ultimate composition over breed areas will be 30-40 percent shrubs, 10 percent forbs, and 50-60 percent grasses on critical deer ranges, and 20-30 percent shrubs, 10 percent forbs, and 60-70 percent grasses on seasonal deer ranges. Any projects will be coordinated with other resource activities to minimize conflicts and impacts.

The wildlife program will initiate the sage-grouse monitoring study to identify important sage-grouse habitats. All wildlife initiated projects will be coordinated in order to minimize conflict between resources.

The wildlife program will identify and provide plant species to be included in seeding projects initiated by other programs. 0nly plant species adapted to a specific range site will be used in treatment projects.

Wildlife WL 1.5
Provide water for wildlife at all wells, developed springs, catchments, and along pipelines during the period May l-to October 1, or year-round where practical. In addition, improve water quality and enhance wildlife food and cover around all existing springs on Public Land by constructing exclosures sufficient in size to protect the spring source and associated vegetation. The spring protection devices will be constructed so no loss of livestock water is incurred.

Wildlife WL 1.7
Construct diagonal fence exclosures at selected corners away from gates or watering facilities within all grazing allotments in the planning unit. Each exclosure will be constructed so as not to exceed one acre in size - total area enclosed will be about ten acres in thirty separate pastures.

Wildlife WL 2.2
Protect important wildlife habitat values on Public Lands as follows:

1. Restrict seismic work, well development, new road development and other surface disturbing activities in mule deer winter ranges between November 15 and April 30 unless specifically authorized by BLM.

2. Protect sage-grouse strutting grounds from surface disturbing activities between April 1 and June 15 each year.

3. Restrict seismic work, well development, new road construction and other surface disturbing activities within 600 feet on either side of riparian zones if that activity could significantly affect water quality and productivity of riparian habitats.

Recreation and Visitor Services

Recreation R 1.4
Enhance recreation use and enjoyment of Public Lands within Rich County by obtaining legal public access into those specific areas identified through activity and site planning for the various resource activities. Legal public access to Public Land will only be obtained in accordance with the access policy stated in Support Decision 2.1 (listed on this table)

Legal public access to Public Land in Rich County will be identified by the installation of roadside directional signs and will be described in a recreational interpretive guide brochure to be completed for Rich County.

Comprehensive Travel and Transportation Management
Designate Public Lands as "open" to all vehicle use, or "closed" to all vehicle use, or "limited" to certain roads, trails, season of use, types of vehicles, etc. as outlined in the Draft Off-Road Vehicle Implementation Plan for the Randolph Planning Unit.

Support SU 2.1
The policy for legal access to Public Land in Rich County is as follows:

1. Resource activity planning will be the primary tool used to identify legal access needs for Public Land. This activity planning will identify important areas where legal access is in the public interest and necessary for resource management. Certain areas where access is not desirable or certain roads which should be closed for resource protection may also be identified through this process.

2. "Legal Public Access" will only be obtained where there is a sufficiently large block of Public Land to insure that said public access is clearly in the public interest and will not unnecessarily jeopardize the interests of adjacent land owners. Exchange of land

(refer to Decision Lands 12.1) will be an important tool used to consolidate Public Land into manageable blocks thereby solving many access problems due to intermingled land ownership.

3. A lesser form of legal access, e.g. administrative access, non-exclusive access, etc., will be obtained into areas where the federal government is a minority land owner. This would include access to isolated parcels of Public Land and Public Land in checker board ownership with adjacent state and private lands.

4. "Legal Public Access" will not be obtained to Neponset Reservoir under any circumstances. Legal access to this area will be limited to access for administrative purposes only; (Refer to Decision Wildlife 3.2).

Develop and implement a transportation management plan that will:

1. Incorporate the road inventory information as developed in the Randolph URA.

2. Provide a priority acquisition schedule for important areas of the Public Lands as identified in activity plans for each resource activity consistent with the access policy as stated above in this decision.

3. Specify the maximum type legal access to be obtained for each area identified in the preceding item.

4. Provide a road maintenance program to meet resource, administrative and other needs. This maintenance program will incorporate cooperative agreements with other federal agencies and Rich County to insure the most efficient, cost effective use of manpower and equipment.

5. Identify and provide for correction of all safety hazards on BLM roads, including the placement of necessary warning, directional and regulatory signs, to insure public safety and resource protection.

PARK CITY AND ISOLATED TRACTS

Locatable Minerals

The unit will remain open to location under the General Mining Laws (Park City).

GRAND STAIRCASE ESCALANTE NATIONAL MONUMENT

Lands and Realty

Habitat Restoration/Vegetation Management

REV-1

Many factors will be considered when deciding to implement a revegetation or restoration strategy. Each project and area to be treated will be evaluated to determine the appropriate strategy. The following general guidelines can be applied to determine which strategy is the most appropriate and how it will be implemented in order to be consistent with the overall vegetation management objectives.

1. Restoration will be the goal whenever possible (i.e., an attempt will be made to return disturbed areas to conditions which promote a natural array of native plant and animal associations).

2. Species used in both restoration and revegetation projects will comply with the non-native plant policy described above (i.e., native plants will be used as a priority).

3. Revegetation strategies will be used in areas of heavy visitation, where site stabilization is desired.

4. Restoration provisions will be included in all surface disturbing projects including provisions for post restoration monitoring of the area. Costs for these activities will be included in the overall cost of the project and will come out of the entire project budget.

5. Priority for restoration or revegetation will be given to projects where Monument resources are being damaged.

These sites will likely be in areas near development and/or heavy visitor use. Although these areas are more likely to be candidates for revegetation projects, careful evaluation of disturbed sites needs to be conducted to include desired future condition of an area. Restoration or revegetation of areas receiving heavy use may include limits on visitor use in order to promote recovery.

Fire and Fuels Management

The Best Management Practices found in Appendix XX were provided at part of WO IM 2011-138. As such, they would be applied as best management practices to fuels and fire management action as a matter of compliance to BLM policy.

SEED-1

When deciding whether to reseed after fires, there are many factors that should be considered. The overriding consideration is the vegetation management objective and priority to use native plants. In trying to make the

determination of whether seeding will help attain these objectives, there are other considerations: (1) the structure and diversity of vegetation in the area before it burned, and (2) the presence of noxious weeds in the area and the likelihood of such weeds increasing as a result of a fire. Areas with high species diversity and little potential for noxious weed spread will not be reseeded. Areas that had little diversity and little potential for noxious weed invasion will be seeded with native species exclusively. Areas of low diversity and high potential for noxious weed invasion will most likely be seeded, and non-native/native seed mixes could be used if it was determined that timing was critical and non-native species will help prevent weed spread. Each fire will have to be evaluated on a case-by-case basis to determine the appropriate actions to meet the established vegetation management objectives. Actions may change over time as a result of new research or other information in accordance with the adaptive management framework outlined in Chapter 3. If seeding with non-natives is deemed necessary, it will be in accordance with the provision stated above (short-lived, nurse crop species with natives in the mix).

KANAB

Special Status Species

- Maintain, protect, and recover habitats of federally listed threatened, endangered, or candidate plant, animal, or fish species, and actively promote recovery to the point that provisions of the Endangered Species Act (ESA) are no longer required.
- Maintain, protect, and enhance habitats of the latest Utah BLM State Director's sensitive plant and animal species list to ensure that BLM-authorized or approved

actions are consistent with the conservation needs of the species and do not contribute to the need to list any species under the ESA.

- Cooperate with the U.S. Fish and Wildlife Service (USFWS) and other agencies, such as UDWR, in managing special status species and their habitat.
- Allow, initiate, and/or participate in scientific research of listed and sensitive species and their habitats.
- To the maximum extent possible, maintain habitat connectivity and avoid habitat fragmentation for special status plant and animal species.
- Develop and implement conservation measures to minimize long-term habitat fragmentation through avoidance and site-specific reclamation in order to provide the habitat quality and quantity to meet ecological requirements and support a natural diversity of species.

SSS-3

Develop and implement monitoring and conservation measures for listed and non-listed special status species and their habitats where land use and human disturbances have been identified as having potential for adverse impacts.

SSS-7

Avoid, control, or regulate surface disturbing and disruptive activities on a case-by-case basis to minimize impacts on identified crucial habitat for sensitive species for the purpose of protecting these species and their associated habitats.

SSS-8

Should special status species be found, temporarily stop surface disturbing and disruptive activities until species-specific protective and/or mitigative measures are developed and implemented, in consultation with USFWS and/or UDWR when applicable.

SSS-9

Apply BMPs to avoid or reduce fragmenting habitat, including:

- Collocating communication and other facilities
- Employing directional drilling for oil and gas
- Using topographic and vegetative screening to reduce the influence of intrusions.

SSS-10

The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed on site, and on a voluntary basis where it is performed offsite, or in accordance with current guidance.

SSS-53

Implement the most current UDWR Strategic Management Plan for Sage-Grouse (UDWR, 2002 and its future revisions), the BLM National Sage-Grouse Habitat Conservation Strategy (BLM,

2004), and recommendations from local sage-grouse working groups to protect, maintain, enhance, and restore Greater sage-grouse populations and habitat.

SSS-54
All surface disturbing activities would be prohibited within ½ mile of Greater sage-grouse leks on a year-round basis. Oil and gas leasing would be open subject to major constraints (NSO).

SSS-55
Allow no surface disturbing or otherwise disruptive activities within 2 miles of Greater sage-grouse leks from March 15 to July 15 to protect nesting and brood-rearing habitat. Oil and gas leasing would be open subject to a controlled surface use and timing stipulation.

SSS-56
Allow no surface disturbing or otherwise disruptive activities within Greater sage-grouse winter habitat from December 1 – March 14. Oil and gas leasing would be open subject to a controlled surface use and timing stipulation.

SSS-57
See Appendix 3 for exceptions, modifications, or waivers.

Within ½ mile radius of a Greater sage-grouse lek site:

Manage oil and gas leasing as open subject to major constraints (NSO) within ½ mile of a Greater sage-grouse lek site.

Purpose: To protect occupied lek sites within Greater sage-grouse habitat.

Exception: An exception may be granted by the Field Manager if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated.

Modification: The Field Manager may modify the boundaries of the stipulation area if (1) portions of the area do not include lek sites, (2) the lek site(s) have been completely abandoned or destroyed, or (3) occupied lek site(s) occur outside the current defined area, as determined by the BLM.

Prohibit surface disturbing activities within 2 miles of a Greater sage-grouse lek in the nesting and brood-rearing habitat from March 15 to July 15:

Allow no surface disturbing or otherwise disruptive activities (e.g., construction and maintenance) within 2 miles of a Greater sage-grouse lek in nesting and brood-rearing habitat from March 15 to July 15.

Purpose: To protect Greater sage-grouse lek in nesting and brood-rearing habitat.

Exception: An exception could be granted if surveys determine that the Greater sage-grouse lek in nesting and brood-rearing habitat is not occupied. An exception may also be granted by the Field Manager if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated or it is determined the lek sites are not active.

Modification: The Field Manager may modify the boundaries of the stipulation area if portions of the area do not include habitat or are outside the current defined area, as determined by the BLM.

Prohibit surface disturbing activities within Greater sage-grouse winter habitat from December 1 - March 14

Allow no surface disturbing or otherwise disruptive activities in Greater sage-grouse winter habitat from December 1 to March 14.

Purpose: To protect Greater sage-grouse wintering habitat.

SSS-58

Prioritize habitat vegetation treatments to maintain and/or improve habitat function in the following areas (Map 5):

- Sage-grouse nesting and brood-rearing habitat
- Sage-grouse winter range.

Lands and Realty

All LUPs include management actions that require reclamation/restoration of disturbed areas that are no longer used in support of authorized actions.

- Make public lands available for community growth and expansion needs, recreation, and public purposes as well as other infrastructure needs.
- Strive to increase and diversify our Nation's sources of traditional and alternative energy resources, improve our energy transportation network, and ensure sound environmental management in support of minerals and energy development, as required by the President's National Energy Policy and the Energy Policy Act of 2005.
- Retain in public ownership public lands that enhance multiple-use management, allow access to public lands, or contain sensitive or rare resources.
- Acquire lands or interests in lands to complement existing resource values and uses.
- Consider for disposal lands or interests in lands that are difficult and uneconomic to manage as part of the public lands, are no longer needed for a federal purpose, or where disposal would serve important public objectives.
- Resolve any outstanding State Grant entitlements (quantity grants, in-lieu selections).
- Make public lands available for ROWs, permits, and leases. The suitability for these land actions would be judged on a case-by-case basis.
- Consider energy and utility corridors to focus placement of new major ROWs for energy and transportation systems.

LAR-4
Exclude new ROWs (including communication sites) (75,700 acres) in the following areas (Map 11):

LAR-5
Avoid new ROWs (51,570 acres) in the following areas (Map 11):

LAR-6
Preference would be to locate ROW developments in common (within existing ROWs/disturbance areas).

LAR-17
Areas and Lands Available for Land Tenure Adjustment

Public lands, in order to be considered for any form of land tenure adjustment (including exchanges, in-lieu selections, desert land entries, R&PP, easement acquisitions, etc.), except for FLPMA Section 203 sales, must meet one or more of the following criteria:

- Is in the public interest; accommodates the needs of state, local, or private entities, including for the economy and community growth and expansion; and is in accordance with other land use goals, objectives, and planning decisions

LAR-18
Habitat for listed threatened, endangered, and candidate species would be retained in federal ownership unless land tenure adjustments would result in a net increase of habitat. All actions involving listed species or their habitat would result in the proper consultation with USFWS. Land tenure adjustments may be considered with the State of Utah and others after consultation with and concurrence by USFWS.

LAR-21
Approximately 6,000 acres of public land would be available for FLPMA Section 203 sales with NEPA compliance and consistent with other decisions in this RMP (Map 13; Appendix 5).

- Results in net gain of important and manageable resource values on public lands such as crucial wildlife habitat, significant cultural sites, high-value recreation areas, high-quality riparian areas, live water, special status species habitat, or areas key to maintenance of productive ecosystems
- Ensures the accessibility of public lands in areas where access is needed and cannot otherwise be obtained
- Is essential to allow effective management of public lands in areas where consolidation of ownership is necessary to meet resource management objectives

Results in the acquisition of lands that serve a national priority as identified in national policy directives.

LAR-26

Consider proposals for ROWs for wind and solar energy development throughout the decision area with the following exceptions:

- Designated wilderness
- WSAs
- ACECs
- Suitable WSR corridors

Habitat Restoration/Vegetation Management

- Sustain or reestablish the integrity of the sagebrush communities to provide the quantity, continuity, and quality of habitat necessary to maintain sustainable populations of Greater sage-grouse and other sagebrush obligate species.
- Manage rangelands to prevent net loss of properly functioning sagebrush steppe habitat.
- Contain or reduce invasive plant species from existing extent; prevent establishment of new invasive species through early detection and rapid response actions.

WL-6

Conduct habitat improvement treatments for species in accordance with current species-specific guidelines and local working group prescriptions.

WL-9

Maintain existing vegetation treatments that benefit wildlife.

WL-10

Prioritize habitat vegetation treatments to maintain and/or improve habitat function in areas of crucial mule deer winter range (Map 5).

VEG-18

Permit commercial seed collection. Areas and species available for commercial collection would be determined on a case-by-case basis as climatic conditions allow, in accordance with statewide guidance and policy.

VEG-23

Apply approved weed control methods to all invasive species in an integrated weed management program (including preventive management; education; and mechanical, biological, wildland or prescribed fire, and chemical techniques).

VEG-30

Treat sagebrush steppe communities to restore natural disturbance processes and a healthy, diverse mosaic of different height and age structures with components of native grasses and forbs and an appropriate pinyon-juniper component for a given ecological site. Mosaics may include stands of young and old sagebrush, openings (ranging from bare ground to short or

sparse vegetation to high-density grasslands), wet meadows, seeps, healthy streamside (riparian) vegetation, and other interspersed shrub and woodland habitats.

VEG-31

Follow the Connelly guidelines (Connelly et al. 2000) for vegetation treatment prescriptions for projects occurring in occupied and/or historic Greater sage-grouse habitat. Adjust and/or modify these guidelines with cooperators (e.g., Utah Division of Wildlife Resources [UDWR], local sage-grouse working group, and Utah Partners for Conservation and Development, as necessary, within the range of variability described in the appropriate ecological site description.

VEG-32

Limit acres of vegetation treatments (e.g., wildlife habitat treatments, watershed treatments, livestock rangeland treatments, wildland fire use, fuels treatments, and stewardship contracting) to an annual average of no more than 22,300 acres (446,000 acres over the life of the plan).

VEG-33

Use the full range of upland vegetation treatment methods and tools (i.e., prescribed fire, mechanical, chemical, biological, woodland product removal, and wildland fire use).

VEG-34

Vegetation treatments may be authorized where protection of sensitive resources would be ensured.

Fire and Fuels Management

Major Vegetation Group	DWFC and Actions Needed to Meet DWFC
Pinyon-Juniper Woodland	Where pinyon and juniper occurred historically, the DWFC outside and inside the WUI is open stands of pinyon and juniper with native grass and shrub understory. Where pinyon and juniper did not occur historically, the DWFC is the native shrub, grass, and forest communities that the pinyon and juniper have invaded. The historical role of fire (estimated 15- to 50- year fire-return interval) prevented encroachment of pinyon and juniper into other vegetation communities. Most pinyon and juniper encroachment has occurred in the past 100 years. Follow treatments with seeding in FRCC 2 and FRCC 3 stands that lack native understory vegetation. Historical occurrence of pinyon and juniper is difficult to map, but pre-settlement trees are generally located in shallow, rocky soils and tend to have unique growth form characterized by rounded, spreading canopies; large basal branches; large irregular trunks; and furrowed fibrous bark. Historic fire-return intervals in these protected sites are more than 100 years. • When possible, allow wildland fire to play its natural role, which mimics the historical fire-return interval and severity in FRCC 1 and FRCC 2 lands that have some cover of native understory vegetation. Due to the high risk of losing key ecosystem components in FRCC 2 (lacking native understory vegetation) and FRCC 3 lands, avoid wildland fires in these areas. Prescribed fires should be applied to pinyon and juniper communities when native surface fuels will carry fire and when there is low risk of invasive species. • Prescribed fire should be used to approximate historical fire-return intervals and promote recovery of the pre-settlement vegetation cover types. Remove most young (less than100 years old) pinyon and juniper trees through fire or mechanical treatments. In the WUI, construct fuel breaks between BLM and private land or other values at risk. • Following wildfire in FRCC 3 (and some FRCC 2 areas that are lacking native understory vegetation), aggressively seed to reduce invasive species establishment and to restore native communities.
Sagebrush	The DWFC, outside and inside the WUI, is healthy sagebrush defined as diverse age classes with an understory of native grasses and forbs. Research suggests that stand-replacement should be burned every 10 to 100 years depending on the particular sagebrush species and its associated habitat. Fire management actions in sagebrush must be carefully balanced between invasive species concerns, wildlife habitat, and the need to restore fire. • When possible, allow wildland fire to play its natural role, which mimics the historical fire-return interval and severity in FRCC 1 and FRCC 2 lands that have a low potential for cheatgrass invasion. Areas with low potential for cheatgrass invasion include higher elevation sites and/or sites that have very low incidence of cheatgrass pre-fire. • Treat dense sagebrush (more than 30 percent) with fire, mechanical, or chemical treatments to reduce sagebrush canopy cover and improve native grass and forb density and cover; an additional objective in treating sagebrush is to remove encroaching pinyon and juniper trees. In the WUI, construct fuel breaks between BLM and private land (or other values at risk) in dense stands of sagebrush.

Major Vegetation Group	DWFC and Actions Needed to Meet DWFC
	• Following wildfire in FRCC 2 and FRCC 3 lands, aggressively seed to promote native understory grasses and forbs and reduce invasion of cheatgrass and noxious weeds. Consider including sagebrush in seeding mixes or planting sagebrush seedlings in high-value wildlife areas following large, high-severity wildfires when natural seed sources would be lacking.
Grassland	Where native grasslands occurred historically, the DWFC outside the WUI is native grass and forb communities. Native grasslands have been lost to pinyon and juniper encroachment, cheatgrass invasion, and non-native plant seedlings (e.g., crested wheatgrass, perennial ryegrass, etc.). Where nonnative grasslands occur, the DWFC is the restoration of the native grassland or shrub community. The historical role of fire in Utah's grasslands is similar to pinyon and juniper and sagebrush community types with fires every 15 to 50 years. • When possible, allow fire to play its natural role, which mimics the historical fire-return interval and severity. • Treat native grasslands with fire, mechanical, or chemical treatments to reduce encroaching trees (mainly juniper), shrubs, and invasive plants. Fire treatments alone should be avoided where there is potential for cheatgrass invasion (areas below 7,000 feet elevation that have adjacent cheatgrass populations). In the WUI, consider green stripping between BLM and private lands and other values at risk. • Following wildfire in FRCC 2 and FRCC 3 lands, aggressively seed to reduce potential for cheatgrass and other invasive weeds
Riparian Wetland	The DWFC, outside and inside the WUI, is riparian and wetland areas with the appropriate composition of native species (e.g., reduction of tamarisk and other invasive species). • When possible, allow fire to play its natural role, mimicking the historical fire-return interval and intensity. Allow low to moderate severity fire to burn into riparian and wetland areas when natural ignitions are managed as wildland fire use. • Restore native riparian and wetland species through fire and mechanical treatments. Reduce flammable invasive species along riparian corridors (e.g., tamarisk) through mechanical, chemical, biological, and fire treatments. For prescribed fire, allow low intensity fire to back into riparian and wetland areas through ignition outside of these areas. Mechanical treatment as the initial treatment would be emphasized where there is a moderate to high potential for riparian and wetland to be burned to a high severity. • Consider active restoration options when native riparian and wetland communities are unlikely to recover with passive restoration (due to invasive species, stream bank erosion, etc.).

FIRE-3

Wildland fire would be used to protect, maintain, and enhance resources and, when possible, would be allowed to function in its natural ecological role. Areas where wildland fire use is appropriate and not appropriate are identified in Table 1. The FMP would provide further operational guidance for wildland fire use.

FIRE-4

To reduce risks and to restore ecosystems, the following fuels management tools would be allowed: wildland fire use; prescribed fire; and mechanical, chemical, seeding, and biological actions. As conditions allow, the BLM would employ the least intrusive method over more intrusive methods. For example, wildland fire use is the preferred method of treatment. Where wildland fire use is not feasible, prescribed burning would be the preferred method. Where prescribed burning is not feasible, non-fire fuels treatments would become the preferred method of treatment.

FIRE-10

Wildland fire would be used to protect, maintain, and enhance resources and, when possible, would be allowed to function in its natural ecological role. However, due to resource conditions and proximity to values at risk, fire cannot be allowed to resume its natural role on public lands. The DWFC is that as lands are transitioned from a higher FRCC to a lower FRCC, the applicability of wildland fire use would increase. Therefore, fire managers would periodically assess the FRCC following changes in vegetation due to management actions and natural

changes. This alternative authorizes wildland fire use as a tool, when appropriate, to reach the DWFC.

FIRE-11

Wildland fire use would be an appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined designated areas. Operational management of wildland fire use is described in the Wildland Fire Implementation Plan. This alternative attempts to in general clarify the types of areas that are not suitable for

wildland fire use while leaving other areas open for possible wildland fire use.

FIRE-12

Although specific areas for wildland fires use would be identified in the FMPs, wildland fire use may be authorized for all areas, except when the following resources and values may be negatively impacted and there are no reasonable Resource Protection Measures to protect such resources and values:

- WUI areas
- Areas that are known to be highly susceptible to post-fire cheatgrass or invasive weed invasion
- Important terrestrial and aquatic habitats
- Non-fire adapted vegetation communities
- Sensitive cultural resources
- Areas of soil with high or very high erosion hazard
- Class I air-shed areas and particulate matter (less than 10 microns in diameter) (PM10) non-attainment areas
- Administrative sites
- Developed recreation sites
- Communication sites
- Oil, gas, and mining facilities
- Above-ground utility corridors
- High-use travel corridors, such as interstates, railroads, and/or highways.

FIRE-13

The appropriate management response for areas containing these resources or values may be wildland fire use, but Resource Protection Measures would be necessary to protect these values if they are threatened. Additional protection actions may include employing strategies and tactics to avoid these values (e.g., using fire retardant to reduce fire spread in certain areas). In fire situations where these resources or values would not be impacted, wildland fire use may still not be employed due to other parameters (weather, personnel availability, etc.). In these situations, the appropriate management response—from aggressive initial action to

monitoring—would be used. The DWFC would be to restore fire to ecosystems when feasible; therefore, fuel treatments should focus on protecting the resources and values listed above so future wildland fire use actions could be more easily implemented.

FIRE-17

Protection of human life is the primary priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources would be based on human health and safety, the values to be protected, and the costs of protection. Priorities for all aspects of fire management decisions and actions would be based on the following:

- WUI
- Maintain existing healthy ecosystems
- High priority sub-basin (Hydrologic Unit Code [HUC] 4) or watershed (HUC 5)
- Special status species
- Cultural resources and cultural landscapes.

The Best Management Practices found in Appendix XX were provided at part of WO IM 2011-138. As such, they would be applied as best management practices to fuels and fire management action as a matter of compliance to BLM policy.

FIRE-18

Resource Protection Measures for fire management practices to protect natural or cultural resource values are described in Appendix 8:

V-1 When restoring or rehabilitating disturbed rangelands, non-intrusive, non-native plant species are appropriate for use when native species: (1) are not available; (2) are not economically feasible; (3) cannot achieve ecological objectives as well as non-native species; and/or (4) cannot compete with already established native species (Noxious Weeds Executive Order 13112 2/3/1999; BLM Manual 9015; BLM ROD 13 Western States Vegetation Treatment EIS 1991).

FW-6

Create small openings in continuous or dense sagebrush (more than 30 percent canopy cover) to create a mosaic of multiple-age classes and associated understory diversity across the landscape to benefit sagebrush-dependent species.

FW-7

On sites that are currently occupied by forests or woodlands, but historically supported sagebrush communities, implement treatments (fire, cutting, chaining, seeding, etc.) to reestablish sagebrush communities.

FW-9

Use the ESR program to apply appropriate post-fire treatments within crucial wildlife habitats, including sage-grouse habitats. Minimize seeding with non-native species that may create a

continuous perennial grass cover and restrict establishment of native vegetation. Seed mixtures shall be designed to reestablish important seasonal habitat components for sage-grouse. Leks shall not be reseeded with plants that change the vegetation height previously found on the lek. Forbs shall be stressed in early and late brood-rearing habitats. In situations of limited funds for ESR actions, prioritize rehabilitation of sage-grouse habitats

Minerals

MIN-9
Approximately 35,538 acres (Map 15) are determined to be unsuitable for surface mining and surface operations incident to an underground mine as stated in 43 CFR 3400.0-5(mm) based on the 20 criteria identified in Appendix 6.

MIN-10
Additional areas could be found unsuitable based on site-specific analysis (Appendix 6).

MIN-13
In addition to the 24,591 acres withdrawn, recommend withdrawing the following areas (9,500 acres) from mineral entry (Map 12).

MIN-14
Allow mineral material disposals on a case-by-case basis subject to site-specific environmental analysis excluding the following areas (105,000 acres) (Map 16).

MIN-4
Manage fluid mineral leases as shown on Map 14:

- Open to leasing subject to standard terms and conditions: 95,400 acres
- Open to leasing subject to moderate constraints (seasonal and CSU): 296,200 acres
- Open to leasing subject to major constraints (NSO): 83,400 acres
- Closed to leasing: 79,000 acres.

Prohibit surface disturbing activities within 2 miles of a Greater sage-grouse lek in the nesting and brood-rearing habitat from March 15 to July 15:

Allow no surface disturbing or otherwise disruptive activities (e.g., construction and maintenance) within 2 miles of a Greater sage-grouse lek in nesting and brood-rearing habitat from March 15 to July 15.

Purpose: To protect Greater sage-grouse lek in nesting and brood-rearing habitat.

Exception: An exception could be granted if surveys determine that the Greater sage-grouse lek in nesting and brood-rearing habitat is not occupied. An exception may also be granted by the Field Manager if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated or it is determined the lek sites are not active.

Modification: The Field Manager may modify the boundaries of the stipulation area if portions of the area do not include habitat or are outside the current defined area, as determined by the BLM.

Waiver: A waiver may be granted if it is determined the habitat no longer exists or has been destroyed.

Prohibit surface disturbing activities within Greater sage-grouse winter habitat from December 1 - March 14

Allow no surface disturbing or otherwise disruptive activities in Greater sage-grouse winter habitat from December 1 to March 14.

Purpose: To protect Greater sage-grouse wintering habitat.

Exception: An exception could be granted if surveys determine that the Greater sage-grouse lek in winter habitat is not occupied, and that snow depths in the area allow continued sage-grouse use. An exception may also be granted by the Field Manager if the operator submits a plan that demonstrates that impacts from the proposed action can be avoided, sufficiently minimized, or adequately mitigated.

Modification: The Field Manager may modify the boundaries of the stipulation area if portions of the area do not include habitat or are outside the current defined area, as determined by the BLM.

Waiver: A waiver may be granted if it is determined the habitat no longer exists or has been destroyed.

Comprehensive Travel and Transportation Management

TRC-1

Management of motorized access would balance protection of resources while providing for resource use needs. Area designations would be as follows (Map 9):

- Open to cross-country OHV use: 1,000 acres
- Limited to designated routes: 528,000 acres
- Closed to OHV use: 25,000 acres.

TRC-5

Areas Closed to OHV Use

Designate the following areas as closed to OHV use:

- Paria SRMA—both RMZs
- Designated wilderness (by Congressional designation)

- In and through islands of vegetation in Welsh's milkweed designated critical habitat (790 acres)
- Suitable "wild" river corridors.

TRR-2
Consideration of route and trail modifications (new or existing) will be conducted on a case-by-case basis in accordance with resource/use objectives and after appropriate NEPA review and analysis (Appendix 7).

Recreation and Visitor Services

REC-45
SRPs will be subject to the following restrictions unless specifically authorized:

- No collection of natural resources (not including firewood for personal onsite use).
- No SRP activities will be authorized in bald eagle winter roost areas from November 15 through March 15 during critical roosting hours (from 1 hour after sunset to 9 a.m.).
- If surveys reveal the presence of nesting Southwestern willow flycatchers, authorize no SRP activities in these locations between May 15 and June 30.
- No Greater sage-grouse lek areas will be advertised by SRP holders or the BLM.
- Implement seasonal/area closures during Greater sage-grouse breeding (March 1 to April 30) and/or wintering (November 1 to February 28) seasons if BLM biologists determine that breeding or wintering is being impacted by SRP activities.

Livestock Grazing

- Maintain or restore healthy, sustainable rangeland ecosystems to meet BLM Utah's Standards for Rangeland Health and to produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.
- Integrate livestock use and associated management practices with other multiple-use needs and objectives to maintain, protect, and improve rangeland health.
- Reduce or eliminate livestock-related rangeland resource problems on all allotments not meeting rangeland health standards while maintaining a production goal of livestock forage in the long term.

GRA-1
Manage livestock grazing allotments within the decision area as available for livestock grazing.

GRA-4
Allocate forage for livestock as noted in the grazing allotment forage allocation table (Appendix 14).

GRA-6
Use livestock grazing to enhance ecosystem health and/or help accomplish resource objectives (e.g., noxious/invasive weed control and hazardous fuel reduction) on allotments where authorized by the authorized officer on a case-by-case basis.

GRA-14
Give emphasis to changes in grazing management practices (e.g., changing season of use and fencing) before reducing AUMs on allotments to resolve conflicts with other uses.

GRA-16
Complete land treatments to maintain or provide additional AUMs needed to meet the demand for livestock forage and divide the AUMs proportionally among all operators within the affected allotments.

Wildlife

WL-32
The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed on site, and on a voluntary basis where it is performed offsite, or in accordance with current guidance.

PRICE

Lands and Realty

LAR-1
Transfer only lands out of federal ownership and/or acquire non-federal lands where needed to accomplish important resource management goals or to meet essential community, State, or county needs.

LAR-2
Dispose of lands as specifically identified for lease or disposal under various authorities (FLPMA 203, 206, R&PP).

LAR-11
Consider land ownership changes on lands not specifically identified in the RMP for disposal or acquisition if the changes are in accordance with resource management objectives and other RMP decisions, determined to be in the public interest, and will accomplish one or more of the following criteria:

The changes are determined to be in the public interest. The public benefits from land resources coming into public ownership, while accommodating the needs of local and State governments, including the needs for public purposes, community growth, and the economy.

The changes result in a gain of important manageable resources on public lands such as crucial wildlife habitat, significant cultural sites, mineral resources, water sources, listed species by habitat, and areas key to productive ecosystems.

The changes ensure public access to lands in areas where access is needed and cannot otherwise be obtained.

The changes promote more effective management and meet essential resource objectives through land ownership consolidation.

The changes result in acquisition of lands that serve regional or national priorities identified in applicable policy directives or legislation.

The changes in federal ownership result in "no net loss" of wetlands and/or riparian areas.

If none of the above criteria are met, proposed land ownership changes will not be approved or will require a plan amendment.

LAR-13
Acquire fee title or interest in non-federal lands (e.g., water rights, scenic easements, and Greater sage-grouse leks) with priority placed on lands with critical resource values.

LAR-14
Lands identified for potential disposal through sale are identified and listed in Appendix R-11 and Map R-19. All potential disposals through sale must meet the goals and objectives of other resource programs.

LAR-23
Lands identified for potential disposal through sale are identified and listed in Appendix R-11 and Map R-19. All potential disposals through sale must meet the goals and objectives of other resource programs.

LAR-25
In development of new utility corridors, avoidance areas will include (Map R-22):

Dry Lake Archaeological District ACEC

Interstate 70 ACEC

Muddy Creek ACEC

San Rafael Canyon ACEC

Segers Hole ACEC

The five non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain their wilderness characteristics.

LAR-26
In development of new utility corridors, exclusion areas will include (Map R-22):

Range Creek SRMA

Big Flat Tops ACEC

Bowknot Bend ACEC

Rock Art ACEC

San Rafael Reef ACEC

Heritage Sites ACEC

LAR-28
Additional ROWs will be granted consistent with RMP goals and objectives.

LAR-29
Preference for communication ROWs will be given to applications using existing designated communication sites (e.g., Cedar Mountain and Bruin Point). Existing communication management plans prescriptions will be adhered to.

LAR-30
In development of new discretionary ROWs, avoidance areas will include (Map R-22):

Dry Lake Archaeological District ACEC

Interstate 70 ACEC

Muddy Creek ACEC

San Rafael Canyon ACEC

Segers Hole ACEC

The five non-WSA lands with wilderness characteristics managed to protect, preserve, and maintain their wilderness characteristics.

LAR-31
In development of new discretionary ROWs, exclusion areas will include (Map R-22):

Range Creek SRMA

Big Flat Tops ACEC

Bowknot Bend ACEC

Rock Art ACEC

San Rafael Reef ACEC

Heritage Sites ACEC

LAR-32
Any wind energy exploration and development will be subject to a site-specific NEPA analysis. Wind energy development is granted under a ROW. The BLM will consider proposals for ROWs for wind energy exploration and development on a case-by-case basis.

LAR-33
The BLM will encourage wind energy development in areas where impacts on vegetation coverage and other resources will be minimized.

LAR-34
The BLM will not permit wind energy development in NSO areas or areas unavailable to leasing for oil and gas, VRM Class I and II areas, and migratory bird breeding habitat and raptor nesting complexes.

Habitat Restoration/Vegetation Management

- Sustain the integrity of the sagebrush habitats within the planning area to provide the quantity, continuity, and quality of habitat necessary to maintain sustainable populations of Greater sage-grouse and other sagebrush obligate species.
- Restore, sustain, or enhance the health of ecosystems through the implementation of the *Standards for Rangeland Health* and *Guidelines for Grazing Management*.
- Identify the amount (and location, where possible) of sagebrush habitat that should undergo restoration and/or rehabilitation throughout the life of the plan, and initiate restoration and/or rehabilitation.

VEG-1
Allow vegetation manipulation with restrictions to achieve the desired vegetation condition. Treat areas determined to need vegetation reestablishment using methods such as introductions, transplants, augmentation, reestablishments, and restocking with attention to diversity and habitat. These areas will be treated with a variety of plant species that are desirable for wildlife habitat, livestock, watershed management, and other resource values while maintaining vegetation species diversity (Map R- 4).

VEG-2
Design sagebrush treatment projects (including fire and fuels vegetation treatments) conducted in Greater sage-grouse occupied or historic habitat to meet prescriptions necessary for the seasonal use habitat requirements (i.e., winter, nesting/brood-rearing). Prescriptions will follow the Connelly guidelines (Connelly et al. 2000) or will be adjusted or modified by the BLM and Utah Division of Wildlife Resources (UDWR), with local Greater sage-grouse working group and

Utah Partners for Conservation and Development input, for projects occurring in occupied or historic habitat.

VEG-3
Use the Utah Partners for Conservation and Development, local Greater sage-grouse working groups, and other interested governmental and non-governmental organizations to identify

sagebrush habitat locations and amounts that should undergo restoration and/or rehabilitation. Initiate restoration and/or rehabilitation of sagebrush habitat locations by (1) maintaining large patches and reconnecting sagebrush habitats with emphasis on those patches occupied by stronghold and isolated populations of Greater sage-grouse; and (2) enlarging the size of sagebrush patches with emphasis on areas occupied by Greater sage-grouse and/or other sagebrush dependent species.

VEG-5

In areas where multiple resources are potentially affected by surface disturbance (e.g., crucial wildlife habitat, livestock pastures, threatened and endangered [T&E] and special status species habitat, and occupied wild horse and burro range), coordinate implementation of any offsite mitigation with other affected agencies and the overlapping resource values. This strategy will enable identification of a suitable mitigation method and location to best accomplish the objective of offsetting the impacts and to ensure that benefits of the mitigation are distributed among all users and resources affected. The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed onsite, and on a voluntary basis where it is performed offsite, or, in accordance with current guidance.

VEG-7

Mitigate impacts on vegetation on the public lands from disturbance activities. Implement short and/or long-term actions or projects to replace or enhance resources that will be impacted. Priority will be given to mitigation measures that benefit multiple resource issues within the immediate area of the impacts (within the livestock allotment, occupied wild horse and burro range or habitat for wildlife, T&E or special status species).

VEG-11

Vegetation manipulations (i.e., mechanical, biological, manual, prescribed fire, or chemical) will be prescribed on a case-by-case basis to achieve and/or maintain *Standards for Rangeland Health.*

VEG-13

Sagebrush communities will be managed and maintained for natural composition and age class distribution in a manner that accommodates key habitat condition for listed T&E or special status species or within sagebrush community areas determined on a case by case basis.

VEG-16

Commercial and noncommercial collection of vegetation products (e.g., seed and live plant) will be allowed by permit. Collection will be limited to areas and species determined on a case-by case basis and evaluated on a rangeland health basis as needed.

Fire and Fuels Management

The Best Management Practices provided at part of WO IM 2011-138 would be applied as best management practices to fuels and fire management action as a matter of compliance to BLM policy.

Fire-1

Minimize wildfire size and frequency in sagebrush communities where Greater sage-grouse habitat objectives will not be met if fire occurs.

Fire-2
To reduce risks and restore ecosystems through fuels management, allow the following fuels management tools throughout the planning area unless otherwise restricted: wildland fire use; prescribed fire; and mechanical, chemical, seeding, and biological actions.

Minerals

MLO-2
In addition to the 328,600 acres currently withdrawn, 92,700 acres will be recommended for withdrawal from locatable mineral entry (Map R-20). See Lands and Realty - Withdrawal Areas.

MLE-9
Oil and gas leasing management will be conducted shown on Map R-25.

Areas open to leasing subject to the standard terms and conditions of the lease form (1,161,000 acres)

Areas open to leasing subject to moderate constraints (timing limitations; CSU, and lease notices) (467,000 acres)

Areas open to leasing subject to major constraints (NSO) (282,000 acres)

Areas unavailable to leasing (569,000 acres)

MLE-12
Geophysical operations will be allowed consistent with existing regulations for geophysical exploration, except in the five non-WSA lands with wilderness characteristics managed in this alternative, which will be closed to activities related to geophysical operations.

MSA-1
Areas that will be closed for mineral materials disposal are indicated on Map R-27 (820,000 acres).

Comprehensive Travel and Transportation Management

TRV-3
Allow for reasonable access to non-BLM-managed lands within the PFO

Recreation and Visitor Services

REC-68
The Price Field Office ERMA (1,362,760 acres) will be managed as identified below and as further described in Appendix R-9.

REC-69
Signs, trails, and facilities will be used to facilitate use and enjoyment of the ERMA.

REC-72
The BLM will issue SRP as a discretionary action subject to NEPA analysis (Appendix R-10).

Additionally, commercial SRPs will also be issued to provide a fair return for the commercial use of public lands.

REC-73
SRPs will be issued according to established evaluation factors described in Appendix R-10. The factors identified will primarily examine the sensitivity of the proposed site and the nature of the proposed use.

OHV-5
OHV recreation will be managed according to the following open, closed, and limited to designated route categories (Map R-17):

0 acres open

557,000 acres closed

1,922,000 acres limited to designated routes

Livestock Grazing

GRA-3
Base changes in levels of use or continuance of permitted use on current laws, policy, and monitoring data, and analysis in accordance with NEPA. The analysis process will consider LUP program decision objectives and priorities in relation to livestock grazing and achievement of *Standards for Rangeland Health* on a case-by-case basis.

GRA-4
Provide for the development and maintenance of range improvement projects and livestock facilities on a case-by-case basis. Construct range improvement projects to BLM specifications. Document access routes for the range improvements in the individual project files

GRA-6
Continue livestock forage allocations as noted in Appendix R-8.

GRA-7
Authorize livestock (cattle and/or horses) grazing within this area on a prescription basis. Grazing will be used as a management tool for the benefit of resource values—watershed, riparian, fisheries, and wildlife. Grazing will also be used to reduce the potential risk of wildland fires because of accumulation of vegetation fine fuel loads.

GRA-12
Increases or decreases in available forage will be adjusted among livestock, wild horses and burros, and wildlife as determined on a case-by-case basis.

GRA-13
Lands acquired after adoption of this plan will be managed consistent with the purposes for which it was acquired or historic use.

Wild Horses and Burros
The AML will be periodically evaluated and subject to adjustment in HMA plans and Environmental Assessments for gathers based on monitoring data and best science methods.

WHB-8
Range Creek HMA; 55,000 acres; 75–125 (horses)

WHB-12
3,000 animal unit months (AUMs) will be allocated for wild horses, and 420 AUMs will be allocated for wild burros.

WHB-13
Increase or decrease in available forage will be adjusted on a case-by-case basis to support Standards for Rangeland Health.

Wildlife

WL-5
Continue existing Habitat Management Plans (HMP). Allow or participate in research of all wildlife species and their habitats.

WL-10
Emphasize the use of mechanical, chemical, and biological methods, as well as fire and livestock grazing, to achieve the desired plant community for fish and wildlife habitats.

WL-11
Maintain sustainable forage levels for livestock and wildlife.

WL-14
Big game winter range will be managed to maximize browse production, using kind of livestock and season of use.

WL-15
Current livestock grazing prescriptions will continue, and where opportunities exist, will be adjusted to enhance forb production on pronghorn ranges

WL-18
Increase or decrease in available forage will be adjusted on a case-by-case basis to support rangeland health objectives.

WL-19

If UDWR acquired additional habitat or forage, or if studies indicated that additional forage was available naturally, the BLM will consider providing forage to support increased population objectives for wildlife.

WL-20

Dates of seasonal closures for surface disturbing activities within all crucial habitats (Map R-8) will be revised and implemented to provide consistency across the entire planning area (Appendix R-3).

WL-22

Land uses within these priority habitats will be managed to promote regeneration, diverse age class distribution, and preservation or restoration of diverse understory to include forbs, grass, and shrub species.

Special Status Species

- Maintain, protect, and enhance habitats (including but not limited to designated critical habitat) and actively promote recovery, maintenance, protection, and enhancement of populations and habitats of BLM, non-listed, special status plant and animal species to ensure that actions authorized, funded, or carried out do not contribute to the need for these species to be listed as T&E under the Endangered Species Act (ESA).

SSS-4

Prohibit surface disturbances that may affect listed species or critical habitat of listed or candidate plants or animals without consultation or conference (ESA, Section 7) between the BLM and USFWS.

SSS-7

Implement the most current *UDWR Strategic Management Plan for Sage-Grouse* (UDWR 2002 and its future revisions), the *BLM National Sage-Grouse Habitat Conservation Strategy* (BLM, 2004), and recommendations from local sage-grouse working groups to protect, maintain, enhance, and restore Greater sage-grouse populations and habitat. All surface disturbing activities will be prohibited within ½ mile of Greater sage-grouse leks on a year-round basis. Oil and gas will be open to leasing subject to major constraints (NSO) (Map R-6). Allow no surface disturbing or otherwise disruptive activities within two miles of a known Greater sage-grouse lek from March 15 to July 15 to protect nesting and brood-rearing habitat. Oil and gas leasing will be open subject to a controlled surface use and timing stipulation. Allow no surface disturbing activities or otherwise disruptive activities within GRSG in winter habitat from December 1 to March 14. Oil and gas leasing will be open to a controlled surface use and timing stipulation. See Appendix R-3 for exceptions, modifications, or waivers.

Fire and Fuels Management

- Manage fire and fuels to protect life, firefighter safety, property, and critical resource values.

- Using Fire Regime Condition Class (FRCC), establish landscape-level fire management initiatives that include a description of areas and the identification of acreages to illustrate where fire suppression actions are warranted; where fire may be restored to the ecosystem through wildland fire use for resource benefit; and where treatments may be used involving prescribed fire and non-fire fuel reduction, maintenance and/or rehabilitation.

Fire-1
Minimize wildfire size and frequency in sagebrush communities where Greater sage-grouse habitat objectives will not be met if fire occurs.

Fire-2
To reduce risks and restore ecosystems through fuels management, allow the following fuels management tools throughout the planning area unless otherwise restricted: wildland fire use; prescribed fire; and mechanical, chemical, seeding, and biological actions.

Fire-3
As conditions allow, employ the least intrusive fire suppression method over more intrusive methods. For example, wildland fire use is the preferred method of treatment. Where conditions are not appropriate for wildland fire use, prescribed burning will be the preferred method. Where prescribed burning is not feasible, non-fire fuel treatments will become the preferred method of treatment.

Fire-5
Use fuel management strategies (e.g., prescribed fire, mechanical, chemical, biological, hand treatments, and wildland fire) to meet desired future conditions.

Fire-6
The general DWFC is to have ecosystems that are at a low risk of losing key ecosystem components following wildfire and that function within their historical ecological range. In terms of FRCC, the DWFC outside the WUI will be to trend to a lower FRCC using the least intrusive method possible. When possible, wildland fire use is the preferred method of treatment to move toward FRCC 1; when conditions do not allow wildland fire use, prescribed fire and then nonfire fuel treatments will be considered. Inside the WUI, the general DWFC is to have less potential for values to be threatened by wildland fire, usually through some modification of fuels.

Fire-10
Specific areas for wildland fire use will be identified in the Moab Fire District FMP. However, wildland fire use could be authorized for all areas except when the following resources and values may be negatively affected and there are no reasonable measures that could be employed to protect such resources and values:

- Areas that are known to be highly susceptible to post-fire invasion by cheatgrass or noxious weeds
- Important terrestrial and aquatic habitats

- Non-fire adapted vegetation communities

Fire-11
The appropriate management response for areas containing these resources or values may be wildland fire use, but measures to protect these values will be necessary to avoid threats to these values. In fire situations where these resources or values will not be affected, wildland fire use might still not be employed because of other conditions, such as weather, personnel availability, or ongoing fire activity.

Fire-13
Unauthorized wildland fire ignitions will be prevented through coordination with partners and affected groups and individuals. The full range of prevention and mitigation activities (e.g., personal contacts, mass media, law enforcement, signing, and defensible space) will be used.

Fire-14
Implementation of fire prevention activities will take priority in the following areas:

- WUI areas
- Major travel corridors Recreation sites
- Public lands as a whole

Fire-18
Implementation of fuels management action will take priority in the following areas:

- WUI areas
- Areas with fuel loading that could potentially result in catastrophic wildfires
- Resource improvement areas

RICHFIELD

Lands and Realty

LAR-1
For any form of land tenure adjustment (including, but not limited to, exchanges, in lieu selections, state grants, desert land entries, R&PP patents, easement acquisitions, etc.), except for FLPMA Section 203 sales, ensure it meets one or more of the following criteria:

- Is in the public interest and accommodates the needs of state, local, or private entities, including needs for the economy, community growth and expansion, and be in accordance with other land use goals, objectives, and planning decisions
- Results in a net gain of important and manageable resource values on public lands such as crucial wildlife habitat, significant cultural sites, high-value recreation areas, high-quality riparian areas, live water, SSS habitat, or areas key to maintenance of productive ecosystems

- Ensures the accessibility of public lands in areas where access is needed and cannot otherwise be obtained;
- Is essential to allow effective management of public lands in areas where consolidation of ownership is necessary to meet resource management objectives
- Is not suitable for management by another federal department or agency
- Results in the acquisition of lands that serve a national priority as identified in national policy directives.

LAR-4

Habitat for listed and candidate T&E species are generally required to be retained in Federal ownership. Consider exceptions in disposal actions with the State of Utah and others with consultation with and concurrence of the USFWS.

LAR-9

Pursue land acquisitions from willing sellers when lands:

- Are within or adjacent to WSAs, ACECs, WSRs, or other special designations
- Are associated with key fisheries or wildlife habitats and riparian zones
- Provide linkage or public access to other public lands
- Have significant paleontological or cultural resources
- Provide high recreation or other significant resource or public values
- Are needed to improve manageability of public lands.

LAR-15

Retain habitat for federally listed and candidate species in federal ownership. Exceptions may be considered in exchanges with the State of Utah and others after consultation with and concurrence with the USFWS.

LAR-16

Make approximately 13,400 acres of public land available for FLPMA Section 203 sales (as listed in Appendix 5 and shown on Maps 17 through 22) subject to NEPA compliance and consistent with other decisions in this RMP.

LAR-29

Consider exceptions in the avoidance areas on a case-by-case basis if the proposed ROW would:

- Not create substantial surface disturbance or would cause only temporary impacts
- Be compatible with the resource values being protected by the goals and objectives of the avoidance areas
- Be consistent with management prescriptions for ACECs and WSRs and pose no irreversible or irretrievable impacts

- Be consistent with the goals and objectives of the identified non-WSA lands with wilderness characteristic`s.

LAR-31
Consider proposals for wind and solar energy development throughout the RFO except within the following areas…

LAR-33
To minimize adverse environmental impacts and the proliferation of separate ROWs, use common ROWs whenever possible, including collocation of new utility transmission lines and other facilities within existing utility and highway corridors.

Habitat Restoration/Vegetation Management

- Manage for a mix of vegetative types, structural stages, and landscape and riparian functions, and provide for native plant, fish, and wildlife (including SSS) habitats.
- Sustain or reestablish the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of the Greater sage-grouse and other sagebrush-dependent wildlife species.

VEG-1
Treat areas determined to need reseeding with a variety of plant species that are desirable for wildlife habitat, livestock, watershed management, and other resource values while maintaining vegetation species diversity.

VEG-2
Where appropriate, require on-site mitigation when surface disturbance cannot be avoided on a site-specific basis. The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed on-site, and on a voluntary basis where it is performed off-site, or, in accordance with current guidance.

VEG-3
Maintain existing vegetative treatments to provide suitable habitats for wildlife and adequate forage for livestock.

VEG-4
Maintain existing vegetation treatments and implement additional treatments (e.g., prescribed fire and wildland fire use, mechanical, biological, manual, and chemical) to achieve or maintain Standards for Rangeland Health and desired vegetation condition. Vegetation treatments (e.g., wildlife habitat treatments, watershed treatments, livestock grazing treatments, fuels treatments, stewardship contracts, etc.) could be conducted on up to 1,472,000 acres over the life of the plan. (An annual average of 73,600 acres would need to receive treatment to reach the total treatment acreage. Actual annual treatment acreage would vary depending on conditions, staffing, etc. These acreage figures include all vegetation and fire fuels treatments.

VEG-5
Allow temporary non-renewable use of targeted grazing to reduce site-specific fuels and/or noxious and invasive weeds (e.g. cheat grass).

VEG-6
The use and perpetuation of native species would be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non- intrusive, non-native plant species may be used where native species:

- Are not available
- Are not economically feasible
- Cannot achieve desired conditions, desired plant communities (DPC), or other ecological objectives as well as non-native species, and/or
- Cannot compete with already established non-native species.
- Non-native forbs and perennial grasses could be used in preference to monocultures of non-native annuals.

Non-Energy Leasable Minerals

MIN-28
- Areas closed to leasing: 447,300 acres
- Areas open to leasing subject to standard conditions of approval: 608,700 acres
- Areas open to leasing subject to CSU and/or timing limitations: 917,500 acres
- Areas open to leasing subject to NSO: 154,500 acres

Locatable Minerals

MIN-31
Continue existing withdrawals (154,700 acres). Recommend withdrawing the following areas from mineral entry:

- Developed recreation sites, including Lonesome Beaver Campground, McMillan Spring Campground, Starr Springs Campground, Dandelion Flat Picnic Area, Hog Springs Picnic Area, Otter Creek Reservoir Recreation Sites, Kingston Canyon Recreation Site, and Koosharem Picnic Area
- North Caineville Mesa ACEC
- Old Woman Front ACEC
- Fremont Gorge Suitable WSR (within one-quarter mile of the high water mark of each bank of the river).

The proposed new withdrawals would encompass 21,500 acres.

Total acres: 176,200

MIN-35
Areas closed to mineral material disposals: 601,800 acres

MIN-36
Areas open to disposal of mineral materials subject to standard conditions of approval: 608,700 acres

MIN-37
Areas open to disposal of mineral materials subject to CSU and/or timing limitations: 917,500 acres

Fluid Minerals

MIN-10
Area closed to leasing: 447,300 acres

MIN-11
Manage fluid mineral leases as shown on Map 23:

- Areas open to leasing with standard lease terms: 608,700 acres
- Areas open to leasing subject to CSU and/or timing limitations: 917,500 acres
- Areas open to leasing subject to NSO: 154,500 acres

Mineral Split Estate

MIN-13
Lease split-estate lands according to BLM RMP stipulations for adjacent or nearby public lands or plans of other surface management agencies, consistent with federal laws, 43 CFR 3101, and the surface owner's rights.

Solid Minerals - Coal

MIN-24
In the Wasatch Plateau coal field, 18,672 acres of National Forest, and in the Emery coal field, 9,624 acres of BLM lands and 3,542 acres of National Forest are acceptable for consideration for leasing by underground mining methods.

Comprehensive Travel and Transportation Management

TRC-7
Open: 9,890 acres

TRC-8
Limited: 1,908,210 acres

TRC-9
Closed: 209,900

SSS-25
Limit OHV use to designated routes and/or seasonal closure of designated routes in all Greater sage-grouse habitats, including: breeding (leks), nesting, brood-rearing, and wintering habitats.

TRC-24
Designate routes to minimize harassment of wildlife or significant disruption of wildlife habitats. Give special attention to protecting SSS and their habitats.

TRC-25
Designate routes to minimize conflicts between OHV use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

Recreation and Visitor Services

REC-31
Continue to issue current SRPs according to site-specific analysis already completed and according to existing permit stipulations. (SRPs are currently in place for commercial uses such as canyoneering, rock climbing, backpacking, hiking, guided hunting, and vehicle tours.)

REC-32
Prior to completing the activity plan, issue additional similar SRPs, subject to the following stipulations:

- Within one-half mile of canyon rims and below the rim, limit group size to 12 or fewer. Allow no commercial or organized group larger than 12 to operate in this area.
- Allow only one commercial group to occupy the same side of the canyon at any one time.
- Review itineraries prior to each operating season.
- Allow no camping within one-half mile of Mexican spotted owl protected activity centers. Require all activities be consistent with the guidelines in the Mexican spotted owl recovery plan.
- Allow no camping within the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater, of any spring or water sources in Desert bighorn sheep use areas during the lambing season (April 15–June 15).
- Stipulate additional requirements, if needed, to protect sensitive species and their critical habitats

Livestock Grazing

Maintain healthy, sustainable rangeland ecosystems and restore degraded rangelands to meet Utah's Standards for Rangeland Health and to provide a wide range of public values, such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.

GRA-7

Handle on a case-by-case basis voluntary relinquishment of grazing permits and preference, in whole or in part, by a permittee in writing to the BLM. The BLM would not recognize as valid, relinquishments that are conditional on specific BLM actions, and BLM would not be bound by them. Relinquished permits and the associated preference would remain available for application by qualified applicants after BLM considers whether such action would meet Rangeland Health Standards and would be compatible with achieving LUP goals and objectives. Prior to re-issuance of the relinquished permit, the terms and conditions may be modified to meet RMP goals and objectives and/or site-specific resource objectives. However, upon relinquishment, BLM may determine through a site-specific evaluation and associated environmental analysis that the public lands involved would be better used for other purposes. Grazing may then be discontinued on the allotment through an amendment to the RMP. Any decision issued concerning discontinuance of livestock grazing would not be permanent and may be reconsidered and changed through future LUP amendments and updates

GRA-8

Permit livestock use on those allotments shown on Map 12 and in Appendix 7.

Acres available for grazing: 1,989,048

Acres unavailable for grazing: 138,952

Available AUMs: 146,202

GRA-12

Consider the following actions if livestock grazing is contributing to declining range conditions:

- Shorten the grazing period
- Temporarily suspend use
- Implement or change grazing system
- Authorize non-use until conditions improve.

GRA-14

Consider changes to permitted use if:

- Change is supported by monitoring data, field observations, ecological site inventory, or other acceptable data.
- Conflicts with other uses are identified.
- There is a change in public land ownership (increase or decrease).

- Protection of other resources is required.
- Changes are required by 43 CFR 4180 (Rangeland Health regulations).

Special Status Species

SSS-6
Maintain the integrity of SSS habitat to provide the quantity, continuity, and quality of habitat necessary to maintain SSS populations.

SSS-7
Conduct habitat improvement treatments for SSS. Future consultation would be needed for biological controls in SSS habitat.

SSS-8
Retain habitat for federally listed and candidate species in federal ownership. Exceptions may be considered in exchanges with the State of Utah and others after consultation with and concurrence from the USFWS.

SSS-9
Consider SSS habitat in all wildfire suppression efforts.

SSS-14
Implement the specific goals and objectives of recovery plans, conservation agreements and strategies, and approved activity-level plans.

SSS-20
Use strategies to avoid or reduce habitat fragmentation when possible, including:

- Co-locating communication and other facilities
- Employing directional drilling for oil and gas
- Closing and reclaiming roads
- Landscape scale evaluations
- Using topographic and vegetative screening to reduce the influence of intrusions.

SSS-21
Mitigate the effects of proposed projects that have the potential to cause long-term or permanent habitat impacts or losses by enhancing, restoring, or creating other habitat within the project's region of influence. Consider protecting the habitat when the habitat type is rare and under severe development pressures. Protection should only be a portion of the mitigation and must contain elements of restoration or enhancement.

SSS-22
Use species-specific buffers and seasonal, temporal, and spatial restrictions to conserve habitat for SSS (Appendix 11 and Appendix 14).

SSS-25
Limit OHV use to designated routes and/or seasonal closure of designated routes in all Greater sage-grouse habitats, including: breeding (leks), nesting, brood-rearing, and wintering habitats.

SSS-26
Implement the most current *UDWR Strategic Management Plan for Sage-Grouse* (UDWR, 2002 and its future revisions), the *BLM National Sage-Grouse Habitat Conservation Strategy* (BLM, 2004), and recommendations from local sage-grouse working groups to protect, maintain, enhance, and restore Greater sage-grouse populations and habitat.

- All surface disturbing activities would be prohibited within ½ mile of Greater sage-grouse leks on a year-round basis. Oil and gas leasing would be open subject to major constraints (NSO).
- Allow no surface disturbing or otherwise disruptive activities within 2 miles of Greater sage-grouse leks from March 15 to July 15 to protect nesting and brood-rearing habitat. Oil and gas leasing would be open subject to a controlled surface use and timing stipulation.
- Allow no surface disturbing or otherwise disruptive activities within Greater sage-grouse winter habitat from December 15 – March 14. Oil and gas leasing would be open subject to a controlled surface use and timing stipulation.

See Appendix 11 for exceptions, modifications, or waivers.

Wildlife
Manage habitat to prevent additional listings of species under the federal ESA, or the State of Utah's Species of Concern List.

WL-6
Coordinate with UDWR to address population dynamics and habitat conditions for major habitat types that support a wide variety of game and non-game species.

WL-7
Use strategies to avoid or reduce habitat fragmentation, such as collocating facilities, employing directional drilling, reclaiming redundant roads, and reclaiming roads no longer serving intended purpose, reducing road densities, and using topographic and vegetative screening to reduce influence of intrusions.

WL-8
The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed onsite, and on a voluntary basis where it is performed off-site, or, in accordance with current guidance.

WL-11
Use prescriptive grazing to favor forage production for big game crucial winter range.

WL-13

Accomplish habitat treatments to meet terrestrial, aquatic, and riparian habitat objectives through the use of prescribed and/or wildland fire, chemical, biological, and mechanical methods.

Fire and Fuels Management

Manage fire and fuels, where appropriate, to restore natural systems to their desired future condition, considering the interrelated social and economic components.

FIRE-4

Implement appropriate management response (AMR) according to General Risk Categories (GRC), as contained in Appendix 6. The GRCs contain criteria for managing dynamic vegetation communities. Wildland fire use would not be appropriate in the following areas:

- Administrative sites
- Developed recreation sites
- Communication sites
- Oil and gas facilities
- Mining facilities
- Above-ground utility corridors
- High-use travel corridors
- Crucial wildlife habitats where fire is unwanted
- GRCA, such as desert scrub communities.

FIRE-6

Adhere to specific fire suppression directions within Potential ACECs for protection of identified relevant and important values from irreparable damage.

FIRE-7

Give specific considerations when implementing suppression activities to SSS habitats and cultural resource sites.

FIRE-8

Manage fire and fuels through treatments conducted on up to 1,472,000 acres over the life of the plan. Use the full range of treatment types (e.g., prescribed and wildland fire use, mechanical, chemical, biological, and cultural treatments). An annual average of 73,600 acres would need to receive treatment to reach the total treatment acreage listed. Actual annual treatment acreage would vary depending on conditions, staffing, etc. These acreage figures include all vegetation and fire fuels treatments.

FIRE-11

Undertake ESR efforts to protect and sustain ecosystems, public health, and safety, and to help communities protect infrastructure.

VERNAL

Special Status Species

WL-5

Reduce habitat fragmentation (see Figure 19a) by requiring oil and gas field development plans and encouraging such activities as well clustering, multiple drilling from a single pad, utilization of existing routes and pipelines, and other measures to minimize surface impacts.

Lands and Realty

LAR-3

The BLM will retain lands within its administrative jurisdiction, except where necessary to accomplish one or more of the following objectives:

- Improve management of natural resources through consolidation of federal, state and private lands.
- Secure key property necessary to protect special status species including threatened and endangered species, promote biological diversity, increase recreational opportunities, and preserve archaeological, paleontological and historical resources.

LAR-6

The following criteria will be used when evaluating proposed land use authorizations:

- Land use authorizations will not be approved in any designated exclusion areas.
- Land use authorizations in avoidance areas may be authorized provided they are considered consistent with the current management objectives; those that are not will either be rejected or will necessitate a plan amendment prior to approval.
- Habitat for listed T&E species will be retained in federal ownership. Exceptions may be considered in exchanges with the State of Utah and others with consultation and concurrence with the USFWS.

LAR-20

Land ownership changes will be considered on lands not specifically identified in the Approved RMP (Figure 6a) for disposal or acquisition if the changes are in accordance with resource management objectives and other RMP decisions, determined to be in the public interest, and will accomplish one or more of the following criteria:

- The changes are determined to be in the public interest. The public will benefit from land resources coming into public ownership, while at the same time accommodating the needs of local and state governments, including the needs for public purposes, community growth and the economy.
- The changes result in a gain of important manageable resources on public lands such as crucial wildlife habitat, significant cultural sites, mineral resources, water sources, listed species by habitat, or areas key to productive ecosystems.

- The changes ensure public access to lands in areas where access is needed and cannot otherwise be obtained.
- The changes will promote more effective management and meet essential resource objectives through land ownership consolidation.
- The changes result in acquisition of lands that serve regional or national priorities identified in applicable policy directives or legislation.

LAR-22
Non-federal lands located within sensitive areas will be acquired through donation, purchase, or land exchange. Land acquisitions will be negotiated from willing landowners.

LAR-23
Acquire fee title or interest in non-federal lands with priority placed on lands with critical resource values (e.g., water rights, scenic easements, Greater sage-grouse leks).

LAR-40
This Approved RMP is consistent with existing right-of-way (ROW) corridors, including the Western Utility Group (WUG) updates to the Western Regional Corridor Study (Figure 6a), and will designate additional corridors subject to physical barriers, and sensitive resource values. Sensitive resource values include, but are not limited to:

- ACECs
- Areas possessing high scenic quality
- Cultural and paleontological resources
- Riparian areas
- Sensitive soils
- Threatened and endangered species habitat

LAR-48
The following areas are recommended for locatable mineral withdrawal:

- Book Cliffs Mountain Browse Instant Study Area (400 acres)
- Green River Scenic Corridor in Browns Park (8,208 acres)
- Lears Canyon relict vegetation areas (1,375 acres)
- White River non-WSA lands with wilderness characteristics (6,720 acres)
- White River SRMA (2,831 acres)
- Developed and potential recreation sites (5,000 acres)

Habitat Restoration/Vegetation Management

- Provide, maintain, enhance, and protect habitats for a diversity of fish and wildlife species within the VPA.

- Maintain, restore, enhance, and protect crucial habitats for all fish and wildlife species and restore degraded habitats. Manage for unfragmented blocks of continuous habitat that will provide the life cycle requirements of a variety of wildlife species.
- Identify species and habitats most in need of conservation.
- Ensure that management of native and naturalized plant species enhances, restores, and does not reduce the biological and genetic diversity of natural ecosystems.
- Protect special status plant species and their habitats.

VEG-4

Manage the vegetation to attain the ecological stage that will benefit wildlife in crucial habitat and livestock grazing. Manage vegetation in remaining areas that results in high vegetation species diversity.

VEG-9

Manage the vegetation to attain the ecological stage that will:

- Ensure sustainability
- Meet authorized use allocations (livestock, wildlife).
- Ensure species diversity

VEG-13

Restore or rehabilitate up to 200,000 acres of sagebrush-steppe habitat over the life of the plan. Such vegetation treatment plans will consider the Western Association of Fish and Wildlife Agencies (WAFWA) Guidelines for Management of Sage-grouse Populations and Habitats and State and Local Conservation Plans.

Forage

- Restore, maintain, and/or improve rangeland conditions and productivity to maintain, meet or make substantial progress towards meeting *BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management* while meeting forage obligations in grazing permits and grazing preference decisions, as well as wildlife habitat.

RNI-2

Part or all of the following measures will be implemented to meet resource objectives for habitat enhancement:

- Fencing (69 Miles)
- Vegetation Treatment (34,640 Acres)
- Water Developments:
- 812 Guzzlers/Reservoirs
- Pipeline (38 Miles)

- 51 Wells/Springs

Fire and Fuels Management

- The primary goal and objective of fire management is to help restore natural systems to their proper functioning condition by restoring fire to its legitimate role in the ecosystem, including managing wildland fire for other resource benefits.

The Best Management Practices provided at part of WO IM 2011-138 would be applied to fuels and fire management action as a matter of compliance to BLM policy.

FIRE-3

Following any wildland fire event, the BLM will select an Interdisciplinary Emergency Stabilization and Restoration (ES&R) team that will evaluate any burned areas to determine if ES&R treatments are needed. ES&R treatments will follow the procedures outlined in the BLM Burned Area Emergency Stabilization and Rehabilitation Handbook (H-1742-1) (dated 02/12/2007). If the interdisciplinary team determines that ES&R treatments are necessary, the team will develop an ES&R plan with site-specific measures designed to minimize resource losses, both on-and off-site, following the wildfire. Consideration will be given to sensitive resource values in preparation of the ES&R plan, including WSAs, special emphasis areas, critical soils, cultural resources, and special status species habitat. ES&R treatments may include, but will not be limited to seeding, seedbed preparation practices, fencing, chemical applications, water retention structures, and control of livestock, and wildlife grazing. Site-specific ES&R plans will be tiered to the existing Normal Fire Year Rehabilitation Plan for the VPA. Criteria for developing ES&R actions are determined by:

- Areas where the risk of imminent soil loss is high
- Areas that contain T&E Species or state sensitive species habitat
- Areas that contain municipal watersheds; and areas where there is a high potential for invasive species establishment

FIRE-5

Criteria for developing hazardous fuel reduction priorities will consist of the following:

- Areas of Fire Regime Condition Class 2 and 3
- Areas where the potential risk of losing keystone ecosystem species is present
- Areas where threats to private/public property exist

FIRE-9

The VPA is divided into fire management categories. Fire suppression activities and the Appropriate Management Response (AMR) will be implemented through the guidance developed under the ABCD polygons as outlined in BLM Land-Use Planning Handbook (H-1601-1). Criteria used in development of the categories were determined through an Interdisciplinary Team of resource specialists. Criteria for each category are described below:

- Category A – Areas where unplanned fire is not desired at all. This category includes the salt desert shrub vegetation type where the risk of cheatgrass invasion is high following fire events. Also included are the major river corridors where fire results in the loss of Fremont cottonwood, a keystone species in present decline. Other constraints to fire management activities include cultural resource sites, high recreational use, and highly developed oil and gas fields.
- Category B – Areas where unplanned fire is not desired because of current conditions. Prescribed fire use is allowed to obtain resource management objectives; mechanical/chemical treatments will be utilized where social and/or resource constraints preclude the use of prescribed fire. This category includes the five identified WUI areas for the VFO, including adjacent urban interfaces, cultural resources, crucial deer winter range, and crucial Greater sage-grouse habitat. Within this habitat, Wyoming sagebrush is identified as a keystone species, which has been in a continual state of decline due to widespread drought and invasive species encroachment.
- Category C – Areas where wildland fire is desired. Prescribed fire is allowed and may be extensive to obtain resource management objectives; mechanical/chemical treatments will be utilized where social and/or resource constraints preclude the use of prescribed fire. This category contains the pinyon-juniper vegetation type, along with aspen/Douglas fir, mountain browse, and non-crucial areas of sagebrush. Other constraints to fire management activities include a limited amount of oil and gas development, non-crucial Greater sage-grouse habitat, a limited amount of T&E species habitat, and a limited amount of cultural resources.
- Category D – Areas where wildland fire is desired, and there are few or no constraints for its use. This category contains non-crucial Greater sage-grouse habitat, a limited amount of T&E species habitat, non-WSA lands with wilderness characteristics, and a limited amount of cultural resources.

Fluid Minerals

MIN-2

Mineral and energy resource exploration and development surface-disturbing activities will be allowed in the VPA unless precluded by other program prescriptions. The stipulations identified for surface-disturbing activities in Appendix K will generally apply to these activities.

MIN-7

Mitigation of oil and gas impacts developed under the Approved RMP and applied to leases issued after the date of this RMP in the form of stipulations will adhere to the BLM's standard format. Stipulations necessary to protect the resource will contain provisions/criteria to allow for the waiver, exception, or modification of the stipulation if warranted.

MIN-8

The Approved RMP will provide for a variety of oil and gas operations and geophysical explorations. These activities will be allowed in the VPA unless precluded by other program

prescriptions. The stipulations identified for surface-disturbing activities in Appendix K will generally apply to these activities.

MIN-10
Approximately 750,131 acres will be open to leasing subject to the terms and conditions of the standard lease form.

MIN-11
Approximately 890,280 acres will be open to leasing subject to moderate constraints, such as TLs and CSU.

MIN-12
Approximately 86,789 acres will be open to leasing subject to major constraints such as No Surface Occupancy (NSO) stipulations.

MIN-13
Approximately 190,434 acres will be administratively unavailable for leasing.

Appendix K
Surface Stipulations Applicable to All Surface-Disturbing Activities

No surface-disturbing activities within ¼ mile of active sage-grouse leks year round.

Exception: None

Modification: None

Waiver: None

Leasable Minerals

MLE-1
36,846 acres along 172 miles of Gilsonite veins will be available for prospecting, leasing, and

development of Gilsonite (additional veins located through field study or prospecting not shown on Figure 9a will also be available if such are within "open" category lands).

MLE-2
76,208 acres will be open to phosphate prospecting, leasing, and development with standard and special stipulations within the phosphate occurrence areas.

Locatable Minerals

MLO-1
Operations on lands open to mineral entry (as well as on claim locations that pre-date withdrawal) must be conducted in compliance with the 43 CFR 3809 and 3715 regulations. The three level of operations under these regulations include casual use, notice and, plan of operation. A plan will have to be filed for operations usually conducted under notice in:

- Areas in the National Wild and Scenic Rivers System and areas designated for potential addition to the system
- Designated ACECs
- Areas designated as part of the National Wilderness Preservation System and administered by the BLM
- Areas designated as "closed" to OHV use as defined in 43 CFR 8340-5
- Any lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated crucial habitat
- National Monuments and National Conservation Areas administered by the BLM; see 43 CFR 3809.11(c)
- A plan must be submitted for any bulk sampling of 1,000 tons or more of presumed ore for testing; see 43 CFR 3809.11(b)

Saleable Minerals

MSA-3

389,788 acres will be available for mineral material disposal with standard and special stipulations.

Comprehensive Travel and Transportation Management

TRC-1

In collaboration with interested parties, the BLM will make future route adjustments based on access needs, recreational opportunities, and natural resource constraints. These adjustments will occur only in areas with open and/or limited route designations and will be analyzed at the activity planning level.

TRC-4

The BLM will impose limitations on types of vehicles allowed on specific designated routes if monitoring indicates that a particular type of vehicle is causing disturbance to the soil, wildlife habitat, cultural or vegetative resources, especially by off-road travel in an area that is limited to designated routes.

TRC-13

OHV travel will be limited to designated routes or closed except for managed open areas as follows:

- Acres that will be open to OHV travel: 6,202
- Acres that will be limited to OHV travel: 1,640,725
- Acres that will be closed to OHV travel: 75,845

Livestock Grazing

- Achieve appropriate utilization of the range by livestock and wildlife through management prescriptions and administrative adjustments.
- Maintain, restore, improve, protect, and expand riparian-wetland areas so they are in Proper Functioning Condition (PFC) and meet BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management for their productivity, biological diversity, and sustainability, and achieve an advanced (late-climax seral stage) ecological status, except where resource management will require an earlier ecological status for such purposes as vegetation diversity.
- PFC is the minimum acceptable riparian goal. However, PFC may not provide the streamside and aquatic conditions to meet goals for other resources. These include, but are not limited to, fisheries habitat, migratory bird habitat, unique recreational values, and/or forage. Specific objectives and management actions such as those stated below will be implemented in order to meet riparian goals.
- Site-specific plans, where appropriate, will be prepared in collaboration with affected livestock operators, the UDWR, the Central Utah Water Conservancy Districts, and other interested parties, agencies, or organizations to identify desired plant communities, establish specific management objectives, and recommend practices to be employed to achieve desired results.
- Monitoring and evaluation strategies will be implemented to measure progress in accordance with BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management.
- Certain situations may occur that will allow the BLM to modify specific grazing objectives set forth in this plan.

GRA-1

Requests from permittees to convert class of livestock will be handled as follows:

- On crucial deer winter ranges, cattle are preferred.
- In areas where fencing will be required, conversion will be contingent upon signed fence agreement and fences will be in place prior to issuance of permit to graze. The applicant(s) requesting the conversion will be responsible to fund the fencing and cattle guards/gates and to construct and maintain fences. (Consistent with Vernal District Grazing Advisory Board and Vernal BLM joint Rangeland Improvement (RI) Policy dated 12/08/1992).
- In areas where grazing will be along paved routes, evaluate and determine the need for fencing. Applicants will be required to fence the road if it is determined necessary to protect human and livestock health and safety.
- Areas with riverine/lotic systems may require additional management actions such as, but not limited to, fencing of streams.

GRA-2
As opportunities arise, such as voluntary relinquishment, consider changes to livestock use to assure management objectives are met.

GRA-4
Identify criteria for acceptable levels of livestock grazing use along river bottoms (see Riparian Resources decision).

GRA-5
If grazing is causing resource degradation, to the extent that BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management are not being met and progress is not being made, monitoring data show that livestock grazing is the most significant factor, and all other options have been exhausted, close those riparian areas that do not satisfactorily respond to changes in management.

GRA-7
Voluntary relinquishments of grazing permits and preference, in whole or in part, by a permittee in writing to the BLM will be handled on a case-by-case basis. The BLM will not recognize as valid, relinquishments which are conditional on specific BLM actions and the BLM will not be bound by them. Relinquished permits and the associated preference will remain available for application by qualified applicants after the BLM considers if such action will meet *BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management* and is compatible with achieving LUP goals and objectives. Prior to re-issuance of the relinquished permit, the terms and conditions may be modified to meet LUP goals and objectives and/or site-specific resource objectives.

GRA-8
However, upon relinquishment, the BLM may determine through a site-specific evaluation and associated NEPA analysis, that the public lands involved are better used for other purposes.

Grazing may then be discontinued on the allotment through an amendment to the existing LUP or a new LUP effort. Any decision issued concerning discontinuance of livestock grazing is not permanent and may be reconsidered and changed through future LUP amendments and updates.

GRA-9
Prior to approving changes in permitted seasons of use, the following will be mandatory:

- Compliance with the standards for range management (see *BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management*)
- Preparation, signature, and implementation of a monitoring plan
- Signature of permittee accepting the grazing management practices determined necessary by the Authorized Officer to approve the change
- Agreement by permittee to management practices that provide for the physiological requirements of desired plants

GRA-10
Requests from a permittee to change seasons of use will be a priority if all of the following criteria were met:

- Changes enhance or meet resource objectives contained in the Vernal RMP
- Allotment(s) are scheduled for assessment the same year a request is made
- Funding for the assessment is voluntarily provided by sources other than the BLM

GRA-11
Develop management plans and/or grazing agreements for livestock allotments to allow flexibility in grazing management which may include consolidation of allotments, change in seasons of use, and reduction and/or consolidation of grazing allotments and pastures (Figure 7a).

GRA-13
Livestock grazing will be allowed under the discretion of the VFO in Area 1.

GRA-14
Livestock grazing will be allowed from 6/1 through 10/31 or 5/1 with a deferment in Area 2.

GRA-15
Livestock grazing will be allowed from 5/1 through 12/31 in Area 3.

GRA-16
Livestock grazing will be allowed from 5/1 through 6/1 in Area 4.

GRA-17
Livestock grazing will be allowed from 5/1 through 6/1 and 10/1 through 2/28 in Area 5.

GRA-18
Livestock grazing will be allowed from 10/1 through 4/1 or 5/1 with a deferment in Area 6.

GRA-19
Livestock grazing will be allowed from 4/1 through 5/31 and/or 9/1 through 10/31 in Area 7.

Forage

- Maintain or improve the total forage resource using techniques that are compatible with the use and development of other resources and that will maintain, meet, or make substantial progress towards meeting BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management.

FOR-1
Monitoring will be used in all localities to determine the amount of forage available for livestock, wildlife, and wild horses until the wild horses are gathered and removed. Results of monitoring will be used to adapt management strategies to prevent deterioration of rangelands, to achieve desired resource conditions, and to meet other resource objectives.

FOR-3

Increases or reductions for all localities associated with joint monitoring of base allocations will be evaluated against the established grazing permits and UDWR herd unit objectives to determine needed adjustments to animal numbers, adjustments in seasons of use, etc. Unless specified elsewhere in the plan, changes in forage allocation will be as follows:

- When all other management options have been exhausted and it is determined that BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management are not being met, reductions will be made to the species of grazing animal shown to be causing the problem.
- Increases in available forage resulting from conservation practices, improved range condition, or development of improvements by the livestock permittee, DWR, or other organizations, will be credited to that entity unless specified elsewhere in the plan.

FOR-5

AUMs will be adjusted downward for livestock, wildlife, or wild horses (or any combination thereof) in all localities when monitoring shows that rangeland objectives are not being met and that the long-term forage availability is not adequate to support the permitted uses.

FOR-6

If it is determined through monitoring that livestock grazing in all localities is beneficial to other resource values, it will be allowed on 16 miles of river corridor along the Upper Green River in Browns Park following an adequate evaluation and assessment. If such use is allowed, it will be of short duration and will not detract from recreation and/or riparian values along the river.

FOR-9

Up to 50% utilization of forage on uplands for all localities will be allowed, unless otherwise specified by a management plan.

FOR-10

AUMs will be allocated for all localities as follows:

- 138,402 AUMs for livestock
- 104,865 AUMs for wildlife
- 2,340 AUMs for wild horses

FOR-12

If additional forage allocation is available, forage increases will be divided proportionately in the Bonanza locality between livestock and big game. Wildlife AUMs that are made available will go to pronghorn and deer.

FOR-14

If forage allocation reductions are needed to progress toward rangeland health, sheep and/or cattle and pronghorn allocations in the Bonanza Herd Area will be reduced proportionately. Pronghorn use will not be reduced below 239 AUMs.

FOR-15
In the Bonanza locality if additional forage allocation is available, forage increases will be divided proportionately between sheep and wildlife. Wildlife AUMs that are made available will go to pronghorn and deer.

FOR-16
1,325 unallocated AUMs in the Book Cliffs locality that were acquired by acquisition of private lands (Cripple Cowboy) will be reserved for watershed. Although wildlife and livestock will not be excluded from utilizing these lands in the Book Cliffs locality, no additional AUMs will be allocated to wildlife or livestock.

FOR-19
If monitoring shows that reductions are necessary because of wildlife and livestock conflicts, reductions in grazing use will be divided proportionately between livestock and big game in the Book Cliffs locality.

FOR-20
In the Book Cliffs locality outside of the Winter Ridge Herd Area and Hill Creek Herd Management Area, additional forage in cattle allotments will be allocated as follows:

- 60% of the additional forage will be allocated to reinstate suspended cattle AUMs and 40% of the additional forage will be allocated for wildlife.
- After restoring all suspended AUMs, additional forage will be allocated proportionately between livestock and wildlife.

FOR-21
In the Book Cliffs locality outside of the Winter Ridge Herd Area and Hill Creek Herd Management Area, additional forage in sheep allotments will be divided proportionately between sheep and big game.

FOR-22
In the Winter Ridge Herd Area and Hill Creek Herd Management Area, additional forage will be divided proportionately between livestock and big game. If big game does not need additional forage, it will be given to livestock.

FOR-23
If monitoring indicates forage assignments cannot be met, then livestock permitted use and wildlife use will be reduced proportionately in the Blue Mountain locality. The first year livestock reductions will be made with an initial 10% adjustment. Five-year agreements will be developed and signed outlining the process for phased reductions to the desired level.

FOR-24
If in the Blue Mountain locality, additional AUMs are realized through management changes and/or livestock-oriented vegetation treatments will be divided proportionately between livestock and big game.

FOR-25
If monitoring indicates forage assignments cannot be met, then livestock and wildlife use will be reduced proportionately in the Diamond Mountain locality. The first year livestock reductions will be made with an initial 10% adjustment. Five-year agreements will be developed and signed outlining the process for phased reductions to the desired level.

FOR-26
In the Diamond Mountain locality, additional AUMs will be provided as follows:

- In the northern half of the Diamond Mountain locality (Diamond Mountain and Browns Park), additional AUMs will be provided to livestock until wildlife demands require them.
- In the southern half of the Diamond Mountain locality (Ashley Valley and Myton Bench), forage increases will be divided proportionately between livestock and big game on non-crucial wildlife areas.

Wildlife

WL-1
The BLM will consider habitat banking (i.e., off-site mitigation) as a method to compensate for habitat loss due to surface-disturbing activities.

WL-5
Reduce habitat fragmentation (see Figure 19a) by requiring oil and gas field development plans and encouraging such activities as well clustering, multiple drilling from a single pad, utilization of existing routes and pipelines, and other measures to minimize surface impacts.

WL-8
The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed on-site, and on a voluntary basis where it is performed off-site, or, in accordance with current guidance.

WL-12
Existing Habitat Management Plans (e.g., Browns Park [1987], Myton [1979], and Diamond Mountain-Ashley Creek [1983]) will continue to be implemented and revised, and new ones will be developed as necessary.

WL-14
Encourage coordination with oil and gas companies to inform the BLM and USFWS of plans for workovers in order to protect species from disturbances during critical time periods.

WL-16
Modify existing fences on public lands where wildlife are adversely affected. Work with other surface management agencies or surface owners toward modifying wildlife-restricting fences that border public lands to improve natural movement of wildlife.

WL-29
Acquire and protect crucial wildlife habitat through sale or exchange.

Appendix H
Table 14. Mineral Development Land Categorization Proposed In Greater Sage-Grouse Wintering Habitat

Oil and Gas

- Standard Stipulations - 98,067 acres (41%)
- Timing and Controlled Surface Use - 98,679 acres (42%)
- No Surface Occupancy - 4,832 acres (2%)
- No Leasing - 35,095 acres (15%)

Other Minerals (Open)-

- Mineral Material-71,668 acres (87%)
- Phosphate-16,100 acres (64%)
- Gilsonite-148 acres (100%)

Appendix H
Table 15. Mineral Development Land Categorization Proposed In Greater Sage-grouse Brooding Habitat

Oil and Gas Development

- Standard Stipulation-288,942 acres (36%)
- Timing and Controlled Surface Use-412,653 acres (51%)
- No Surface Occupancy-21,092 acres (3%)
- No Leasing-91,085 acres (11%)

Other Minerals
(Open)-NA

- Mineral Material-183,838 acres (88%)
- Phosphate-50,184 acres (81%)
- Gilsonite-456 acres (100%)

Recreation and Visitor Services

REC-5
Special Recreation Permits (SRPs) will continue to be considered on a case-by-case basis. All proposed applications for permits will be evaluated to determine compliance with the goals and objectives of this plan.

Special Status Species

- Conserve and protect special status species and enhance their habitats.
- Conserve and recover all state special status species, including federally listed species and the ecosystems on which they depend.
- Implement the management recovery measures necessary to increase populations of special status species, including federally listed animal species, and restore them to their historic ranges by enhancing, protecting, and restoring known and potential habitat and the ecosystems on which they depend.
- Mitigate or reduce long-term habitat fragmentation through avoidance and site-specific reclamation to return areas to productive levels.
- Manage all listed T&E plant and animal species and the habitats upon which they depend in such a manner as to conserve and recover these species to the point where protection under the ESA is no longer necessary.
- Manage non-listed sensitive species and the habitats upon which they depend in such a manner as to preclude the need to list them as either threatened or endangered under the Endangered Species Act. The guidance for this management is put forth in the BLM 6840 Manual.
- Implement the specific goals and objectives of recovery plans, conservation agreements and strategies, and approved activity level plans. The BLM will continue to work with USFWS and others to ensure that plans and agreements are updated as necessary to reflect the latest scientific data.
- Implement the direction contained in the Northwest National Fire Plan Project Design and Consultation Process and the Counterpart Regulations, including Alternative Consultation Agreements.
- Implement the management necessary to increase populations of special status species, including federally listed animal species, and restore them to their historic ranges by enhancing, protecting, and restoring known and potential habitat.

SSS-7

As additional data are collected over the life of the RMP, land managers will continually reevaluate population and habitat status. Management emphasis will be to accumulate ecological information and distributional data to enhance the BLM's ability to protect, conserve, recover, and manage these species in the future.

SSS-8

The BLM will work with UDWR and other partners to implement conservation actions identified in the State Wildlife Action Plan (Comprehensive Wildlife Conservation Strategy) (UDWR, 2005), which identified priority wildlife species and habitats, assessed threats to their survival, and identified long-term conservation action needs (per WO IM 2006-114).

SSS-10

Conservation measures developed during the consultation on existing LUPs (June 2007) will be implemented as part of committed mitigation on new oil and gas leases. Appendix L contains lease notices developed from the conservation measures.

SSS-25

No surface-disturbing activities within 0.25 mile of active Greater sage-grouse leks will be allowed year-round. No permanent facilities or structures will be allowed within two miles when possible.

SSS-26

No surface-disturbing activities within two miles of active Greater sage-grouse leks will be allowed from March 1 through June 15.

SSS-27

Within 0.5 mile of known active leks, the best available technology will be used to reduce noise, e.g., installation of multi-cylinder pumps, hospital sound-reducing mufflers, and placement of exhaust systems.

FW-2:

Avoid if possible or limit the size of, wildland fires in important wildlife habitats such as, mule deer winter range, riparian and occupied sage-grouse habitat. Use Resource Advisors to help prioritize resources and develop Wildland Fire Situation Analyses (WFSAs) and Wildland Fire Implementation Analyses (WFSAs) and Wildland Fire Implementation Plans (WFIPs) when important habitats may be impacted. (SUP, WFU)

FW-3:

Minimize wildfire size and frequency in sagebrush communities where sage-grouse habitat objectives will not be met if a fire occurs. Prioritize wildfire suppression in sagebrush habitat with an understory of invasive, annual species. Retain unburned islands and patches of sagebrush unless there are compelling safety, private property and resource protection or control objectives at risk. Minimize burn out operations (to minimize burned acres) in occupied sage-grouse habitats when there are not threats to human life and/or important resources. (SUP)

FW-5:

Use wildland fire to meet wildlife objectives. Evaluate impacts to sage-grouse habitat in areas where wildland fire use for resource benefit may be implemented. (WFU, RX)

FW-9:

Utilize the Emergency Stabilization and Rehabilitation program to apply appropriate post fire treatments within crucial wildlife habitats, including sage-grouse habitats. Minimize seeding with non-native species that may create a continuous perennial grass cover and restrict establishment of native vegetation. Seed mixtures should be designed to re-establish important seasonal habitat components for sage-grouse. Leks should not be re-seeded with plants that change the vegetation heights previously found on the lek. Forbs should be stressed in early and late brood-rearing habitats. In situations of limited funds for emergency stabilization and rehabilitation actions, prioritize rehabilitation of sage-grouse habitats. (ESR)

FW-10:
Seed mixtures should be designed to reestablish important seasonal habitat components for sage-grouse. Leks should not be reseeded with plants that change the vegetation height previously found on the lek. Forbs should be stressed in early and late brood-rearing habitats. In situations of limited funds for emergency stabilization and rehabilitation actions, prioritize rehabilitation of sage-grouse habitats. (ESR)

FW-11:
Vegetation treatments would consider the Western Association of Fish and Wildlife Agencies Guidelines for Management of Sage-grouse Populations and Habitats and State and Local Conservation Plans. This is in accordance with the Memorandum of Understanding among the Western Association of Fish and Wildlife Agencies, Forest Service, Bureau of Land Management, and U.S. Fish and Wildlife Service regarding sage-grouse management. (WFU, RX, NF, ESR)

ASHLEY

Fisheries and Aquatic Wildlife
Accomplish non-structural habitat improvements on approximately 500 acres annually.

DIXIE

Lands and Realty

West Wide Energy Corridor(s)
Applicants shall identify important, sensitive, or unique habitats and BLM-special status species, FS-sensitive, and state-listed species in the vicinity of proposed projects and design the project to avoid or mitigate impacts to these habitats and species.

Fluid Minerals

Oil/Gas Amendment: NSO-09
As shown on Figure 3.6-2 in the Final EIS for Oil and Gas Leasing on Lands Administered by the Dixie National Forest, August 2011, within 1 mile of sage-grouse leks (all habitats), and between 1 and 2 miles of sage-grouse leks within sagebrush habitat only. This prohibition includes all surface disturbing activities such as roads, well pads, and other facilities.

Oil/Gas Amendment: CSU-09
No activities would be allowed from May 1 to July 15. Outside these dates, surface disturbance for oil and gas operations is limited to no more than 1 percent of total habitat (1% = 130 acres), including the areas of avoidance due to human activity (i.e., roads and well pads) with radius/buffer to be determined by the Dixie National Forest. Reclaimed oil and gas disturbance which has met reclamation requirements is not included in the disturbed / avoidance area calculation.

Oil/Gas Amendment: NSO-09
Seismic activities, including blasting, would be limited during the lekking period: March 1 – May 15.

FISHLAKE

Lands and Realty

West Wide Energy Corridor(s)
Applicants shall identify important, sensitive, or unique habitats and BLM-special status species, FS-sensitive, and state-listed species in the vicinity of proposed projects and design the project to avoid or mitigate impacts to these habitats and species.

MIN
Within 4 miles of sage-grouse leks delineated and mapped by the Forest Service Protecting breeding and brood-rearing sage-grouse from predation, habitat fragmentation, and disturbance.

Exceptions: An exception may be granted if the Forest Supervisor, in coordination with the Utah Division of Wildlife Resources, determines through analysis that the nature of the actions, as proposed or conditioned, could be fully mitigated. This might occur if topography and/or vegetation are present that would effectively screen the structure or facility from the breeding habitat.

Modifications: None

Waivers: None

MIN
Within sage-grouse brood-rearing habitat delineated and mapped by UDWR, no activities would be allowed during the period May 1 through July 5.

Exception: An exception may be granted if the Forest Supervisor, in coordination with the Utah Division of Wildlife Resources, determines through analysis that the nature of the actions, as proposed or conditioned, could be fully mitigated.

Modification: A modification may be granted if the Forest Supervisor determines through coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate a portion of the lease area affected by this stipulation no longer contains brood-rearing habitat.

Waiver: A waiver may be granted if the Forest Supervisor determines through coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate the entire lease area affected by this stipulation no longer contains brood-rearing habitat.

MIN
Within sage-grouse winter habitat delineated and mapped by UDWR, protect wintering sage-grouse from predation, habitat fragmentation, and disturbance during the critical period from December 1 to March 15.

Exception: An exception may be granted if the Forest Supervisor, in coordination with the Utah Division of Wildlife Resources, determines through analysis that the nature of the actions, as proposed or conditioned, could be fully mitigated.

Modification: A modification may be granted if the Forest Supervisor determines through

consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate a portion of the lease area affected by this stipulation no longer contains winter habitat.

Waiver: A waiver may be granted if the Forest Supervisor determines through coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate the entire lease area affected by this stipulation no longer contains winter habitat.

MANTI LA SAL

Forestwide Direction – Minerals Management Leasables

No surface occupancy stipulations will be used as appropriate in leases, licenses, or permits on sage-grouse leks/nesting/brooding areas.

UINTA

Special Status Species

Objective-2-14 (O-2-14)

By 2018, provide habitat suitable to maintain stable Greater sage-grouse populations in the Vernon and Strawberry Reservoir Management Areas at or above established objectives, and increase depressed populations by 10 percent.

Objective-2-15 (O-2-15)

By 2018, maintain identified Greater sage-grouse nesting habitats in the Vernon and Strawberry Reservoir Management Areas at prescribed conditions in 80 percent of habitats.

Objective-2-16 (O-2-16)

By 2018, improve or restore 1,000 acres of Greater sage-grouse habitat on breeding, brood-rearing, and winter range habitats in the Vernon and Strawberry Reservoir Management Areas not currently meeting prescribed conditions.

Lands and Realty

C&S-1 Guideline

Locate energy transmission, mining, or other large structures and facilities that could be used as perch sites for raptors at least two miles from Greater sage-grouse leks.

C&S-2 Guideline

Avoid building power lines and other tall structures that could become potential perch sites for raptors within two miles of Greater sage-grouse habitats (nesting, brood-rearing, and winter) in the Vernon and Strawberry Reservoir Management Areas. Bury power lines or, if structures must be built or currently exist, modify the structures to prevent raptors from using the structures.

West Wide Energy Corridor(s)

Applicants shall identify important, sensitive, or unique habitats and BLM-special status species, FS-sensitive, and state-listed species in the vicinity of proposed projects and design the project to avoid or mitigate impacts to these habitats and species.

Habitat Restoration/Vegetation Management

Veg-7 Guideline

Manage approximately 80% of potential Greater sage-grouse breeding and winter habitat areas in the Vernon and Strawberry Reservoir Management Areas to support the percentages and heights of canopy cover listed in the table below. Breeding habitat should retain the given height levels of grasses and a diversity of forbs annually through June 1 in the Vernon Management Area and June 15 in the Strawberry Reservoir Management Area. Vegetation should be maintained in a mosaic of openings and shrubs. (Correction #4)

Table 3-4

Vegetation Requirements in the Vernon and Strawberry Reservoir Management Areas

[1] Minimum height is measured as droop height, the highest naturally growing portion of the plant.

[2] Above snow.

N/A There are no minimum percent canopy cover or minimum height requirements for Greater sage-grouse winter habitat in grasses or forbs

Table 3-4: Vegetation Type	Minimum % Canopy Cover	Minimum Height Canopy Cover[1]	
		Vernon Management Area	Strawberry Reservoir Management Area
Greater Sage-grouse Breeding Habitat -- Maintain through June 15 – Strawberry Maintain through June 1 – Vernon -- (Correction #4)			
Sagebrush	15-25%	16-32 inches	16-32 inches
Grasses	≥ 15%	≥ 6 inches	≥ 7 inches
Forbs	≥ 10%	≥ 6 inches	≥ 7 inches
Greater Sage-grouse Winter Habitat			
Sagebrush	10-30%[2]	10-14 inches [2]	10-14 inches [2]
Grasses	N/A	N□A	N/A
Forbs	N/A	N/A	N/A

Fire and Fuels Management

Fire-11 Guideline

All wildfires in Greater sage-grouse breeding habitats in the Vernon and Strawberry Reservoir Management Areas should be suppressed. Prescribed fire and wildland fire use may be allowed in these areas only to maintain or enhance Greater sage-grouse habitat.

Fluid Minerals – Unleased Federal Fluid Mineral Estate

M&E-13: Standard
For all new leasable mineral operations, leasing stipulations will be applied according to Appendix H. (Amendment #4)

NSO – 23: Greater Sage-grouse Brood-Rearing, and Winter Habitats
NO SURFACE OCCUPANCY FOR SAGE-GROUSE HABITAT

For the Purpose Of: Facilitating recovery of the species, and protecting sage-grouse and key habitat for this species (brood-rearing and winter habitat as identified by the Utah Division of Wildlife Resources and as portrayed in the 2003 Uinta National Forest Land and Resource Management Plan). No well sites or production facilities such as tank batteries and compressor stations may be constructed on these lands. Construction of roads, pipelines and other similar facilities must comply with direction in the 2003 Uinta National Forest Land and Resource Management Plan[2], and involve consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources.

Exception: None

Modification: A modification may be granted if the authorizing official determines through consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate a portion of the lease area affected by this stipulation no longer contains brood-rearing or winter habitat.

Waiver: A waiver may be granted if the authorizing official determines through consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate the entire lease area affected by this stipulation no longer contains brood-rearing or winter habitat.

CSU – 17; Sage-grouse Breeding Habitat
CONTROLLED SURFACE USE FOR SAGE-GROUSE (NOISE REDUCTION)

For the Purpose Of: Protecting breeding and brood-rearing sage-grouse from disturbance. Within 5 km (3.1 miles) of known active leks use the best available technology such as installation of multi-cylinder pumps, hospital sound reducing mufflers, and placement of exhaust systems to reduce noise.

Exception: None

Modification: None

Waiver: None

CSU – 18; Sage-grouse Breeding Habitat
CONTROLLED SURFACE USE FOR SAGE-GROUSE (STRUCTURES NEAR LEKS)

For the Purpose Of: Protecting breeding and brood-rearing sage-grouse from predation, habitat fragmentation, and disturbance. No permanent (i.e., lasting more than 1 year) structures or facilities within 4 miles of an active sage-grouse lek in breeding or brood-rearing habitat.

Exception: An exception may be granted if the authorized officer, in consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, determines through analysis that the nature of the actions, as proposed or conditioned, could be fully mitigated. This might occur if topography and/or vegetation is present that would effectively screen the structure or facility from the breeding habitat.

Modification: A modification may be granted if the authorizing official determines through consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate a portion of the lease area affected by this stipulation no longer contains breeding or brood-rearing habitat.

Waiver: A waiver may be granted if the authorizing official determines through consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate the entire lease area affected by this stipulation no longer contains breeding or brood-rearing habitat.

CSU – 19: Sage-grouse Winter Habitat
CONTROLLED SURFACE USE FOR SAGE-GROUSE (STRUCTURES IN WINTER HABITAT)

For the Purpose Of: Protecting wintering sage-grouse from predation, habitat fragmentation, and disturbance. No permanent structures or facilities (i.e., lasting more than 1 year) in winter habitat.

Exception: An exception may be granted if the authorized officer, in consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, determines through analysis that the nature of the actions, as proposed or conditioned, could be fully mitigated.

Modification: A modification may be granted if the authorizing official determines through consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate a portion of the lease area affected by this stipulation no longer contains winter habitat.

Waiver: A waiver may be granted if the authorizing official determines through consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources, that new habitat studies demonstrate the entire lease area affected by this stipulation no longer contains winter habitat.

TL – 12: Sage-grouse Brood-Rearing Habitat
TIMING LIMITATION FOR SAGE-GROUSE BROOD-REARING HABITAT

For the Purpose Of: Protecting sage-grouse during the critical breeding and brood-rearing season by precluding activities which could cause increased stress, displacement, and or

breeding failures during the critical time period (March 1st to June 1st in the Vernon Management Area; March 1st to June 15th in the Strawberry Reservoir and Currant Creek Management Areas).

TL – 13: Sage-grouse Winter Habitat
TIMING LIMITATION FOR SAGE-GROUSE WINTER HABITAT

For the Purpose Of: Protecting sage-grouse during the critical breeding and brood-rearing season by precluding activities which could cause increased stress, displacement, and or breeding failures during the critical time period (November 15th to March 1st in the Vernon Management Area; November 1st to March 15th in the Strawberry Reservoir and Upper Provo Management Areas).

Leased Federal Fluid Mineral Estate

WL&F-6 Guideline
Adjust timing and location of management and public activities to minimize disturbance of Greater sage-grouse breeding sites in the Vernon and Strawberry Reservoir Management Areas. Activities should not take place within sight distance or 0.5 mile of leks (whichever is less) annually from March 1 to June 1 in the Vernon Management Area and from March 1 to June 15 in the Strawberry Management Area. (Correction #4)

Vegetation

Sub-goal-2-8 (G-2-8)
Ecosystem resilience is maintained by providing for a full range of seral stages and age classes (by cover type) that achieve a mosaic of habitat conditions and diversity to meet a variety of desired resource management objectives. Recruitment and sustainability of some early seral species and vegetation communities in the landscape are necessary to maintain ecosystem resilience to perturbations.

Sub-goal-2-10 (G-2-10)
Management actions maintain ecosystem health and encourage conditions that are within the historic range of variation. Management actions remain within the variability of size, intensity, and frequency of native disturbance regimes characteristic of the subject landscape and ecological processes.

Sub-goal-2-11 (G-2-11)
Key shrubs and/or trees are maintained to a level that allows adequate recruitment to maintain or recover the woody component. Specifically, the Forest is managed for more plants in the combined sprout and young categories than in the combined mature and dead categories.

Sub-goal-2-43 (G-2-43)
Livestock are managed to achieve or maintain desired vegetative composition for Greater sage-grouse nesting and brood-rearing habitats in the Vernon and Strawberry Reservoir Management Areas.

Veg-13 Guideline
All vegetation management activities should mimic the natural pattern, structure, and composition of vegetation on the landscape (within the historic range of variability).

Fisheries & Aquatic Wildlife

3.3 Aquatic and Terrestrial Habitat
This prescription applies to areas with multiple habitats (big game winter range, Lynx Analysis Units [LAUs], Greater sage-grouse habitat in the Vernon and Strawberry Reservoir Management Areas, etc.). Where habitats overlap, the most restrictive standard or guideline will take precedence. See Appendix E for maps of habitat areas.

MP-3.3-1Guideline
Non-recreation developments may be considered.

MP-3.3-2Guideline
Vegetation management activities may be allowed if they maintain or enhance biophysical resources.

3.3 Aquatic and Terrestrial Habitat
These areas are managed for quality habitat to contribute toward maintenance and/or recovery of plant and animal species. Resources are maintained or improved to achieve desired conditions for habitats of threatened, endangered, sensitive, and Management Indicator Species (MIS). Most, but not all, of the critical deer and elk winter range is included within this prescription. Vegetation management, including timber harvest, may be used to address vegetation needs for wildlife habitat, watershed improvement, and/or forest health needs. Additional motorized trails may be constructed. Grazing may be allowed with limitations based on the species for which a particular area is being managed (e.g., an area managed for Greater sage-grouse habitat will require different stubble heights than an area managed for winter range). No additional winter recreation facilities may be constructed in the areas of this prescription managed as Lynx Analysis Units (LAUs).

Wildlife

FW-Goal-2
Biologically diverse, sustainable ecosystems maintain or enhance habitats for native flora and fauna, forest and rangeland health, and watershed health.

Sub-goal-2-23 (G-2-23)
Areas identified as being of special concern for habitat such as big game winter range, big game natal areas, Canada lynx denning areas, and Greater sage-grouse breeding areas in the Vernon and Strawberry Reservoir Management Areas are maintained and, where potential exists, improved or expanded. Disturbances in these areas are limited during critical periods for wildlife.

Sub-goal-2-24 (G-2-24)
Adequate amounts and distribution of big game hiding and thermal cover are maintained. Adequate amounts of hiding cover for wildlife is retained around created openings and along roads where vegetative management activities are implemented.

Sub-goal-2-26 (G-2-26)
Wildlife travel corridors, riparian corridors, and key linkage routes are maintained and, where feasible, restored. Connections among large, contiguous blocks of suitable habitat are provided (e.g., key linkage routes for Canada lynx within and between Lynx Analysis Units [LAUs] and big game summer and winter range movements). Wildlife movement is facilitated within key linkage areas, considering highway crossing structures when feasible. Unified management direction is established through cooperation with other ownerships via habitat conservation plans, conservation easement or agreements, and land acquisitions.

Sub-goal-2-35 (G-2-35)
Avian mortality is reduced by minimizing the construction of tower facilities, including lighted towers, on communication sites.

WL&F-3 Guideline
Provide for wildlife movement through and/or around structures or project sites such as fences, spring developments, guzzlers, roads, and ditches.

WL&F-4 Guideline
In Greater sage-grouse nesting habitats in the Vernon and Strawberry Reservoir Management Areas, avoid removing sagebrush within 300 yards of Greater sage-grouse foraging areas along riparian zones, meadows, lakebeds, and farmland, unless such removal is necessary to achieve Greater sage-grouse habitat management objectives.

Special Status Species

Objective-2-11 (O-2-11)
By 2013, maintain or restore 10 structures for threatened, endangered, or sensitive (TES) species.

Sub-goal-3-1 (G-3-1)
If consistent with ecosystem health and integrity, and threatened, endangered, and sensitive species management, forage for livestock grazing on lands identified as suited for this use is provided to support social and economic community stability.

Objective-6-6 (O-6-6)
By 2008, develop summer use dispersed recreation management plans that address dispersed recreation; promote protection of environmentally sensitive areas and threatened, endangered, and sensitive species; and are coordinated with the Forest Travel Management Plan.

Fire and Fuels Management

Fire-2 Guideline

Prescribed fire and the full range of suppression tactics and fuel reduction methods are authorized forest-wide, except where direction for certain management areas and management prescriptions provides otherwise.

Fire-3 Guideline

Wildland fire use is authorized forest-wide, except in high-use travel corridors, where there are susceptible known cultural resources, and where direction for certain management areas and management prescriptions provides otherwise. The appropriate response is suppression in high-use travel corridors or where there are susceptible known cultural resources. In areas authorized for wildland fire use, the full range of appropriate management responses, from full suppression to monitoring, may be used.

Fire-6 Guideline

Except for initial attack fire suppression, all equipment used in ground-disturbing or fire suppression operations on the Forest shall be cleaned prior to entry onto the Forest, or movement from one Forest project area to another, to remove all plant parts, dirt, and material that may carry noxious weed seeds. Ground-disturbing operations include, but are not limited to, range seedings, timber harvest, reforestation, wildlife browse plantings, road construction, fuel reduction, and fire suppression operations.

Fire-11 Guideline

All wildfires in Greater sage-grouse breeding habitats in the Vernon and Strawberry Reservoir Management Areas should be suppressed. Prescribed fire and wildland fire use may be allowed in these areas only to maintain or enhance Greater sage-grouse habitat.

Livestock Grazing

Graze-4 Standard

Limit grazing to meet the following utilization levels on non-riparian vegetation types based on the annual average of the current year's growth. However, through June 15 at Strawberry Reservoir Management Area and through June 1 at Vernon Management Area, minimum canopy cover and height requirements for Greater sage-grouse habitat in the Vernon and Strawberry Reservoir Management Areas (as shown in the table in Veg-7 on page 3-17) take precedence over the forage utilization standards in the following table. (Correction #4)

Table 3-10: Forage Utilization Standards

Vegetation Type	Forage Utilization	
	Very Early – Early Seral	**Mid – Late Seral**
General Uplands and Winter Range		
Upland shrublands (sagebrush, snowberry, mountain mahogany species, cliffrose, bitterbrush, saltbrush, and mountain brush)	40%	60%
Grasslands	45%	65%
Forest-wide		
Sub-alpine shrublands	25%	35%
Sub-alpine grasslands	40%	45%

Lands and Realty

Lands-1: Guideline

Use the following criteria to assist in the identification of lands that could be made available for disposal/conveyance (criteria are not listed in any priority):

6. Additionally, disposal/conveyance of lands should not result in any net loss in critical winter ranges or threatened, endangered, or sensitive species habitats; wetlands; or identified critical access to the Forest.

WASATCH-CACHE

Lands and Realty

West Wide Energy Corridor(s)

Applicants shall identify important, sensitive, or unique habitats and BLM-special status species, FS-sensitive, and state-listed species in the vicinity of proposed projects and design the project to avoid or mitigate impacts to these habitats and species.

Habitat Restoration/Vegetation Management

- Provide for sustained diversity of species at the genetic, populations, community and ecosystem levels. Maintain communities within their historic range of variation that sustains habitats for viable populations of species. Restore or maintain hydrologic functions. Reduce potential for uncharacteristic high-intensity wildfires, and insect epidemics.
- To achieve sustainable ecosystems, meet properly functioning condition (PFC) criteria for all vegetation types that occur in the Wasatch-Cache National Forest. Focus on approximating natural disturbances and processes by restoring composition, age class diversity, patch sizes, and patterns for all vegetation types.
- Increase grass and forb production and plant species and age-class diversity in sagebrush and pinyon/juniper by treating approximately 2,000 acres average annually for a 10-year total of 20,000 acres.

Manage vegetation for properly functioning condition at the landscape scale. Desired structure and pattern for cover types of the Wasatch-Cache National Forest (from USDA Forest Service 1996) are as follows except in the Wildland Urban Interface (defined in Glossary), where vegetation structure and pattern should be managed to reduce threat of severe fire to property and human safety.

Sagebrush(Big)/Grassland: Balanced range of structural stages. 40% of area with 15% or more crown cover (as measured by line intercept method). Patterns are within the historical range.

Tall Forb: Minimum ground cover of 90% leading into the winter season. Patterns within historical range on area still suitable for Tall Forb dominance.

Riparian: Amount and type of vegetation community types present that maintain riparian-dependent resources and provide a high rate of recovery following disturbance: Plant community type compositions and accompanying riparian ecosystem functions maintain proper ground water recharge, storage, delivery, water tables, channel morphology and bank stability.

INTEGRATED INVASIVE SPECIES MANAGEMENT

Integrated weed management should be used to maintain or restore habitats for threatened, endangered, proposed and sensitive plants and other native species of concern where they are threatened by noxious weeds or non-native plants. When treating noxious weeds comply with policy in Intermountain Region's Forest Service Manual 2080, Supplement #R4 2000-2001-1 (Appendix III).

Appendix J

Methodology for Calculating a Substantial Livestock Grazing Reduction under Alternative C2

APPENDIX J
METHODOLOGY FOR CALCULATING A SUBSTANTIAL LIVESTOCK GRAZING REDUCTION UNDER ALTERNATIVE C2

Under Alternative C2, which reduces livestock grazing, the BLM utilized the Desired Stocking level formula found in BLM Technical Reference 4400-7, Rangeland Monitoring Analysis, Interpretation, and Evaluation (BLM 1985, p. 54), to analyze a reduced animal unit month (AUM) amount. The formula uses actual use over key management area utilization that equals the desired actual use over the desired key management area utilization. The formula is:

$$\frac{\text{Actual Use}}{\text{Key Management Area Utilization}} = \frac{\text{Desired Actual Use}}{\text{Desired Key Management Area Utilization}}$$

The key management area utilization selected was 50 percent. This number was derived from the take half leave half rule of thumb that began with work by Franklin J. Crider in 1955, which considered root growth stoppage resulting from grass defoliation. He states, "Removals during the growing season of half or more of the foliage of grasses—cool- and warm-season species including bunch, rhizomatous, and stoloniferous types—caused root growth to stop for a time after each removal…" This rule of thumb has been employed over time and, from a general perspective, is the limit of utilization set as a management tool by many BLM field offices. This level is reflected in several allotment decisions in the Randolph Management Framework Plan in Rich County, as well as the Vernal and Moab RMPs. The 50 percent utilization limit has been interpreted by some to also mean "moderate use" or "proper use," with the same idea of leaving half the plant for regrowth and site protection. Current literature is providing more information on moderate use and its relation to specific species on specific sites and geographic locations. Moderate grazing has been defined as low as 35 percent and as high as 65 percent on rare occasions, specifically for crested wheatgrass (Holechek et al. 2004). The 41- to 60-percent class interval found in the key species method (formerly the modified key forage plant method) is used by BLM field offices throughout Utah (Interagency Technical Reference 1734-03, Utilization Studies and Residual Measurements; Coulloudon et al. 1999). This 41 to 60 percent class interval has been interpreted as moderate, and its description states: "Half the available

forage (by weight) on key species appears to have been utilized." Schmutz et al. (1963) also shows that moderate use is 40 to 60 percent with a mid-point of 50 percent. At this level of planning, the general rule is to take half leave half. Most, if not all, BLM field offices are managing for a 50 percent or less utilization limit, so the 50 percent key management area utilization level was used at the base assumption. It is also assumed that all key management areas across the planning area have a 50 percent utilization limit. There may be situations in which site-specific key management areas have a utilization limit higher or lower than 50 percent that benefits ecological processes.

The formula was used to determine a reduced AUM allocation for Alternative C2. A desired key management area utilization of 30 percent was selected to determine the desired active use (AUM) number for this land use plan amendment. In Pellant et al. (2005), 30 percent is the mid-point of the class interval sometimes referred to as light (21 to 40 percent).

Conservation stocking is a term commonly used by range researchers to define a level of grazing between light and moderate, generally involving about 35 percent use of forage (Holechek et al. 2004). Holechek et al. (2004) continues that, "Conservation stocking involves using about 35 percent of forage resources on arid and semiarid rangelands. There appears to be little biological benefit from lighter use levels." Schmutz et.al. (1963) shows that light use is 20 to 40 percent with a mid-point of 30 percent. Given the slight variation within the light or conservative use levels as outlined in the literature, the BLM used the 30 percent mid-point of the Pellant et al. (2005) class interval, which is more conservative than Holechek et al. (2004) or Schmutz et al. (1963).

Because actual use is not collected by every BLM field office on every allotment every year, active use, as shown on current grazing permits, was used in its place. Average billed use was not used in the formula because the amount billed may be limited by other factors such as permittees' livestock operational requirements and fire rehabilitation efforts. The average billed use may also have resulted in lower utilization levels not reflected in the 50 percent utilization level assumption. Active use should more closely reflect a relationship between the active use and the average utilization of 50 percent throughout the planning area because of LUP limitations and existing permit terms and conditions.

The use of 50 percent to 30 percent utilization provides a reduction of 329,521 active AUMs (labeled as "actual use" in the formula) in the calculation for a desired actual use of 197,713 AUMs. This would result in a reduction of active AUMs as well as a reduction of the average billed use and is used for analysis purposes in Alternative C2. Site-specific limits of utilization and the application of the reduction will be determined at the field office level where site-specific information about true actual use, ecological condition, and achievement of applicable habitat requirements can be addressed.

The 50 percent and 30 percent utilization limits used in the formula are not intended to suggest a utilization limit or objective in this planning effort.

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Appendix K

Fire and Invasives Assessment Tool

APPENDIX K
FIRE AND INVASIVES ASSESSMENT TOOL

In the Great Basin Region (WAFWA Management Zones III, IV, and V), the US Fish and Wildlife Service (2013) identified wildfire as a primary threat to Greater Sage-Grouse (GRSG) and its habitat. In particular, it identified wildfire in response to invasive annual grasses and conifer expansion. The Fire and Invasives Assessment Tool (FIAT) provides the BLM and other land management agencies with a framework for prioritizing wildfire management and GRSG habitat conservation.

Supported by US Forest Service General Technical Report 326 (Chambers et al. 2014; see **Attachment 1**), FIAT provides the BLM and other agencies with a mechanism to identify and prioritize areas within GRSG habitat for potential treatment based on their resistance and resilience characteristics. In the cold desert ecosystem typical throughout the Great Basin, soil moisture and temperature fundamentally influence a landscape's ability to resist environmental change. These factors also influence the landscape's ability to be resilient after long-term ecosystem shifts following a disturbance, such as wildfire. Low resistance and resilient landscapes are typically characterized by low elevations, south-facing slopes, and porous soils. These areas will likely respond differently to fuels management, wildfire, and subsequent rehabilitation compared to more resistant and resilient landscapes, such as those at higher elevations or on north-facing slopes.

At the resource management planning level, FIAT consists of the following parts:

- The identification of areas at the landscape level, based on national datasets and scientific literature, where the threat to GRSG and its habitat from conifer expansion and wildfire/invasive annual grass is highest
- The identification of regional and local areas where focused wildfire and habitat management is critical to GRSG conservation efforts
- The identification of overarching management strategies for conifer expansion and invasive annual grasses in the areas of habitat recovery/restoration, fuels management, fire operations, and post-fire rehabilitation/emergency stabilization and rehabilitation

Attachment 2 outlines the FIAT landscape-level framework and describes the anticipated process for implementing the resource management strategies in the BLM district office and National Forest Unit. Ultimately, the outcomes of the FIAT process will provide land managers with spatially defined priorities and management protocols for the following:

- Operational decision-making during fires
- Implementation of NEPA projects for invasive annual grass and conifer reduction, fuel breaks, and emergency stabilization and rehabilitation efforts in GRSG habitat

Attachment 1—Chambers et al. 2014 report

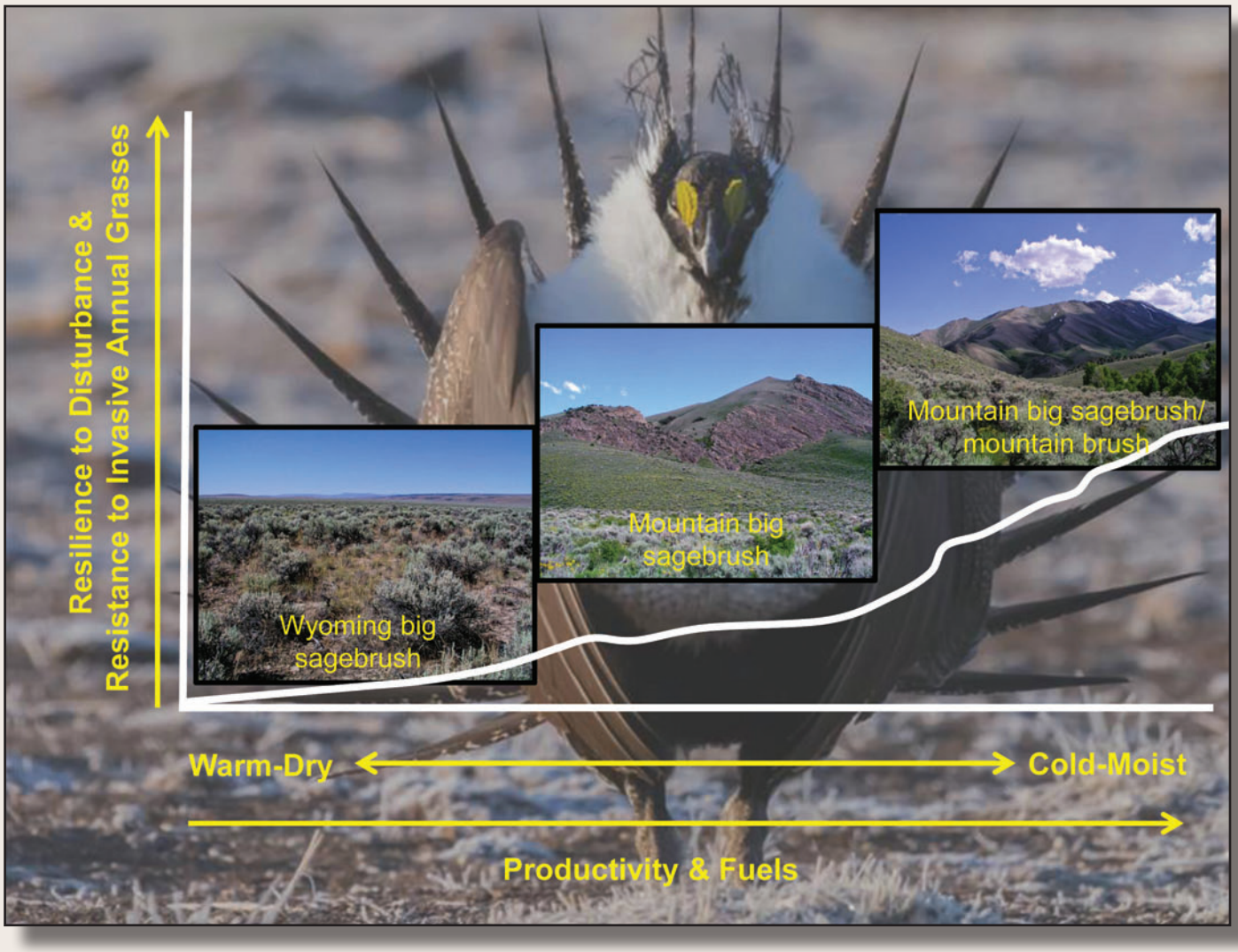
Attachment 2—Greater Sage-Grouse Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment

Appendix K – Attachment 1

United States Department of Agriculture

Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach

Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Mike Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, and Amarina Wuenschel



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Abstract

This Report provides a strategic approach for conservation of sagebrush ecosystems and Greater Sage-Grouse (sage-grouse) that focuses specifically on habitat threats caused by invasive annual grasses and altered fire regimes. It uses information on factors that influence (1) sagebrush ecosystem resilience to disturbance and resistance to invasive annual grasses and (2) distribution, relative abundance, and persistence of sage-grouse populations to develop management strategies at both landscape and site scales. A sage-grouse habitat matrix links relative resilience and resistance of sagebrush ecosystems with sage-grouse habitat requirements for landscape cover of sagebrush to help decision makers assess risks and determine appropriate management strategies at landscape scales. Focal areas for management are assessed by overlaying matrix components with sage-grouse Priority Areas for Conservation (PACs), breeding bird densities, and specific habitat threats. Decision tools are discussed for determining the suitability of focal areas for treatment and the most appropriate management treatments.

Keywords: sagebrush habitat, Greater Sage-Grouse, fire effects, invasive annual grasses, management prioritization, conservation, prevention, restoration

Cover photos: *Greater Sage-grouse photo by Rick McEwan; sagebrush habitat photos by Jeanne Chambers.*

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Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach

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Introduction

An unprecedented conservation effort is underway across 11 States in the western United States to reduce threats to Greater Sage-Grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) and the sagebrush ecosystems on which they depend (fig. 1). Recent efforts were accelerated by the March 2010 determination that sage-grouse warrant protection under the Federal Endangered Species Act, and by increased emphasis on broad collaboration among state and Federal partners to proactively identify and implement actions to reverse current trends (USFWS 2010, 2013). Conservation success hinges on being able to achieve "the long-term conservation of sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities" (USFWS 2013). While strides are being made to curtail a host of threats across the range, habitat loss and fragmentation due to wildfire and invasive plants remain persistent challenges to

Figure 1. Greater Sage-Grouse (*Centrocercus urophasianus*) (photo by Charlotte Ganskopp).

achieving desired outcomes – particularly in the western portion of the range (Miller et al. 2011; USFWS 2010; 2013). Management responses to date have not been able to match the scale of this problem. Natural resource managers are seeking coordinated approaches that focus appropriate management actions in the right places to maximize conservation effectiveness (Wisdom and Chambers 2009; Murphy et al. 2013).

Improving our ability to manage for resilience to disturbance and resistance to invasive species is fundamental to achieving long-term sage-grouse conservation objectives. Resilient ecosystems have the capacity to ***regain*** their fundamental structure, processes, and functioning when altered by stressors like drought and disturbances like inappropriate livestock grazing and altered fire regimes (Holling 1973; Allen et al. 2005). Species resilience refers to the ability of a species to recover from stressors and disturbances (USFWS 2013), and is closely linked to ecosystem resilience. Resistant ecosystems have the capacity to ***retain*** their fundamental structure, processes, and functioning when exposed to stresses, disturbances, or invasive species (Folke et al. 2004). Resistance to invasion by nonnative plants is increasingly important in sagebrush ecosystems; it is a function of the abiotic and biotic attributes and ecological processes of an ecosystem that limit the population growth of an invading species (D'Antonio and Thomsen 2004**)**. A detailed explanation of the factors that influence resilience and resistance in sagebrush ecosystems is found in Chambers et al. 2014.

In general, species are likely to be more resilient if large populations exist in large blocks of high quality habitat across the full breadth of environmental variability to which the species is adapted (Redford et al. 2011). Because sage-grouse are a broadly distributed and often wide-ranging species that may move long-distances between seasonal habitats (Connelly et al. 2011a,b), a strategic approach that integrates both landscape prioritization and site-scale decision tools is needed. This document develops such an approach for the conservation of sagebrush habitats across the range of sage-grouse with an emphasis on the western portion of the range. In recent years, information and tools have been developed that significantly increase our understanding of factors that influence the resilience of sagebrush ecosystems and the distribution of sage-grouse populations, and that allow us to strategically prioritize management activities where they are most likely to be effective and to benefit the species. Although the emphasis of this Report is on the western portion of the sage-grouse range, the approach has management applicability to other sagebrush ecosystems.

In this report, we briefly review causes and effects of invasive annual grasses and altered fire regimes, and then discuss factors that determine resilience to disturbances like wildfire and resistance to invasive annual grasses in sagebrush ecosystems. We illustrate how an understanding of resilience and resistance, sagebrush habitat requirements for sage-grouse, and consequences that invasive annual grasses and wildfire have on sage-grouse populations can be used to develop management strategies at both landscape and site scales. A sage-grouse habitat matrix is provided that links relative resilience and resistance with habitat requirements for landscape cover of sagebrush to both identify priority areas for management and determine effective management strategies at landscape scales. An approach for assessing focal areas for sage-grouse habitat management is described that overlays Priority Areas for Conservation (PACs) and breeding bird densities with resilience and resistance and habitat suitability to spatially link sage-grouse populations with habitat conditions and risks. The use of this approach is illustrated for the western portion of the range and for a diverse area in the northeast corner of Nevada. It concludes with a discussion of the tools available for determining the suitability of focal areas for treatment and the most appropriate management treatments. Throughout the document, the emphasis is on using this approach to guide and assist fire operations, fuels management, post-fire rehabilitation, and habitat restoration activities to maintain or enhance sage-grouse habitat.

Threats of Invasive Annual Grasses and Altered Fire Regimes to Sagebrush Ecosystems and Sage-Grouse

Effects on Sagebrush Ecosystems

Sage-grouse habitat loss and fragmentation due to wildfire and invasive plants are widely recognized as two of the most significant challenges to conservation of the species, particularly in the western portion of the range (Miller et al. 2011; USFWS 2010, 2013). During pre-settlement times, sagebrush-dominated ecosystems had highly variable fire return intervals that ranged from decades to centuries (Frost 1998; Brown and Smith 2000; Miller et al. 2011). At coarse regional scales, fire return intervals in sagebrush ecological types were determined largely by climate and its effects on fuel abundance and continuity. Consequently, fire frequency was higher in sagebrush types with greater productivity at higher elevations and following periods of increased precipitation than in lower elevation and less productive ecosystems (West 1983b; Mensing et al. 2006). At local scales within sagebrush types, fire return intervals likely were determined by topographic and soil effects on productivity and fuels and exhibited high spatial and temporal variability (Miller and Heyerdahl 2008).

Euro-American arrival in sagebrush ecosystems began in the mid-1800s and initiated a series of changes in vegetation composition and structure that altered fire regimes and resulted in major changes in sagebrush habitats. The first major change in fire regimes occurred when inappropriate grazing by livestock led to a decrease in native perennial grasses and forbs and effectively reduced the abundance of fine fuels (Knapp 1996; Miller and Eddleman 2001; Miller et al. 2011). Decreased competition from perennial herbaceous species, in combination with ongoing climate change and favorable conditions for woody species establishment at the turn of the twentieth century, resulted in increased abundance of shrubs (primarily *Artemisia* species) and trees, including juniper (*Juniperus occidentalis, J. osteosperma*) and piñon pine (*Pinus monophylla*), at mid to high elevations (Miller and Eddleman 2001; Miller et al. 2011). The initial effect of these changes in fuel structure was a reduction in fire frequency and size. The second major change in fire regimes occurred when non-native annual grasses (e.g., *Bromus tectorum, Taeniatherum caput-medusa*) were introduced from Eurasia in the late 1800s and spread rapidly into low to mid-elevation ecosystems with depleted understories (Knapp 1996). The invasive annual grasses increased the amount and continuity of fine fuels in many lower elevation sagebrush habitats and initiated annual grass/fire cycles characterized by shortened fire return intervals and larger, more contiguous fires (fig. 2; D'Antonio and Vitousek 1992; Brooks et al. 2004). Since settlement of the region, cheatgrass came to dominate as much as 4 million hectares (9.9 million acres) in the states of Nevada and Utah alone (fig. 3; Bradley and Mustard 2005). The final change in fire regimes occurred as a result of expansion of juniper and piñon pine trees into sagebrush types at mid to high elevations and a reduction of the grass, forb, and shrub species associated with these types. Ongoing infilling of trees is increasing woody fuels, but reducing fine fuels and resulting in less frequent fires (fig. 4; Miller et al. 2013). Extreme burning conditions (high winds, high temperatures, and low relative humidity) in high density (Phase III) stands are resulting in large and severe fires that result in significant losses of above- and below-ground organic matter (sensu Keeley 2009) and have detrimental ecosystem effects (Miller et al. 2013). Based on tree-ring analyses at several Great Basin sites, it is estimated that the extent of piñon and/or juniper woodland increased two to six fold since settlement, and most of that area will exhibit canopy closure within the next 50 years (Miller et al. 2008).

Figure 2. A wildfire that burned through a Wyoming big sagebrush ecosystem with an invasive annual grass understory in southern Idaho (top) (photo by Douglas J. Shinneman), and a close-up of a fire in a Wyoming big sagebrush ecosystem (bottom) (photo by Scott Schaff).

Figure 3. A wildfire that started in invasive annual grass adjacent to a railroad track and burned upslope into a mountain big sagebrush and Jeffrey pine ecosystem in northeast Nevada (top). A big sagebrush ecosystem that has been converted to invasive annual grass in north central Nevada (bottom) (photos by Nolan E. Preece).

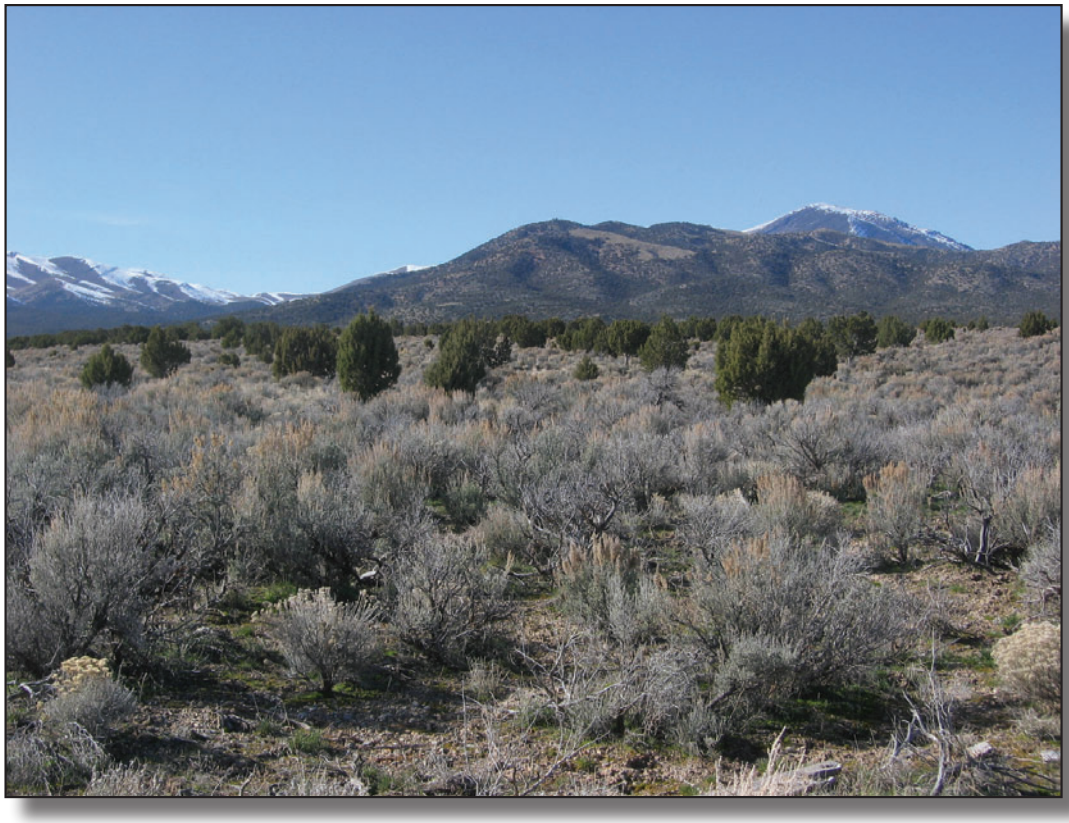

Figure 4. Expansion of Utah juniper trees into a mountain big sagebrush ecosystem in east central Utah (top) that is resulting in progressive infilling of the trees and exclusion of native understory species (bottom) (photos by Bruce A. Roundy).

Effects on Sage-Grouse Habitat Selection and Population Dynamics

Understanding the effects of landscape changes on sage-grouse habitat selection and population dynamics can help managers apply more strategic and targeted conservation actions to reduce risks. Two key land cover shifts resulting from invasive annual grasses and altered fire regimes are affecting the ability to achieve the range-wide goal of stable-to-increasing population trends − large-scale reduction of sagebrush cover and conversion of sagebrush ecosystems to annual grasslands.

Sage-grouse are true sagebrush obligates that require large and intact sagebrush landscapes. Consequently, wildfires occurring at the extremes of the natural range of variability that remove sagebrush, even temporarily, over large areas and over short time periods often have negative consequences for sage-grouse. Several range-wide studies have identified the proportion of sagebrush-dominated land cover as a key indicator of sage-grouse population persistence and, importantly, have revealed critical levels of sagebrush landscape cover required by sage-grouse (see Appendix 2 for a description of landscape cover and how it is derived). Knick et al. (2013) found that 90% of active leks in the western portion of the range had more than 40% landscape cover of sagebrush within a 5-km (3.1-mi) radius of leks. Another range-wide analysis documented a high risk of extirpation with <27% sagebrush landscape cover and high probability of persistence with >50% sagebrush landscape cover within 18-km (11.2-mi) of leks (Wisdom et al. 2011). Similarly, Aldridge et al. (2008) found long-term sage-grouse persistence required a minimum of 25%, and preferably at least 65%, sagebrush landscape cover at the 30-km (18.6-mi) scale. Considered collectively, cumulative disturbances that reduce the cover of sagebrush to less than a quarter of the landscape have a high likelihood of resulting in local population extirpation, while the probability of maintaining persistent populations goes up considerably as the proportion of sagebrush cover exceeds two-thirds or more of the landscape. Reduction of sagebrush cover is most critical in low to mid elevations where natural recovery of sagebrush can be very limited within timeframes important to sage-grouse population dynamics (Davies et al. 2011).

Nonnative annual grasses and forbs have invaded vast portions of the sage-grouse range, reducing both habitat quantity and quality (Beck and Mitchell 2000; Rowland et al. 2006; Miller et al. 2011; Balch et al. 2013). Due to repeated fires, some low- to mid-elevation native sagebrush communities are shifting to novel annual grassland states resulting in habitat loss that may be irreversible with current technologies (Davies et al. 2011; Miller et al. 2011; Chambers et al. 2014). At the broadest scales, the presence of non-native annual grasslands on the landscape may be influencing both sage-grouse distribution and abundance. In their analysis of active leks, Knick et al. (2013) found that most leks had very little annual grassland cover (2.2%) within a 5-km (3.1-mi) radius of the leks; leks that were no longer used had almost five times as much annual grassland cover as active leks. Johnson et al. (2011) found that lek use became progressively less as the cover of invasive annual species increased at both the 5-km (3.1-mi) and 18-km (11.2-mi) scales. Also, few leks had >8% invasive annual vegetation cover within both buffer distances.

Patterns of nest site selection also suggest local impacts of invasive annual grasses on birds. In western Nevada, Lockyer (2012) found that sage-grouse selected large expanses of sagebrush-dominated areas and, within those areas, sage-grouse selected microsites with higher shrub canopy cover and lower cheatgrass cover. Average cheatgrass cover at selected locations was 7.1% compared to 13.3% at available locations. Sage-grouse hens essentially avoided nesting in areas with higher cheatgrass cover. Kirol et al. (2012) also found nest-site selection was negatively correlated with the presence of cheatgrass in south-central Wyoming.

Sage-grouse population demographic studies in northern Nevada show that recruitment and annual survival also are affected by presence of annual grasslands at larger scales. Blomberg et al. (2012) analyzed land cover within a 5-km (3.1-mi) radius of leks and found that leks impacted by annual grasslands experienced lower recruitment than non-impacted leks, even following years of high precipitation. Leks that were not affected by invasive annual grasslands exhibited recruitment rates nearly twice as high as the population average and nearly six times greater than affected leks during years of high precipitation.

Piñon and juniper expansion at mid to upper elevations into sagebrush ecosystems also has altered fire regimes and reduced sage-grouse habitat availability and suitability over large areas with population-level consequences (Miller et al. 2011; Baruch-Mordo et al. 2013; Knick et al. 2013). Conifer expansion results in non-linear declines in sagebrush cover and reductions in perennial native grasses and forbs as conifer canopy cover increases (Miller et al. 2000) and this has direct effects on the amount of available habitat for sagebrush-obligate species. Sites in the late stage of piñon and juniper expansion and infilling (Phase III from Miller et al. 2005) have reduced fire frequency (due to decreased fine fuels), but are prone to higher severity fires (due to increased woody fuels) which significantly reduces the likelihood of sagebrush habitat recovery (fig. 5) (Bates et al. 2013). Even before direct habitat loss occurs, sage-grouse avoid or are negatively associated with conifer cover during all life stages (i.e., nesting, brood-rearing, and wintering; Doherty et al. 2008, 2010a; Atamian et al. 2010; Casazza et al. 2011). Also, sage-grouse incur population-level impacts at a very low level of conifer encroachment. The ability to maintain active leks is severely compromised when conifer canopy exceeds 4% in the immediate vicinity of the lek (Baruch-Mordo et al. 2013), and most active leks average less than 1% conifer cover at landscape scales (Knick et al. 2013).

Figure 5. A post-burn, Phase III, singleleaf piñon and Utah juniper dominated sagebrush ecosystem in which soils are highly erosive and few understory plants remain (photo by Jeanne C. Chambers).

Resilience to Disturbance and Resistance to Invasive Annual Grasses in Sagebrush Ecosystems

Our ability to address the changes occurring in sagebrush habitats can be greatly enhanced by understanding the effects of environmental conditions on resilience to stress and disturbance, and resistance to invasion (Wisdom and Chambers 2009; Brooks and Chambers 2011; Chambers et al. 2014). In cold desert ecosystems, resilience of native ecosystems to stress and disturbance changes along climatic and topographic gradients. In these ecosystems, Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*), mountain big sagebrush (*A. t.* spp. *vaseyana*), and mountain brush types (e.g., mountain big sagebrush, snowberry [*Symphorocarpus* spp.], bitterbrush [*Purshia tridentata*]) occur at progressively higher elevations and are associated with decreasing temperatures and increasing amounts of precipitation, productivity, and fuels (fig. 6; West and Young 2000). Piñon pine and juniper woodlands are typically associated with mountain big sagebrush types, but can occur with relatively cool and moist Wyoming big sagebrush types and warm and moist mountain brush types (Miller et al. 2013). Resilience to disturbance, including wildfire, has been shown to increase along these elevation gradients (fig. 7A) (Condon et al. 2011; Davies et al. 2012; Chambers et al. 2014; Chambers et al. *in press*). Higher precipitation and cooler temperatures, coupled with greater soil development and plant productivity at mid to high elevations, can result in greater resources and more favorable environmental conditions for plant growth and reproduction (Alexander et al. 1993; Dahlgren et al. 1997). In contrast, minimal precipitation and high temperatures at low elevations result in lower resource availability for plant growth (West 1983a,b;

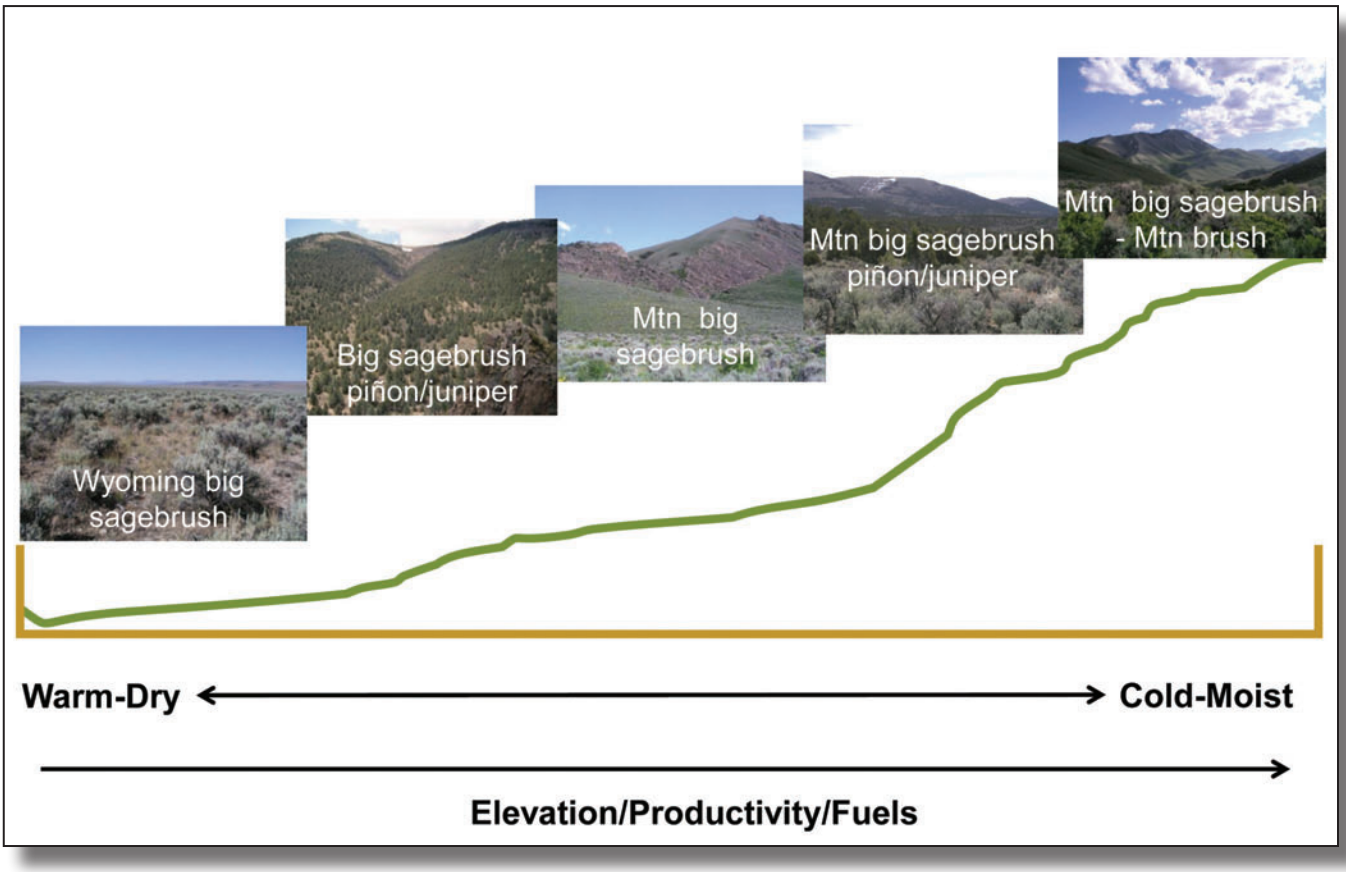

Figure 6. The dominant sagebrush ecological types that occur along environmental gradients in the western United States. As elevation increases, soil temperature and moisture regimes transition from warm and dry to cold and moist and vegetation productivity and fuels become higher.

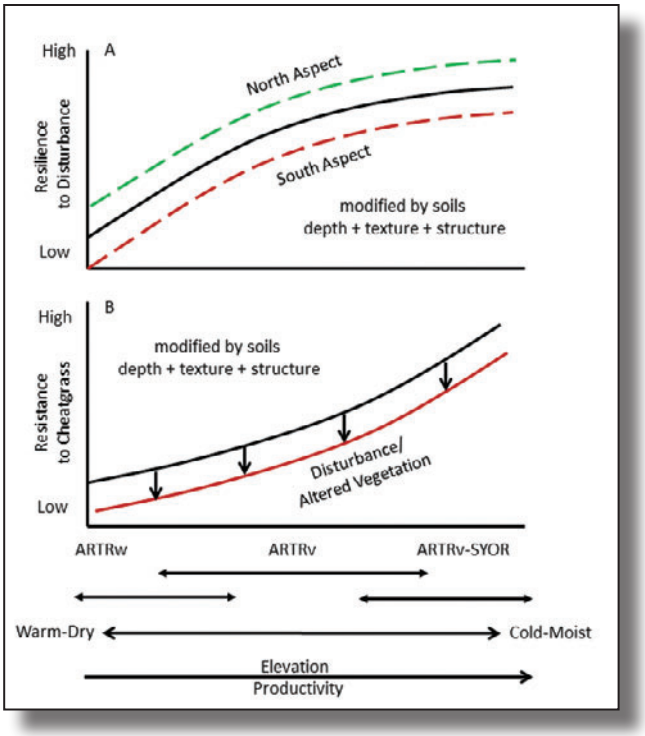

Figure 7. (**A)** Resilience to disturbance and (**B)** resistance to cheatgrass over a typical temperature/precipitation gradient in the cold desert. Dominant ecological sites occur along a continuum that includes Wyoming big sagebrush on warm and dry sites, to mountain big sagebrush on cool and moist sites, to mountain big sagebrush and root-sprouting shrubs on cold and moist sites. Resilience increases along the temperature/precipitation gradient and is influenced by site characteristics like aspect. Resistance also increases along the temperature/precipitation gradient and is affected by disturbances and management treatments that alter vegetation structure and composition and increase resource availability (modified from Chambers et al. 2014; Chambers et al. *in press*).

Smith and Nowak 1990). These relationships also are observed at local plant community scales where aspect, slope, and topographic position affect solar radiation, erosion processes, effective precipitation, soil development and vegetation composition and structure (Condon et al. 2011; Johnson and Miller 2006).

Resistance to invasive annual grasses depends on environmental factors and ecosystem attributes and is a function of (1) the invasive species' physiological and life history requirements for establishment, growth, and reproduction, and (2) interactions with the native perennial plant community including interspecific competition and response to herbivory and pathogens. In cold desert ecosystems, resistance is strongly influenced by soil temperature and moisture regimes (Chambers et al. 2007; Meyer et al. 2001). Germination, growth, and/or reproduction of cheatgrass is physiologically limited at low elevations by frequent, low precipitation years, constrained at high elevations by low soil temperatures, and optimal at mid elevations under relatively moderate temperature and water availability (fig. 7B; Meyer et al. 2001; Chambers et al. 2007). Slope, aspect, and soil characteristics modify soil temperature and moisture and influence resistance to cheatgrass at landscape to plant community scales (Chambers et al. 2007; Condon et al. 2011; Reisner et al. 2013). Genetic variation in cheatgrass results in phenotypic traits that increase survival and persistence in populations from a range of environments, and is likely contributing to the recent range expansion of this highly inbreeding species into marginal habitats (Ramakrishnan et al. 2006; Merrill et al. 2012).

The occurrence and persistence of invasive annual grasses in sagebrush habitats is strongly influenced by interactions with the native perennial plant community (fig. 7B). Cheatgrass, a facultative winter annual that can germinate from early fall through early spring, exhibits root elongation at low soil temperatures, and has higher nutrient uptake and growth rates than most native species (Mack and Pyke 1983; Arredondo et al. 1998; James et al. 2011). Seedlings of native, perennial plant species are generally poor competitors with cheatgrass, but adults of native, perennial grasses and forbs, especially those with similar growth forms and phenology, can be highly effective competitors with the invasive annual (Booth et al. 2003; Chambers et al. 2007; Blank and Morgan 2012).

Also, biological soil crusts, which are an important component of plant communities in warmer and drier sagebrush ecosystems, can reduce germination or establishment of cheatgrass (Eckert et al. 1986; Kaltenecker et al. 1999). Disturbances or management treatments that reduce abundance of native perennial plants and biological soil crusts and increase the distances between perennial plants often are associated with higher resource availability and increased competitive ability of cheatgrass (Chambers et al. 2007; Reisner et al. 2013; Roundy et al. *in press*).

The type, characteristics, and natural range of variability of stress and disturbance strongly influence both resilience and resistance (Jackson 2006). Disturbances like overgrazing of perennial plants by livestock, wild horses, and burros and more frequent or more severe fires are typically outside of the natural range of conditions and can reduce the resilience of sagebrush ecosystems. Reduced resilience is triggered by changes in environmental factors like temperature regimes, abiotic attributes like water and nutrient availability, and biotic attributes such as vegetation structure, composition, and productivity (Chambers et al. 2014) and cover of biological soil crusts (Reisner et al. 2013). Resistance to an invasive species can change when changes in abiotic and biotic attributes result in increased resource availability or altered habitat suitability that influences an invasive species' ability to establish and persist and/or compete with native species. Progressive losses of resilience and resistance can result in the crossing of abiotic and/or biotic thresholds and an inability of the system to recover to the reference state (Beisner et al. 2003; Seastedt et al. 2008).

Interactions among disturbances and stressors may have cumulative effects (Chambers et al. 2014). Climate change already may be shifting fire regimes outside of the natural range of occurrence (i.e., longer wildfire seasons with more frequent and longer duration wildfires) (Westerling et al. 2006). Sagebrush ecosystems generally have low productivity, and the largest number of acres burned often occurs a year or two after warm, wet conditions in winter and spring that result in higher fine fuel loads (Littell et al. 2009). Thus, annual grass fire cycles may be promoted by warm, wet winters and a subsequent increase in establishment and growth of invasive winter annuals. These cycles may be exacerbated by rising atmospheric CO_2 concentrations, N deposition, and increases in human activities that result in soil surface disturbance and invasion corridors (Chambers et al. 2014). Modern deviations from historic conditions will likely continue to alter disturbance regimes and sagebrush ecosystem response to disturbances; thus, management strategies that rely on returning to historical or "pre-settlement" conditions may be insufficient, or even misguided, given novel ecosystem dynamics (Davies et al. 2009).

Integrating Resilience and Resistance Concepts With Sage-Grouse Habitat Requirements to Manage Wildfire and Invasive Annual Grass Threats at Landscape Scales

The changes in sagebrush ecosystem dynamics due to invasive annual species and longer, hotter, and drier fire seasons due to a warming climate make it unlikely that these threats can be ameliorated completely (Abatzoglou and Kolden 2011; USFWS 2013). Consequently, a strategic approach is necessary to conserve sagebrush habitat and sage-grouse (Wisdom et al. 2005; Meinke et al. 2009; Wisdom and Chambers 2009; Pyke 2011). This strategic approach requires the ability to (1) identify those locations that provide current or potential habitat for sage-grouse and (2) prioritize management actions based on the capacity of the ecosystem to respond in the desired manner and to effectively allocate resources to achieve desired objectives. Current understanding of the relationship of landscape cover of sagebrush to sage-grouse habitat provides the capacity to identify those locations on the landscape that have a high probability of

sage-grouse persistence (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Similarly, knowledge of the relationships of environmental characteristics, specifically soil temperature and moisture regimes, to ecological types and their inherent resilience and resistance gives us the capacity to prioritize management actions based on probable effectiveness of those actions (Wisdom and Chambers 2009; Brooks and Chambers 2011; Miller et al. 2013; Chambers et al. 2014; Chambers et al. *in press*,).

In this section, we discuss the use of landscape cover of sagebrush as an indicator of sage-grouse habitat, and the use of soil temperature and moisture regimes as an indicator of resilience to disturbance, resistance to invasive annual grasses and, ultimately, the capacity to achieve desired objectives. We then show how these two concepts can be coupled in a sage-grouse habitat matrix and used to determine potential management strategies at the landscape scales on which sage-grouse depends.

Landscape Cover of Sagebrush as an Indicator of Sage-Grouse Habitat

Landscape cover of sagebrush is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Landscape cover of sagebrush less than about 25% has a low probability of sustaining active sage-grouse leks (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Above 25% landscape cover of sagebrush, the probability of maintaining active sage-grouse leks increases with increasing sagebrush landscape cover. At landscape cover of sagebrush ranging from 50 to 85%, the probability of sustaining sage-grouse leks becomes relatively constant (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, we use 25% as the level below which there is a low probability of maintaining sage-grouse leks and 65% as the level above which there is little additional increase in the probability of sustaining active leks with further increases of landscape cover of sagebrush (fig. 8; Knick et al. 2013). Between about 25% and 65% landscape sagebrush cover, increases in landscape cover of sagebrush have a constant positive relationship with sage-grouse lek probability (fig. 8; Knick et al. 2013). Restoration and management activities that result in an increase in the amount of sagebrush dominated landscape within areas of pre-existing landscape cover between 25% and 65% likely will result in a higher probability of sage-grouse persistence, while declines in landscape cover of sagebrush likely will result in reductions in sage-grouse (Knick et al. 2013). It is important to note that

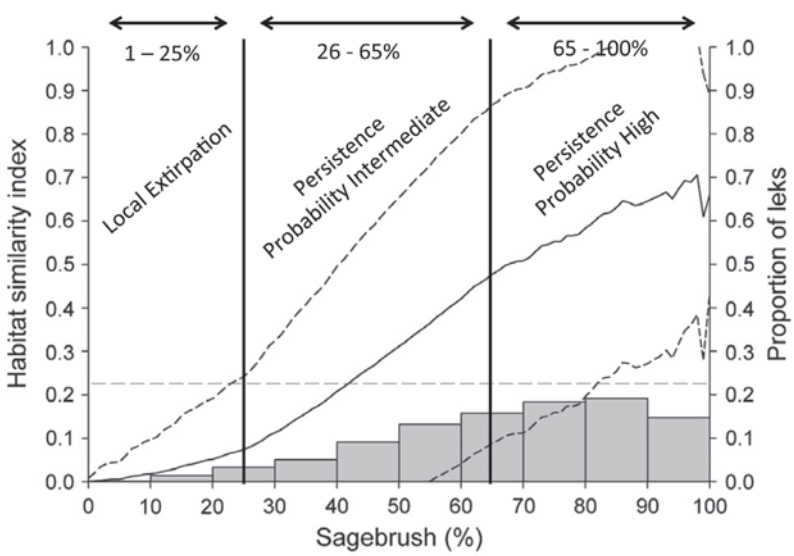

Figure 8. The proportion of sage-grouse leks and habitat similarity index (HSI) as related to the percent landscape cover of sagebrush. The HSI indicates the relationship of environmental variables at map locations across the western portion of the range to minimum requirements for sage-grouse defined by land cover, anthropogenic variables, soil, topography, and climate. HSI is the solid black line ± 1 SD (stippled lines). Proportion of leks are the grey bars. Dashed line indicates HSI values above which characterizes 90% of active leks (0.22). The categories at the top of the figure and the interpretation of lek persistence were added based on Aldridge et al. 2008; Wisdom et al. 2011; and Knick et al. 2013 (figure modified from Knick et al. 2013).

these data and interpretations relate only to persistence (i.e., whether or not a lek remains active) and it is likely that higher proportions of sagebrush cover or improved condition of sagebrush ecosystems may be required for population growth.

For the purposes of delineating sagebrush habitat relative to sage-grouse requirements for landscape cover of sagebrush, we calculated the percentage landscape sagebrush cover within each of the selected categories (1-25%, 26-65%, >65%) for the range of sage-grouse (fig. 9, 10). An explanation of how landscape cover of sagebrush is derived is in Appendix 2. Large areas of landscape sagebrush cover >65% are found primarily in Management Zones (MZ) II (Wyoming Basin), IV (Snake River Plains), and V (Northern Great Basin). In contrast, relatively small areas of landscape sagebrush cover >65% are located in MZ I (Great Plains), III (Southern Great Basin), VI (Columbia Basin), and VII (Colorado Plateau). Sagebrush is naturally less common in the Great Plains region compared to other parts of the range and previous work suggested that sage-grouse populations in MZ I may be more vulnerable to extirpation with further reductions in sagebrush cover (Wisdom et al. 2011). In the western portion of the range, where the threat of invasive annual grasses and wildfire is greatest, the area of sagebrush cover >65% differs among MZs. MZ III is a relatively arid and topographically diverse area in which the greatest extent of sagebrush cover >65% is in higher elevation, mountainous areas. MZs IV and V have relatively large extents of sagebrush cover >65% in relatively cooler and wetter areas, and MZs IV and VI have lower extents of sagebrush cover >65% in warmer and dryer areas and in areas with significant agricultural development. These differences in landscape cover of sagebrush indicate that different sets of management strategies may apply to the various MZs.

Soil Temperature and Moisture Regimes as Indicators of Ecosystem Resilience and Resistance

Potential resilience and resistance to invasive annual grasses reflect the biophysical conditions that an area is capable of supporting. In general, the highest potential resilience and resistance occur with ***cool*** to ***cold*** (frigid to cryic) soil temperature regimes and relatively ***moist*** (xeric to ustic) soil moisture regimes, while the lowest potential resilience and resistance occur with ***warm*** (mesic) soil temperatures and relatively ***dry*** (aridic) soil moisture regimes (Chambers et al. 2014, Chambers et al. *in press*). Definitions of soil temperature and moisture regimes are in Appendix 3. Productivity is elevated by high soil moisture and thus resilience is increased (Chambers et al. 2014); annual grass growth and reproduction is limited by cold soil temperatures and thus resistance is increased (Chambers et al. 2007). The timing of precipitation also is important because cheatgrass and many other invasive annual grasses are particularly well-adapted to Mediterranean type climates with cool and wet winters and warm and dry summers (Bradford and Lauenroth 2006; Bradley 2009). In contrast, areas that receive regular summer precipitation (ustic soil moisture regimes) often are dominated by warm and/or cool season grasses (Sala et al. 1997) that likely create a more competitive environment and result in greater resistance to annual grass invasion and spread (Bradford and Lauenroth 2006; Bradley 2009).

Much of the remaining sage-grouse habitat in MZs I (Great Plains), II (Wyoming Basin), VII (Colorado Plateau), and cool-to-cold or moist sites scattered across the range, are characterized by moderate to high resilience and resistance as indicated by soil temperature and moisture regimes (fig. 11). Sagebrush habitats across MZ I are unique from a range-wide perspective because soils are predominantly cool and ustic, or bordering on ustic as a result of summer precipitation; this soil moisture regime appears to result in higher resilience and resistance (Bradford and Lauenroth 2006).

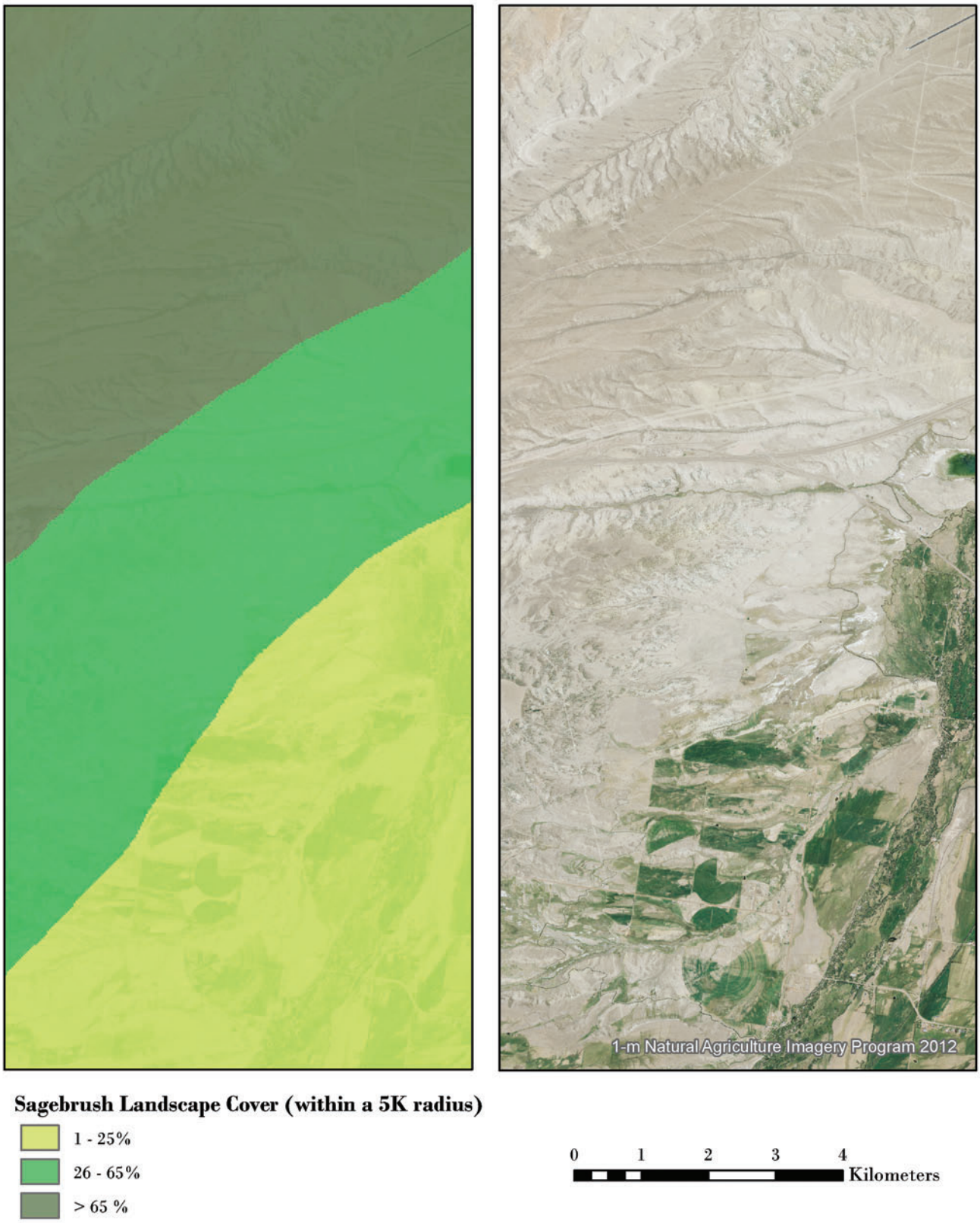

Figure 9. Landscape cover of sagebrush from 1-m National Agricultural Imagery (right) and the corresponding sagebrush landscape cover for the 1-25%, 26-65%, and >65% categories (left). See Appendix 2 for an explanation of how the categories are determined.

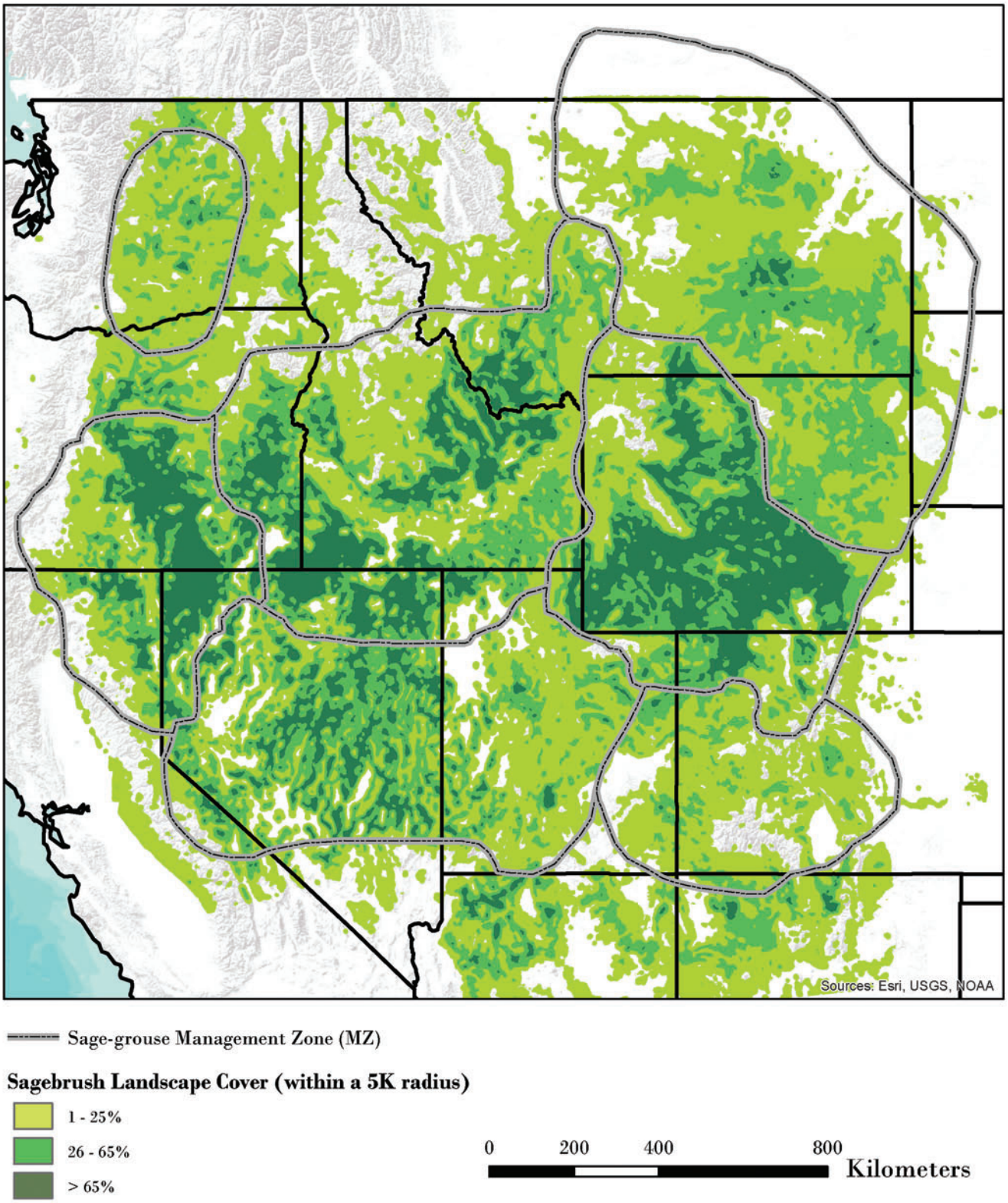

Figure 10. The landscape cover of sagebrush within each of three selected categories (1-25%, 26-65%, >65%) for the range of sage-grouse (Management Zones I – VII; Stiver et al. 2006). The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover.

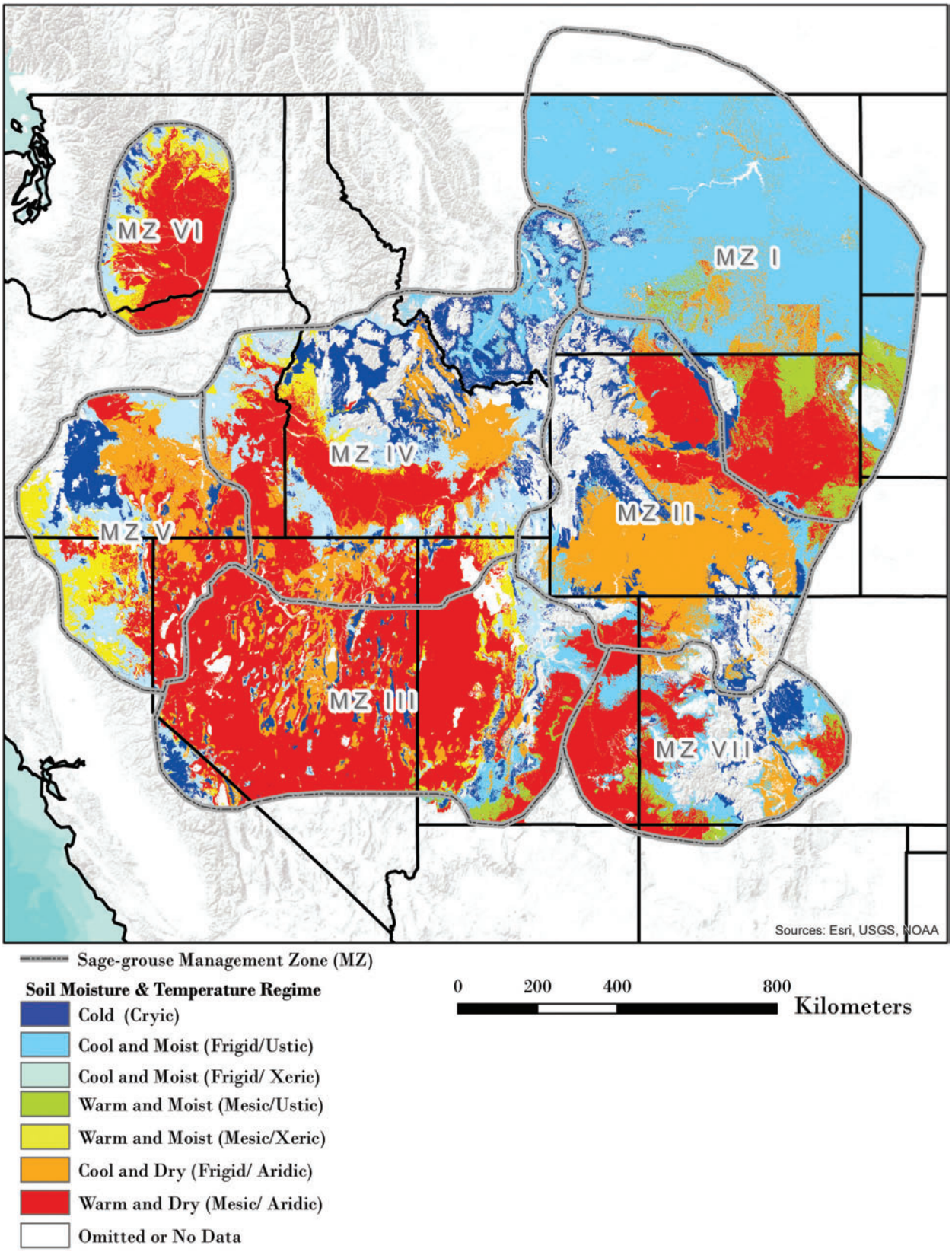

Figure 11. The soil temperature and moisture regimes for the range of sage-grouse (Management Zones I – VII; Stiver et al. 2006). Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b).

However, significant portions of MZs III (Southern Great Basin), much of IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin) are characterized largely by either warm and dry, or warm to cool and moist ecological types with moderate to low resilience and resistance (fig. 11; table 1). Areas within these MZs that have warm and dry soils are typically characterized by Wyoming big sagebrush ecosystems with low to moderately low resilience and resistance and are currently of greatest concern for sage-grouse conservation (fig. 12A). Areas with warm to cool soil temperature regimes and moist precipitation regimes are typically characterized by either Wyoming or mountain big sagebrush, have moderate to moderately low resilience and resistance,

Table 1. Predominant sagebrush ecological types in Sage-Grouse Management Zones III, IV, V, and VI based on soil temperature and soil moisture regimes, typical characteristics, and resilience to disturbance and resistance to invasive annual grasses (modified from Miller et al. 2014 a,b). Relative abundance of sagebrush species and composition of understory vegetation vary depending on Major Land Resource Area and ecological site type.

Ecological type	Characteristics	Resilience and resistance
Cold and Moist (Cryic/Xeric)	Ppt: 14 inches + Typical shrubs: *Mountain big sagebrush, snowfield sagebrush, snowberry, serviceberry, silver sagebrush, and/or low sagebrushes*	*Resilience* – **Moderately high**. Precipitation and productivity are generally high. Short growing seasons can decrease resilience on coldest sites. *Resistance*– **High**. Low climate suitability to invasive annual grasses
Cool and Moist (Frigid/Xeric)	Ppt: 12-22 inches Typical shrubs: *Mountain big sagebrush, antelope bitterbrush, snowberry, and/or low sagebrushes* Piñon pine and juniper potential in some areas	*Resilience* – **Moderately high**. Precipitation and productivity are generally high. Decreases in site productivity, herbaceous perennial species, and ecological conditions can decrease resilience. *Resistance* – **Moderate**. Climate suitability to invasive annual grasses is moderate, but increases as soil temperatures increase.
Warm and Moist (Mesic/Xeric)	Ppt: 12-16 inches Typical shrubs: *Wyoming big sagebrush, mountain big sagebrush, Bonneville big sagebrush, and/or low sagebrushes* Piñon pine and juniper potential in some areas	*Resilience* – **Moderate**. Precipitation and productivity are moderately high. Decreases in site productivity, herbaceous perennial species, and ecological conditions can decrease resilience. *Resistance* – **Moderately low**. Climate suitability to invasive annual grasses is moderately low, but increases as soil temperatures increase.
Cool and Dry (Frigid/Aridic)	Ppt: 6-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush, and/or low sagebrushes*	*Resilience* – **Low**. Effective precipitation limits site productivity. Decreases in site productivity, herbaceous perennial species, and ecological conditions further decrease resilience. *Resistance* – **Moderate**. Climate suitability to invasive annual grasses is moderate, but increases as soil temperatures increase.
Warm and Dry (Mesic/Aridic, bordering on Xeric)	Ppt: 8-12 inches Typical shrubs: *Wyoming big sagebrush, black sagebrush and/or low sagebrushes*	*Resilience* – **Low.** Effective precipitation limits site productivity. Decreases in site productivity, herbaceous perennial species, and ecological conditions further decrease resilience. Cool season grasses susceptibility to grazing and fire, along with hot dry summer fire conditions, promote cheatgrass establishment and persistence. *Resistance* – **Low.** High climate suitability to cheatgrass and other invasive annual grasses. Resistance generally decreases as soil temperature increases, but establishment and growth are highly dependent on precipitation.

and have the potential for piñon and juniper expansion (Miller et al. 2014a; Chambers et al. *in press*). Many of these areas also are of conservation concern because piñon and juniper expansion and tree infilling can result in progressive loss of understory species and altered fire regimes (Miller et al. 2013). In contrast, areas with cool to cold soil temperature regimes and moist precipitation regimes have moderately high resilience and high resistance and are likely to recover in a reasonable amount of time following wildfires and other disturbances (Miller et al. 2013) (fig. 12B)

Figure 12. A Wyoming big sagebrush ecosystem with warm and dry soils in southeast Oregon (top) (photo by Richard F. Miller), compared to a mountain big sagebrush ecosystem with cool and moist soils in central Nevada (bottom) (photo by Jeanne C. Chambers).

Management Strategies Based on Landscape Cover of Sagebrush and Ecosystem Resilience and Resistance: The Sage-Grouse Habitat Matrix

Knowledge of the potential resilience and resistance of sagebrush ecosystems can be used in conjunction with sage-grouse habitat requirements to determine priority areas for management and identify effective management strategies at landscape scales (Wisdom and Chambers 2009). The sage-grouse habitat matrix (table 2) illustrates the relative resilience to disturbance and resistance to invasive annual grasses of sagebrush ecosystems in relation to the proportion of sagebrush cover on the landscape. As resilience and resistance go from high to low, as indicated by the rows in the matrix, decreases in sagebrush regeneration and abundance of perennial grasses and forbs progressively limit the capacity of a sagebrush ecosystem to recover after fire or other disturbances. The risk of annual invasives increases and the ability to successfully restore burned or otherwise disturbed areas decreases. As sagebrush cover goes from low to high within these same ecosystems, as indicated by the columns in the matrix, the capacity to provide adequate habitat cover for sage-grouse increases. Areas with less than 25% landscape cover of sagebrush are unlikely to provide adequate habitat for sage-grouse; areas with 26-65% landscape cover of sagebrush can provide habitat for sage-grouse but are at risk if sagebrush loss occurs without recovery; and areas with >65% landscape cover of sagebrush provide the necessary habitat conditions for sage-grouse to persist. Potential landscape scale management strategies can be determined by considering (1) resilience to disturbance, (2) resistance to invasive annuals, and (3) sage-grouse land cover requirements. Overarching management strategies to maintain or increase sage-grouse habitat at landscape scales based on these considerations are conservation, prevention, restoration, and monitoring and adaptive management (table 3; see Chambers et al. 2014). These strategies have been adapted for each of the primary agency programs including fire operations, fuels management, post-fire rehabilitation, and habitat restoration (table 4). Because sagebrush ecosystems occur over continuums of environmental conditions, such as soil temperature and moisture, and have differing land use histories and species composition, careful assessment of the area of concern always will be necessary to determine the relevance of a particular strategy (Pyke 2011; Chambers et al. 2014; Miller et al. 2014 a, b). The necessary information for conducting this type of assessment is found in the “Putting It All Together” section of this report.

Although the sage-grouse habitat matrix (table 2) can be viewed as partitioning land units into spatially discrete categories (i.e., landscapes or portions thereof can be categorized as belonging to one of nine categories), it is not meant to serve as a strict guide to spatial allocation of resources or to prescribe specific management strategies. Instead, the matrix should serve as a decision support tool for helping managers implement strategies that consider both the resilience and resistance of the landscape and landscape sagebrush cover requirements of sage-grouse. For example, low elevation Wyoming big sagebrush plant communities with relatively low resilience and resistance may provide important winter habitat resources for a given sage-grouse population. In a predominantly Wyoming big sagebrush area comprised of relatively low sagebrush landscape cover, a high level of management input may be needed to realize conservation benefits for sage-grouse. This doesn’t mean that management activities should not be undertaken if critical or limiting sage-grouse habitat resources are present, but indicates that inputs will be intensive, potentially more expensive, and less likely to succeed relative to more resilient landscapes. It is up to the user of the matrix to determine how such tradeoffs influence management actions.

Table 2. Sage-grouse habitat matrix based on resilience and resistance concepts from Chambers et al. 2014, and sage-grouse habitat requirements from Aldridge et al. 2008, Wisdom et al. 2011, and Knick et al. 2013. Rows show the ecosystems relative resilience to disturbance and resistance to invasive annual grasses derived from the sagebrush ecological types in table 1 (1 = high resilience and resistance; 2 = moderate resilience and resistance; 3 = low resilience and resistance). Columns show the current proportion of the landscape (5-km rolling window) dominated by sagebrush (A = 1-25% land cover; B = 26-65% land cover; 3 = >65% land cover). Use of the matrix is explained in text. Overarching management strategies that consider resilience and resistance and landscape cover of sagebrush are in table 3. Potential management strategies specific to agency program areas, including fire operations, fuels management, post-fire rehabilitation, and habitat restoration are in table 4.

Ecosystem Resilience to Disturbance and Resistance to Invasive Annual Grasses	Proportion of Landscape Dominated by Sagebrush		
	Low 1-25%	**Moderate 26-65%**	**High >65%**
	Too little sagebrush on the landscape significantly threatens likelihood of sage-grouse persistence.	Sage-grouse are sensitive to the amount of sagebrush remaining on the landscape and populations could be at-risk with additional disturbances that remove sagebrush.	Sufficient sagebrush exists on the landscape and sage-grouse are highly likely to persist.
High	**1A** Natural sagebrush recovery is likely to occur, but if large, contiguous areas lack sagebrush, the time required for recovery may be too great.	**1B** Natural sagebrush recovery is likely to occur, but certain areas may lack connectivity.	**1C** Natural sagebrush recovery is likely to occur.
	Perennial herbaceous species are typically sufficient for recovery. Risk of annual invasives is low. Seeding/transplanting success is high. Recovery following inappropriate livestock use is often possible given changes in management.		
Moderate	**2A** Natural sagebrush recovery is likely on cooler and moister sites, but if large, contiguous areas lack sagebrush, the time required for recovery may be too great.	**2B** Natural sagebrush recovery is likely on cooler and moister sites, but certain areas may lack connectivity.	**2C** Natural sagebrush recovery is likely on cooler and moister sites.
	Perennial herbaceous species are usually adequate for recovery on cooler and moister sites. Risk of annual invasives is moderately high on warmer and drier sites. Seeding-transplanting success depends on site characteristics, and more than one intervention may be required especially on warmer and drier sites. Recovery following inappropriate livestock use depends on site characteristics and management.		
Low	**3A** Natural sagebrush recovery is not likely.	**3B** Natural sagebrush recovery may occur, but the time required will likely be too great and certain areas may lack connectivity.	**3C** Natural sagebrush recovery may occur, but the time required will likely be too great.
	Perennial herbaceous species are typically inadequate for recovery. Risk of annual invasives is high. Seeding/transplanting success depends on site characteristics, annual invasives, and post-treatment precipitation but is often low. More than one intervention likely will be required. Recovery following inappropriate livestock use is unlikely.		

Table 3. Potential management strategies based on resilience to disturbance, resistance to annual grass invasion, and sage-grouse habitat requirements based on Aldridge et al. 2008; Wisdom et al. 2011; and Knick et al. 2013 (adapted from Chambers et al. 2014).

Conserve – maintain or increase resilience to disturbance and resistance to invasive annuals in areas with high conservation value	
Priorities	• Ecosystems with low to moderate resilience to fire and resistance to invasive species that still have large patches of landscape sagebrush cover and adequate perennial grasses and forbs – *ecological types with warm and dry and cool and dry soil temperature/moisture regimes.* • Ecosystems with a high probability of providing habitat for sage-grouse, especially those with >65% landscape cover of sagebrush and adequate perennial herbaceous species – *all ecological types.*
Objective	• Minimize impacts of current and future human-caused disturbances and stressors.
Activities	• Immediately suppress fire in moderate to low resilience and resistance sagebrush and wooded shrublands to prevent an invasive annual grass-fire cycle. Large sagebrush patches are high priority for protection from wildfires. • Implement strategic fuel break networks to provide anchor points for suppression and reduce losses when wildfires escape initial attack. • Manage livestock grazing to prevent loss of perennial native grasses and forbs and biological soil crusts and allow natural regeneration. • Limit anthropogenic activities that cause surface disturbance, invasion, and fragmentation. (e.g., road and utility corridors, urban expansion, OHV use, and mineral/energy projects). • Detect and control new weed infestations.
Prevent – maintain or increase resilience and resistance of areas with declining ecological conditions that are at risk of conversion to a degraded, disturbed, or invaded state	
Priorities	• Ecosystems with moderate to high resilience and resistance – *ecological types with relatively cool and moist soil temperature and moisture regimes*. ○ Prioritize landscape patches that exhibit declining conditions due to annual grass invasion and/or tree expansion (e.g., at risk phase in State and Transition Models). • Ecosystems with a moderate to high probability of providing sage-grouse habitat, especially those with 26-65% landscape cover of sagebrush and adequate perennial native grasses and forbs – *all ecological types*.
Objectives	• Reduce fuel loads and decrease the risk of high intensity and high severity fire. • Increase abundance of perennial native grasses and forbs and of biological soil crusts where they naturally occur. • Decrease the longer-term risk of annual invasive grass dominance.
Activities	• Use mechanical treatments like cut and leave or mastication to remove trees, decrease woody fuels, and release native grasses and forbs in warm and moist big sagebrush ecosystems with relatively low resistance to annual invasive grasses that are in the early to mid-phase of piñon and/or juniper expansion. • Use prescribed fire or mechanical treatments to remove trees, decrease woody fuels, and release native grasses and forbs in cool and moist big sagebrush ecosystems with relatively high resistance to annual invasive grass that are in early to mid-phase of piñon and/or juniper expansion. • Actively manage post-treatment areas to increase perennial herbaceous species and minimize secondary weed invasion. • Consider the need for strategic fuel breaks to help constrain fire spread or otherwise augment suppression efforts.
Restore – increase resilience and resistance of disturbed, degraded, or invaded areas	

Priorities	• Areas burned by wildfire – *all ecological types*
	  ○ Prioritize areas with low to moderate resilience and resistance, and that have a reasonable expectation of recovery.
	  ○ Prioritize areas where perennial grasses and forbs have been depleted.
	  ○ Prioritize areas that experienced high severity fire.

(continued)

Table 3. (Continued).

	• Sage-grouse habitat – *all ecological types*
	  ○ Prioritize areas where restoration of sagebrush and/or perennial grasses is needed to create large patches of landscape cover of sagebrush or connect existing patches of sagebrush habitat.
	  ○ Prioritize areas with adequate landscape cover of sagebrush where restoration of perennial grasses and forbs is needed.
	• Areas affected by anthropogenic activities that cause surface disturbance, invasion, and fragmentation. (e.g., road and utility corridors, urban expansion, OHV use, and mineral/energy projects) – *all ecological types.*

Objectives	• Increase soil stability and curtail dust. • Control/suppress invasive annual grasses and other invasive plants. • Increase landscape cover of sagebrush. • Increase perennial grasses and forbs and biological soil crusts where they naturally occur. • Reduce the risk of large fires that burn sage-grouse habitat.
Activities	• Use integrated strategies to control/suppress annual invasive grass and other annual invaders. • Establish and maintain fuel breaks or greenstrips in areas dominated by invasive annual grasses that are adjacent to areas with >25% landscape sagebrush cover and adequate perennial native grasses and forbs. • Seed perennial grasses and forbs that are adapted to local conditions to increase cover of these species in areas where they are depleted. • Seed and/or transplant sagebrush to restore large patches of sagebrush cover and connect existing patches. • Repeat restoration treatments if they fail initially to ensure restoration success especially in warm and dry soil temperature moisture regimes where weather is often problematic for establishment. • Actively manage restored/rehabilitated areas to increase perennial herbaceous species and minimize secondary weed invasion.
Monitoring and Adaptive Management– implement comprehensive monitoring to track landscape change and management outcomes and provide the basis for adaptive management	
Priorities	• Regional environmental gradients to track changes in plant community and other ecosystem attributes and expansion or contraction of species ranges – *all ecological types.* • Assess treatment effectiveness – *all ecological types.*
Objectives	• Understand effects of wildfire, annual grass invasion, piñon and juniper expansion, climate change and other global stressors in sagebrush ecosystems • Increase understanding of the long- and short-term outcomes of management treatments.
Activities	• Establish a regional network of monitoring sites that includes major environmental gradients. • Collect pre- and post-treatment monitoring data for all major land treatments activities. • Collect data on ecosystem status and trends (for example, land cover type, ground cover, vegetation cover and height [native and invasive], phase of tree expansion, soil and site stability, oddities). • Use consistent methods to monitor indicators. • Use a cross-boundary approach that involves all major land owners. • Use a common data base for all monitoring results (e.g., Land Treatment Digital Library; http://greatbasin.wr.usgs.gov/ltdl/). • Develop monitoring products that track change and provide management implications and adaptations for future management. • Support and improve information sharing on treatment effectiveness and monitoring results across jurisdictional boundaries (e.g., Great Basin Fire Science Delivery Project; www.gbfiresci.org).

Table 4. Specific management strategies by agency program area for the cells within the sage-grouse habitat matrix (table 2). The rows indicate relative resilience and resistance (numbers) and the columns indicate landscape cover of sagebrush by category (letters). Resilience and resistance are based on soil temperature and moisture regimes (fig. 11) and their relationship to ecological types (table 1). Percentage of the landscape dominated by sagebrush is based on the capacity of large landscapes to support viable sage-grouse populations over the long term (fig. 8). Note that these guidelines are related to the sage-grouse habitat matrix, and do not preclude other factors from consideration when determining management priorities for program areas. The "Fire Operations" program area includes preparedness, prevention, and suppression activities.

High Resilience to Disturbance and Resistance to Invasive Annual Grasses (1A, 1B, 1C)	
Natural sagebrush recovery is likely to occur. Perennial herbaceous species are sufficient for recovery. Risk of invasive annual grasses is typically low.	
Fire Operations	• Fire suppression is typically third order priority, but varies with large fire risk and landscape condition (cells 1A, 1B, 1C). Scenarios requiring higher priority may include: ○ Areas of sagebrush that bridge large, contiguous expanses of sagebrush and that are important for providing connectivity for sage-grouse (cells 1B, 1C). ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 1A, 1B, 1C) ○ Areas with later phase (Phase III) post-settlement piñon and juniper that have high resistance to control, are subject to large and/or severe fires, and place adjacent sage-grouse habitat at risk (cells 1A, 1B). ○ All areas when critical burning environment conditions exist. These conditions may be identified by a number of products including, but not limited to: Predictive Services 7-Day Significant Fire Potential Forecasts; National Weather Service Fire Weather Watches and Red Flag Warnings; fire behavior forecasts or other local knowledge.
Fuels Management	• Fuels management to reduce large sagebrush stand losses is a second order priority, especially in cells 1B and 1C. Management activities include: ○ Strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Tree removal in early to mid-phase (Phases I, II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads. ○ Tree removal in later phase (Phase III), post-settlement piñon and juniper areas to reduce risks of large or high severity fires. Because these areas represent non-sage-grouse habitat, prescribed fire may be appropriate on cool and moist sites, but invasive plant control and restoration of sagebrush and perennial native grasses and forbs may be necessary.
Post-Fire Rehabilitation	• Post-fire rehabilitation is generally low priority (cells 1A, 1B, 1C). Areas of higher priority include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Steep slopes and soils with erosion potential.
Habitat Restoration and Recovery	• Restoration is typically passive and designed to increase or maintain perennial herbaceous species, biological soil crusts and landscape cover of sagebrush (cells 1A, 1B, 1C). Areas to consider for active restoration include: ○ Areas where perennial herbaceous cover density, or composition is inadequate for recovery after surface disturbance. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse.
Moderate Resilience to Disturbance and Resistance to Invasive Annuals (2A, 2B, 2C)	
Natural sagebrush recovery is likely to occur on cooler and moister sites, but the time required may be too great if large, contiguous areas lack sagebrush. Perennial herbaceous species are usually adequate for recovery on cooler and moister sites. Risk of invasive annual grasses is moderately high on warmer and drier sites.	
Fire Operations	• Fire suppression is typically second order priority (cells 2A, 2B, 2C). Scenarios requiring higher priority may include: ○ Areas of sagebrush that bridge large, contiguous expanses of sagebrush and that are important for providing connectivity for sage-grouse (cells 2B, 2C).

(continued)

Table 4. (Continued).

	○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 2A, 2B, 2C) ○ Areas with later phase (Phase III), post-settlement piñon and juniper that have high resistance to control, are subject to large and/or severe fires, and place adjacent sage-grouse habitat at risk (cells 2A, 2B). ○ Areas where annual grasslands place adjacent sage-grouse habitat at risk (cell 2A). ○ All areas when critical burning environment conditions exist. These conditions may be identified by a number of products including, but not limited to: Predictive Services 7-Day Significant Fire Potential Forecasts; National Weather Service Fire Weather Watches and Red Flag Warnings; fire behavior forecasts or other local knowledge.
Fuels Management	• Fuels management to reduce large sagebrush stand losses is a first order priority, especially in cells 2B and 2C. Management activities include: ○ Strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Tree removal in early to mid-phase (Phase I, II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads. ○ Tree removal in later phase (Phase III), post-settlement piñon and juniper areas to reduce risks of large or high severity fires. Because these areas represent non-sage-grouse habitat, prescribed fire may be appropriate on cool and moist sites, but restoration of sagebrush and perennial native grasses and forbs may be necessary.
Post-Fire Rehabilitation	• Post-fire rehabilitation is generally low priority (cells 2A, 2B, 2C) in cooler and moister areas. Areas of higher priority include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Relatively warm and dry areas where annual invasives are expanding. ○ Steep slopes with erosion potential.
Habitat Restoration and Recovery	• Restoration is typically passive on cooler and moister areas and is designed to increase or maintain perennial herbaceous species, biological soil crusts, and landscape cover of sagebrush (cells 2A, 2B, 2C). Areas to consider for active restoration include: ○ Areas where perennial herbaceous cover, density, and species composition is inadequate for recovery after surface disturbance. ○ Areas where seeding or transplanting sagebrush is needed to maintain habitat connectivity for sage-grouse. ○ Relatively warm and dry areas where annual invasives are expanding.

Low Resilience to Disturbance and Resistance to Invasive Annuals (3A, 3B, 3C)

Natural sagebrush recovery is not likely. Perennial herbaceous species are typically inadequate for recovery. Risk of invasive annual grasses is high.

Fire Operations	• Fire suppression priority depends on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). These areas may be a higher priority if they are adjacent to intact sage-grouse habitat or are essential for connectivity. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). These areas are higher priority if they have intact understories and if they are adjacent to sage-grouse habitat. ○ Areas with >65% landscape cover of sagebrush are first order priority (cell 3C). ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 3A, 3B, 3C).

(continued)

Table 4. (Continued).

Fuels Management	• Fuels management priority and management activities depend on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). Strategic placement of fuel breaks may be needed to reduce loss of adjacent sage-grouse habitat by wildfire. Examples include linear features or other strategically placed treatments that serve to constrain fire spread or otherwise augment suppression efforts. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). These areas are higher priority if they have intact understories and if they are adjacent to sage-grouse habitat. Strategic placement of fuel breaks may be needed to reduce loss of large sagebrush stands by wildfire. ○ Areas with >65% landscape cover of sagebrush are first order priority (cell 3C). Strategic placement of fuel breaks may be needed to reduce loss of large sagebrush stands by wildfire. ○ Areas where sagebrush communities have been successfully reestablished through seedings or other rehabilitation investments (cells 3A, 3B, 3C). Strategic placement of fuel breaks may be needed to protect investments from repeated loss to wildfire.
Post-Fire Rehabilitation	• Post-fire rehabilitation priority and management activities depend on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority (cell 3A). Exceptions include (1) sites that are relatively cool and moist and (2) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. In highly invaded areas, integrated strategies that include seeding of perennial herbaceous species and seeding and/or transplanting sagebrush will be required. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). Exceptions include (1) sites that are relatively cool and moist or that are not highly invaded, and (2) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. Seeding of perennial herbaceous species will be required where cover, density and species composition of these species is inadequate for recovery. Seeding and/or transplanting sagebrush as soon as possible is necessary for rehabilitating sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with >65% landscape cover of sagebrush are first order priority, especially if they are part of a larger, contiguous area of sagebrush (cell 3C). Seeding of perennial herbaceous species will be required where cover, density and species composition of these species is inadequate for recovery. Seeding and/or transplanting sagebrush as soon as possible is necessary for rehabilitating sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation.
Habitat Restoration and Recovery	• Restoration priority and management activities depends on the landscape cover of sagebrush: ○ Areas with <25% landscape cover of sagebrush are typically third order priority. Exceptions include (1) surface disturbances and (2) areas adjacent to sage-grouse habitat where seeding can be used to prevent annual invasive spread (cell 3A). In highly invaded areas, integrated strategies that include seeding of perennial herbaceous species and seeding and/or transplanting sagebrush will be required. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with 26-65% landscape cover of sagebrush are typically second order priority (cell 3B). Exceptions include (1) surface disturbances, (2) sites that are relatively cool and moist or that are not highly invaded, and (3) areas adjacent to sage-grouse habitat where seeding can be used to increase connectivity and prevent annual invasive spread. Seeding of perennial herbaceous species may be required where cover, density and species composition of these species is inadequate. Seeding and/or transplanting sagebrush as soon as possible is necessary for restoring sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation. ○ Areas with >65% landscape cover of sagebrush are first order priority, especially if they are part of a larger, contiguous area of sagebrush (cell 3C). Seeding of perennial herbaceous species may be required where cover, density, and species composition of these species is inadequate. Seeding and/or transplanting sagebrush as soon as possible is necessary for restoring sage-grouse habitat. Success will likely require more than one intervention due to low and variable precipitation.

Another important consideration is that ecological processes such as wildfire can occur either within or across categories in the sage-grouse habitat matrix and it is necessary to determine the appropriate spatial context when evaluating management opportunities based on resilience and resistance and sage-grouse habitat. For example, if critical sage-grouse habitat occurs in close proximity to landscapes comprised mainly of annual grass-dominated plant communities, then fire risk to adjacent sage-grouse habitat can increase dramatically (Balch et al. 2013). In this scenario, management actions could include reducing the influence of invasive annual grasses with a strategic fuel break on the perimeter of intact sagebrush. Thus, management actions may have value to sustaining existing sage-grouse habitat, even if these measures are applied in locations that are currently not habitat; the spatial relationships of sagebrush and invasive annual grasses should be considered when prioritizing management actions and associated conservation measures.

Informing Wildfire and Fuels Management Strategies to Conserve Sage-Grouse

Collectively, responses to wildfires and implementation of fuels management projects are important contributors to sage-grouse conservation. Resilience and resistance concepts provide a science-based background that can inform fire operations and fuels management strategies and allocation of scarce assets during periods of high fire activity. In fire operations, firefighter and public safety is the overriding objective in all decisions. In addition, land managers consider numerous other values at risk, including the Wildland-Urban Interface (WUI), habitats, and infrastructure when allocating assets and prioritizing efforts. Resilience and resistance concepts are especially relevant for evaluating tradeoffs related to current ecological conditions and rates of recovery and possible ecological consequences of different fire management activities. For example, prioritizing initial attack efforts based on ecological types and their resilience and resistance at fire locations is a possible future application of resilience and resistance concepts. Also, fire prevention efforts can be concentrated where human ignitions have commonly occurred near intact, high quality habitats that also have inherently low resilience and resistance.

Fuels management projects are often applied to (1) constrain or minimize fire spread; (2) alter species composition; (3) modify fire intensity, severity, or effects; or (4) create fuel breaks or anchor points that augment fire management efforts (fig. 13). These activities are selectively used based on the projected ecosystem response, anticipated fire patterns, and probability of success. For example, in areas that are difficult to restore due to low to moderate resilience, fuel treatments can be placed to minimize fire spread and conserve sagebrush habitat. In cooler and moister areas with moderate to high resilience and resistance, mechanical or prescribed fire treatments may be appropriate to prevent conifer expansion and dominance. Given projected climate change and longer fire seasons across the western United States, fuels management represents a proactive approach for modifying large fire trends. Fire operations and fuels management programs contribute to a strategic, landscape approach when coupled with data that illustrate the likelihood of fire occurrence, potential fire behavior, and risk assessments (Finney et al. 2010; Oregon Department of Forestry 2013). In tandem with resilience and resistance concepts, these data can further inform fire operations and fuels management decisions.

Figure 13. Fuel breaks may include roads, natural features, or other management imposed treatments intended to modify fire behavior or otherwise augment suppression efforts at the time of a fire. Such changes in fuel type and arrangement may improve suppression effectiveness by modifying flame length and fire intensity, and allow fire operations to be conducted more safely. The top photo shows a burnout operation along an existing road to remove available fuels ahead of an oncoming fire and constrain overall fire growth (photo by BLM Idaho Falls District). The bottom photo shows fuel breaks located along a road, which complimented fire control efforts when a fire intersected the fuel break and road from the right (photo by Ben Dyer, BLM).

Putting it all Together

Effective management and restoration of sage-grouse habitat will benefit from a collaborative approach that prioritizes the best management practices in the most appropriate places. This section describes an approach for assessing focal areas for sage-grouse habitat management based on widely available data, including (1) Priority Areas for Conservation (PACs), (2) breeding bird densities, (3) habitat suitability as indicated by the landscape cover of sagebrush, (4) resilience and resistance and dominant ecological types as indicated by soil temperature and moisture regimes, and (5) habitat threats as indicated by cover of cheatgrass, cover of piñon and juniper, and by fire history. Breeding bird density data are overlain with landscape cover of sagebrush and with resilience and resistance to spatially link sage-grouse populations with habitat conditions and risks. We illustrate the use of this step-down approach for evaluating focal areas for sage-grouse habitat management across the western portion of the range, and we provide a detailed example for a diverse area in the northeast corner of Nevada that is comprised largely of PACs with mixed land ownership. The sage-grouse habitat matrix (table 2) is used as a tool in the decision process, and guidelines are provided to assist in determining appropriate management strategies for the primary agency program areas (fire operations, fuels management, post-fire rehabilitation, habitat restoration) for each cell of the matrix.

We conclude with discussions of the tools available to aid in determining the suitability of an area for treatment and the most appropriate management treatments such as ecological site descriptions and state and transition models and of monitoring and adaptive management. Datasets used to compile the maps in the following sections are in Appendix 4.

Assessing Focal Areas for Sage-Grouse Habitat Management: Key Data Layers

Priority areas for conservation: The recent identification of sage-grouse strongholds, or Priority Areas for Conservation (PACs), greatly improves the ability to target management actions towards habitats expected to be critical for long-term viability of the species (fig. 14; USFWS 2013). Understanding and minimizing risks of large-scale loss of sagebrush and conversion to invasive annual grasses or piñon and juniper in and around PACs will be integral to maintaining sage-grouse distribution and stabilizing population trends. PACs were developed by individual states to identify those areas that are critical for ensuring adequate representation, redundance, and resilience to conserve sage-grouse populations. Methods differed among states; in general, PAC boundaries were identified based on (1) sage-grouse population data including breeding bird density, lek counts, telemetry, nesting areas, known distributions, and sightings/observations; and (2) habitat data including occupied habitat, suitable habitat, seasonal habitat, nesting and brood rearing areas, and connectivity areas or corridors. Sage-grouse habitats outside of PACs also are important in assessing focal areas for management where they provide connectivity between PACs (genetic and habitat linkages), seasonal habitats that may have been underestimated due to emphasis on lek sites to define priority areas, habitat restoration and population expansion opportunities, and flexibility for managing habitat changes that may result from climate change (USFWS 2013). If PAC boundaries are adjusted, they will need to be updated for future analyses.

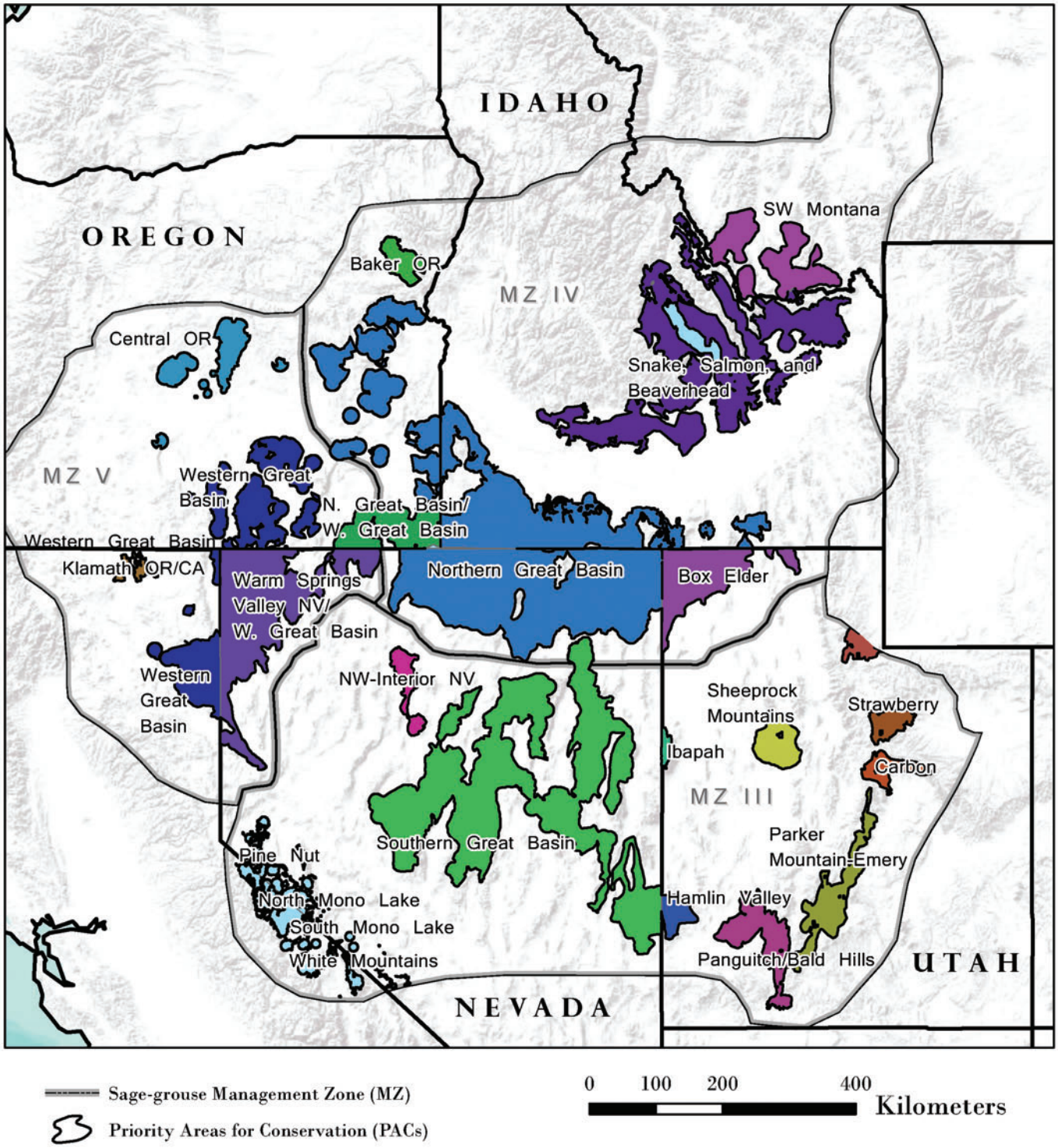

Figure 14. Priority Areas for Conservation (PACs) within the range of sage-grouse (USFWS 2013). Colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Breeding bird density: Range-wide breeding bird density areas provide one of the few accessible data sets for further prioritizing actions within and adjacent to PACs to maintain species distribution and abundance. Doherty et al. (2010b) developed a useful framework for incorporating population data in their range-wide breeding bird density analysis, which used maximum counts of males on leks (n = 4,885) to delineate breeding bird density areas that contain 25, 50, 75, and 100% of the known breeding population (fig. 15). Leks were mapped according to these abundance values and buffered by a 6.4 to 8.5 km (4.0 to 5.3 mi) radius to delineate nesting areas. Findings showed that while sage-grouse occupy extremely large landscapes, their breeding distribution is highly aggregated in comparably smaller identifiable population centers; 25% of the known population occurs within 3.9% (2.9 million ha; 7.2 million ac) of the species range, and 75% of birds are within 27.0% of the species range (20.4 million ha; 50.4 million ac) (Doherty et al. 2010b). The Doherty et al. (2010b) analysis emphasized breeding habitats primarily because little broad scale data exist for summer and winter habitat use areas. Even though the current breeding bird density data provide the most comprehensive data available, they do not include all existing sage-grouse populations. Incorporating finer scale seasonal habitat use data at local levels where it is available will ensure management actions encompass all seasonal habitat requirements.

For this assessment, we chose to use State-level breeding bird density results from Doherty et al. (2010b) instead of range-wide model results to ensure that important breeding areas in MZs III, IV, and V were not underweighted due to relatively higher bird densities in the eastern portion of the range. It is important to note that breeding density areas were identified using best available information in 2009, so these range-wide data do not reflect the most current lek count information or changes in conditions since the original analysis. Also, breeding density areas should not be viewed as rigid boundaries but rather as the means to prioritize landscapes regionally where step-down assessments and actions may be implemented quickly to conserve the most birds.

Landscape cover of sagebrush: Landscape cover of sagebrush is one of the key determinants of sage-grouse population persistence and, in combination with an understanding of resilience to disturbance and resistance to invasive annuals, provides essential information both for determining priority areas for management and appropriate management actions (fig. 10; tables 2 and 3). Landscape cover of sagebrush is a measure of large, contiguous patches of sagebrush on the landscape and is calculated from remote sensing databases such as LANDFIRE (see Appendix 4). We used the three cover categories of sagebrush landscape cover discussed previously to predict the likelihood of sustaining sage-grouse populations (1-25%, 25-65%, >65%). The sagebrush landscape cover datasets were created using a moving window to summarize the proportion of area (5-km [3.1-mi] radius) dominated by sagebrush surrounding each 30-m pixel and then assigned those areas to the three categories (see Appendix 2). Because available sagebrush cover from sources such as LANDFIRE does not exclude recent fire perimeters, it was necessary to either include these in the analysis of landscape cover of sagebrush or display them separately. Although areas that have burned since 2000 likely do not currently provide desired sage-grouse habitat, areas with the potential to support sagebrush ecological types can provide conservation benefits in the overall planning effort especially within long-term conservation areas like PACs. The landscape cover of sagebrush and recent fire perimeters are illustrated for the western portion of the range (fig.16) and northeast Nevada (fig. 17).

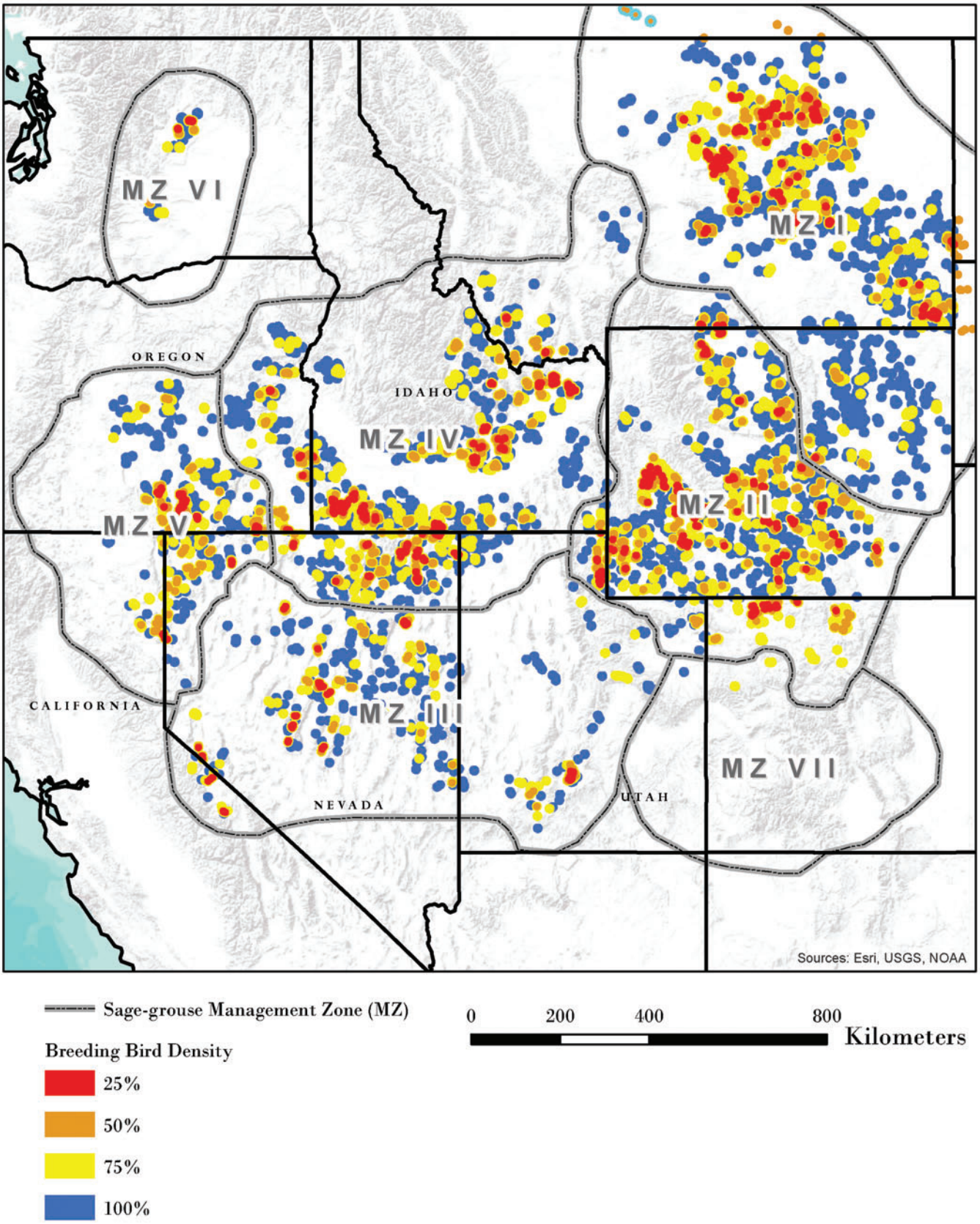

Figure 15. Range-wide sage-grouse breeding bird densities from Doherty et al. 2010. Points illustrate breeding bird density areas that contain 25, 50, 75, and 100% of the known breeding population and are based on maximum counts of males on leks (n = 4,885). Leks were mapped according to abundance values and buffered by 6.4 to 8.5 km (4.0 to 5.2 mi) to delineate nesting areas.

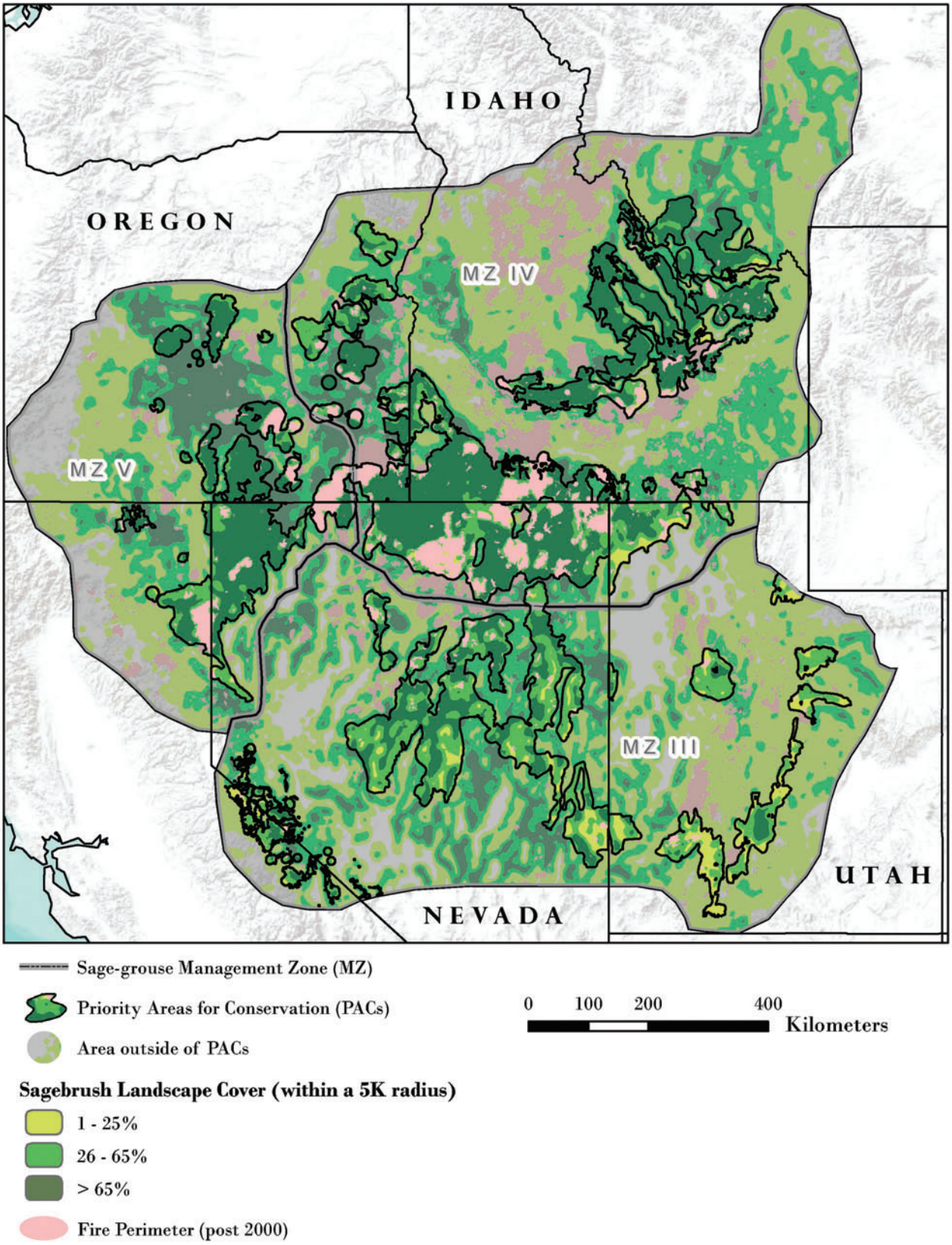

Figure 16. The landscape cover of sagebrush within each of three selected categories (1-25%, 26-65%, >65%) for Management Zones III, IV, and V (Stiver et al. 2006). The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover. Darker colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

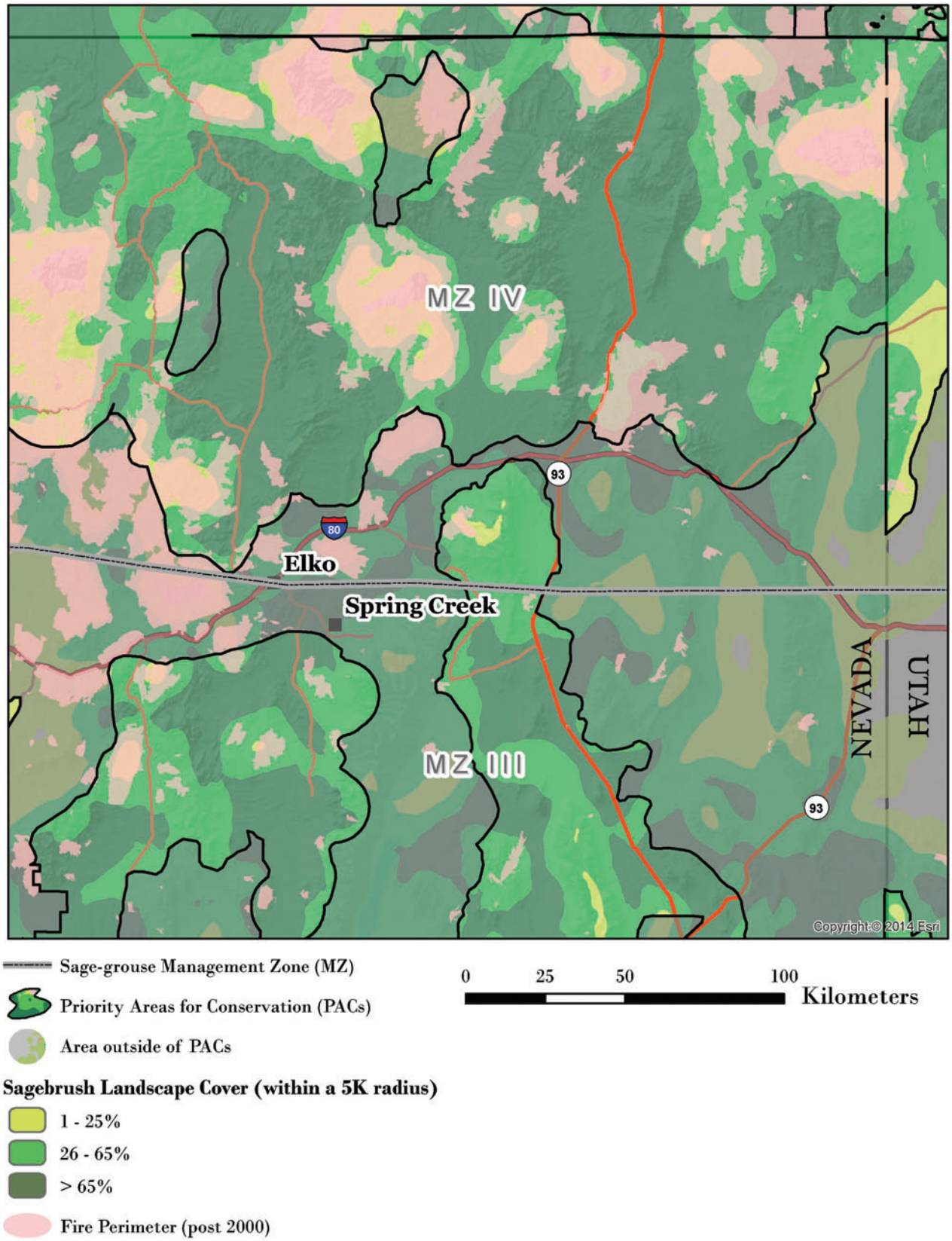

Figure 17. The landscape cover of sagebrush within each of the selected categories (1-25%, 26-65%, >65%) for the northeastern portion of Nevada. The proportion of sagebrush (USGS 2013) within each of the categories in a 5-km (3.1-mi) radius surrounding each pixel was calculated relative to other land cover types for locations with sagebrush cover. Darker colored polygons delineate Priority Areas for Conservation (USFWS 2013).

Resilience to disturbance and resistance to annuals: Soil temperature and moisture regimes are a strong indicator of ecological types and of resilience to disturbance and resistance to invasive annual plants (fig. 11; table 1). Resilience and resistance predictions coupled with landscape cover of sagebrush can provide critical information for determining focal areas for targeted management actions (tables 2, 3, and 4). The available data for the soil temperature and moisture regimes were recently compiled to predict resilience and resistance (see Appendix 3). These data, displayed for the western portion of the range and northeast Nevada (figs. 18 and 19), illustrate the spatial variability within the focal areas. Soil temperature and moisture regimes are two of the primary determinants of ecological types and of more detailed ecological site descriptions, which are described in the section on "Determining the Most Appropriate Management Treatments at the Project Scale."

Habitat threats: Examining additional land cover data or models of invasive annual grasses and piñon and/or juniper, can provide insights into the current extent of threats in a planning area (e.g., Manier et al. 2013). In addition, evaluating data on fire occurrence and size can provide information on fire history and the rate and pattern of change within the planning area. Data layers for cheatgrass cover have been derived from Landsat imagery (Peterson 2006, 2007) and from model predictions based on species occurrence, climate variables, and anthropogenic disturbance (e.g., the Bureau of Land Management [BLM] Rapid Ecoregional Assessments [REAs]). The REAs contain a large amount of geospatial data that may be useful in providing landscape scale information on invasive species, disturbances, and vegetation types across most of the range of sage-grouse (http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas.html). Similarly, geospatial data for piñon and/or juniper have been developed for various States (e.g., Nevada and Oregon) and are becoming increasingly available rangewide. In addition, more refined data products are often available at local scales. Land managers can evaluate the available land cover datasets and select those land covers with the highest resolution and accuracy for the focal area. Land cover of cheatgrass and piñon and/or juniper and the fire history of the western portion of the range and northeast Nevada are in figures 20-25.

Assessing Focal Areas for Sage-Grouse Habitat Management: Integrating Data Layers

Combining resilience and resistance concepts with sage-grouse habitat and population data can help land managers further gauge relative risks across large landscapes and determine where to focus limited resources to conserve sage-grouse populations. Intersecting breeding bird density areas with soil temperature and moisture regimes provides a spatial tool to depict landscapes with high bird concentrations that may have a higher relative risk of being negatively affected by fire and annual grasses (figs. 26, 27). For prioritization purposes, areas supporting 75% of birds (6.4 to 8.5 km [4.0 to 5.2 mi] buffer around leks) can be categorized as high density while remaining breeding bird density areas (75-100% category; 8.5-km [5.2-mi] buffer around leks) can be categorized as low density. Similarly, warm and dry types can be categorized as having relatively low resilience to fire and resistance to invasive species and all other soil temperature and moisture regimes can be categorized as having relatively moderate to high resilience and resistance. Intersecting breeding bird density areas with landscape cover of sagebrush provides another spatial component revealing large and intact habitat blocks and areas in need of potential restoration to provide continued connectivity (fig. 28).

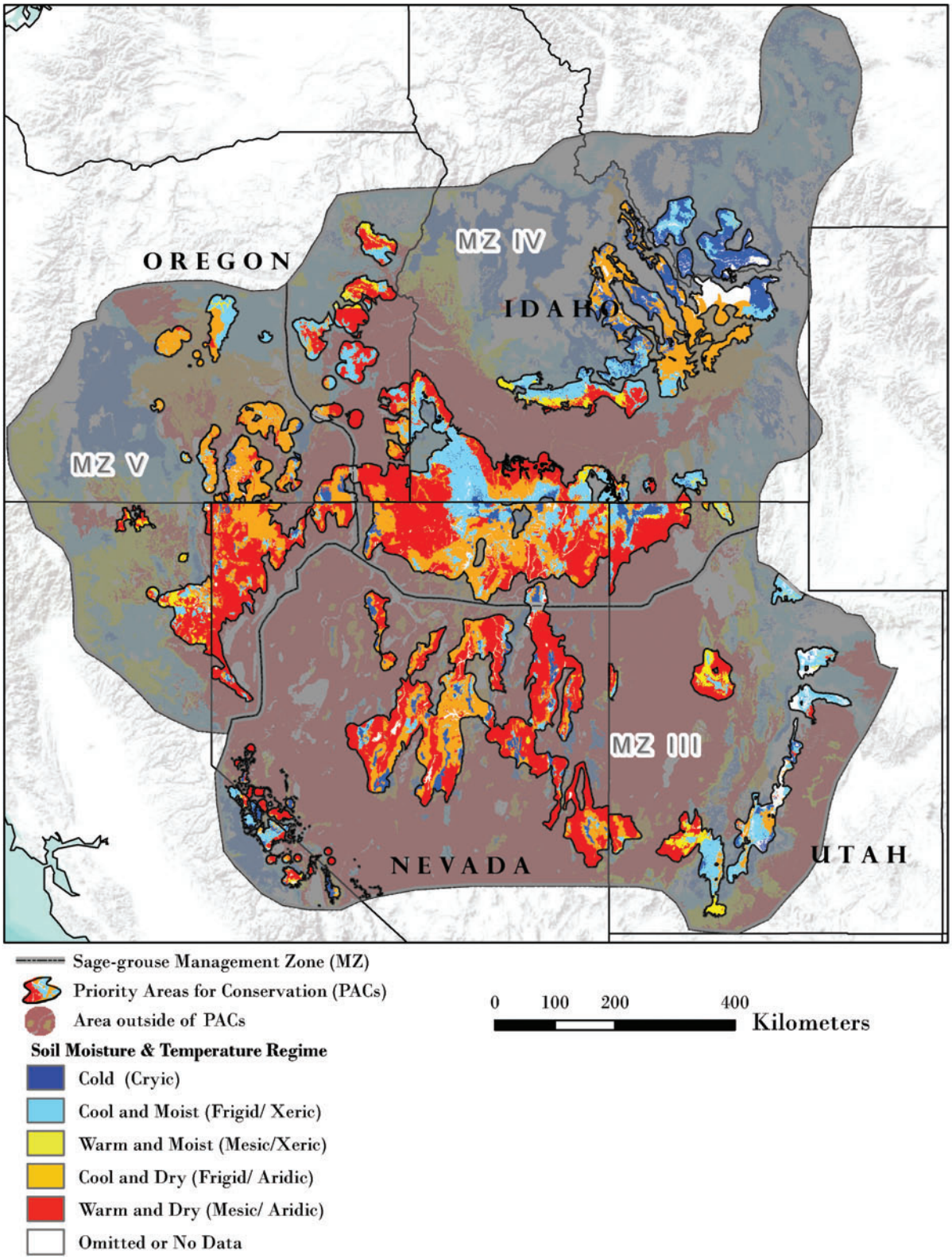

Figure 18. The soil temperature and moisture regimes within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b). Darker colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

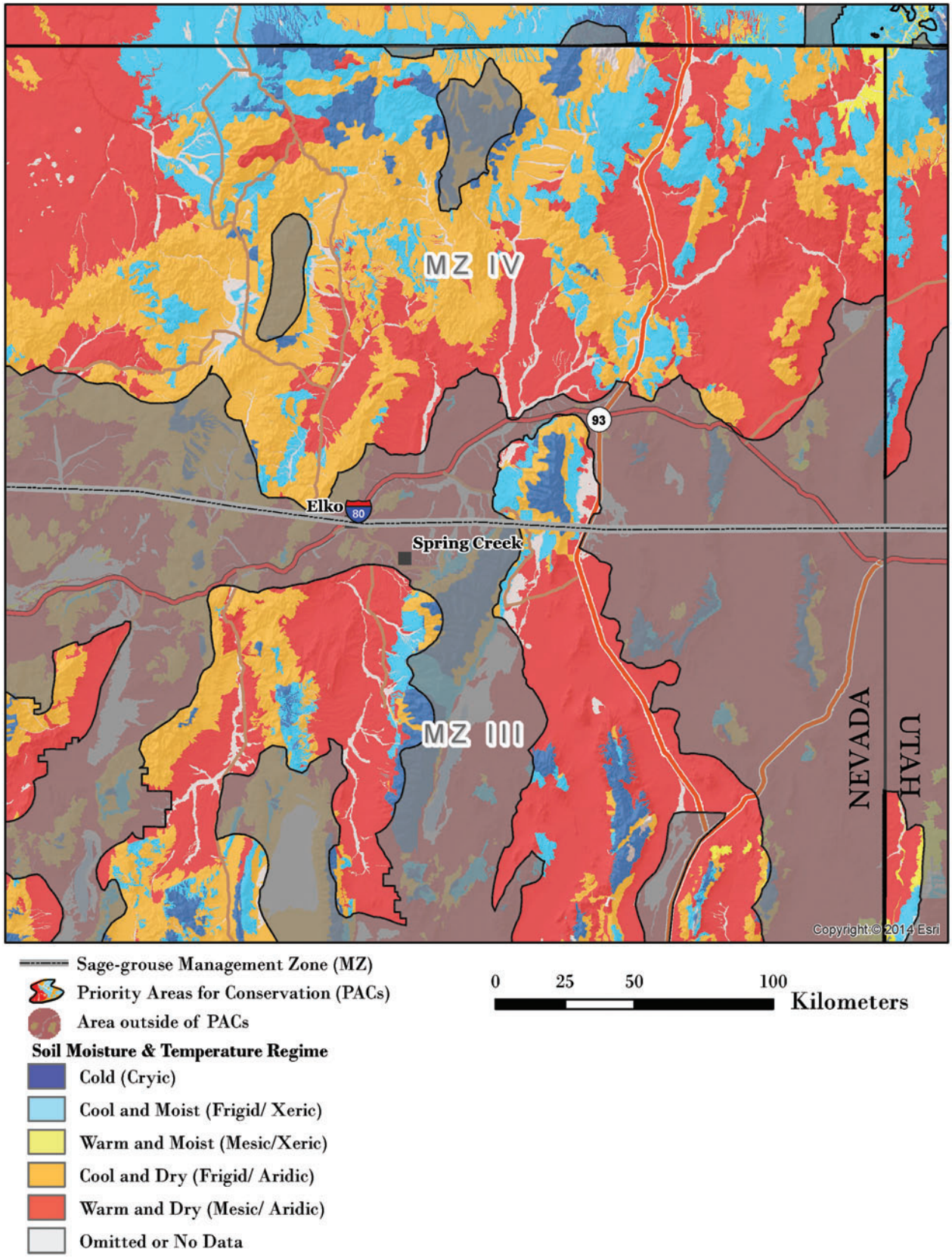

Figure 19. The soil temperature and moisture regimes for the northeast corner of Nevada. Soil temperature and moisture classes were derived from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (Soil Survey Staff 2014a). Gaps in that dataset were filled in with the NRCS State Soil Geographic Database (STATSGO) (Soil Survey Staff 2014b). Darker colored polygons delineate Priority Areas for Conservation (USFWS 2013).

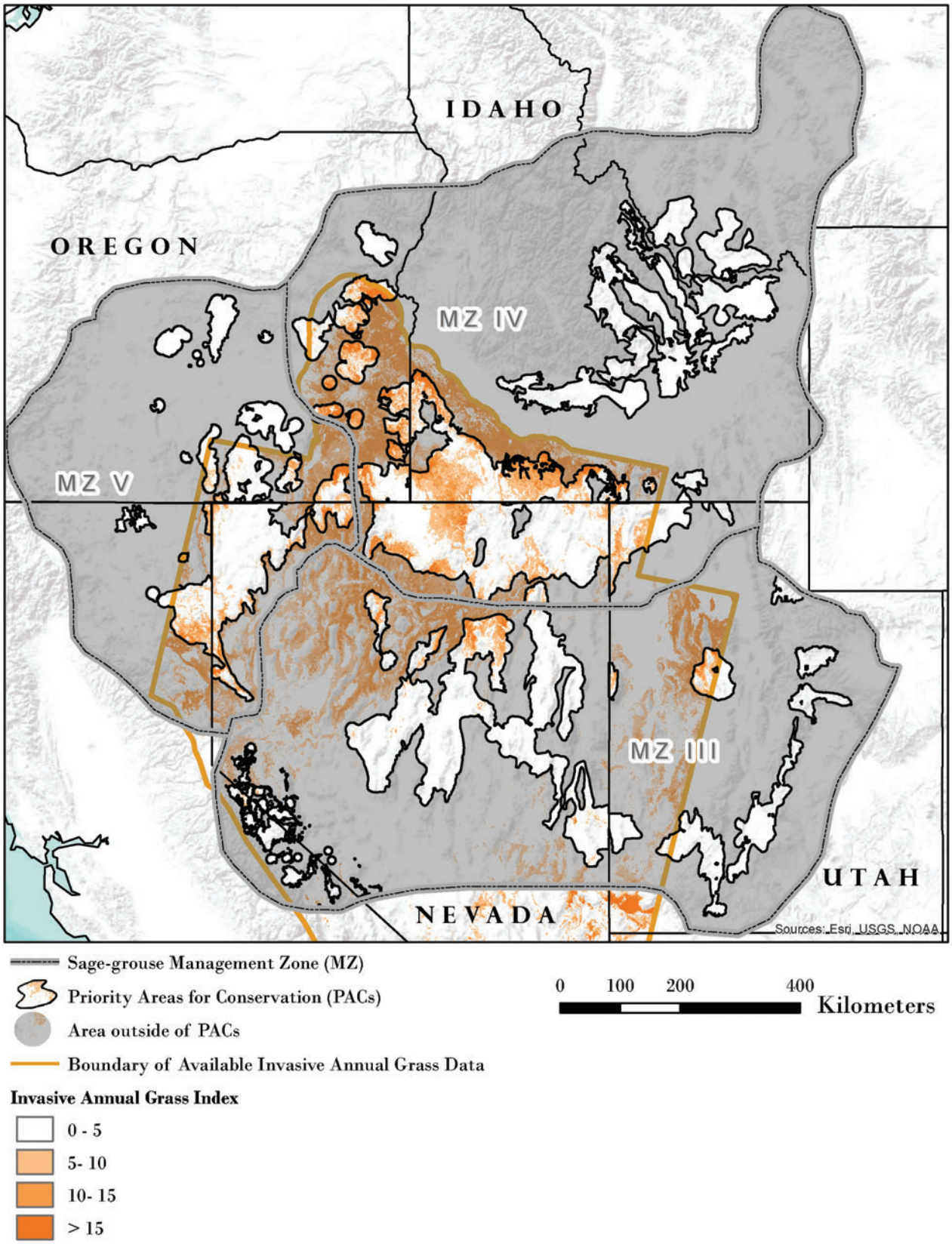

Figure 20. Invasive annual grass index for Nevada (Peterson 2006) and the Owhyee uplands (Peterson 2007) displayed for sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

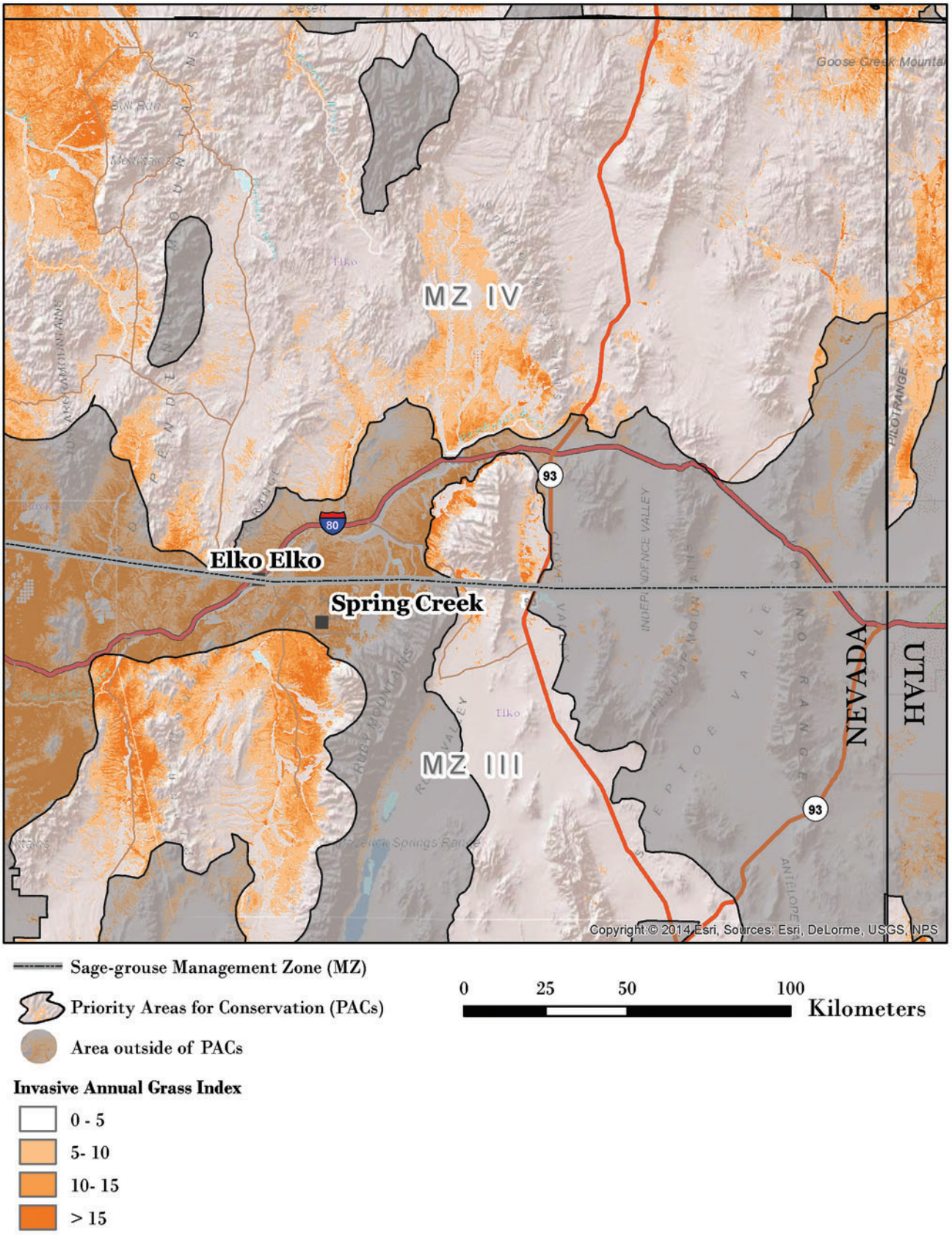

Figure 21. Invasive annual grass index for Nevada (Peterson 2006) and the Owhyee uplands (Peterson 2007) displayed for the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

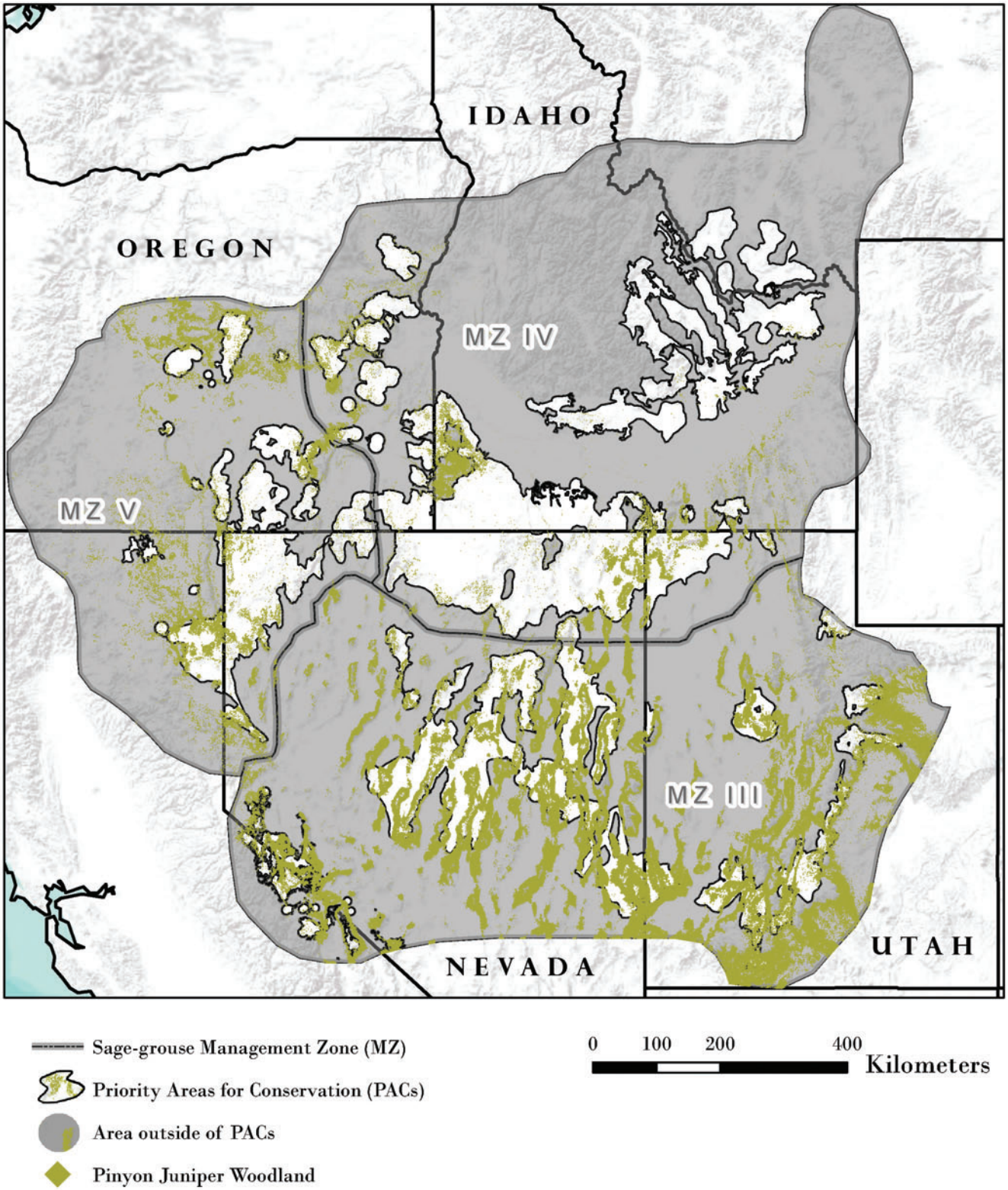

Figure 22. Piñon and/or juniper woodlands (USGS 2004; USGS 2013) within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Figure 23. Piñon and/or juniper woodlands (USGS 2004; USGS 2013) within the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

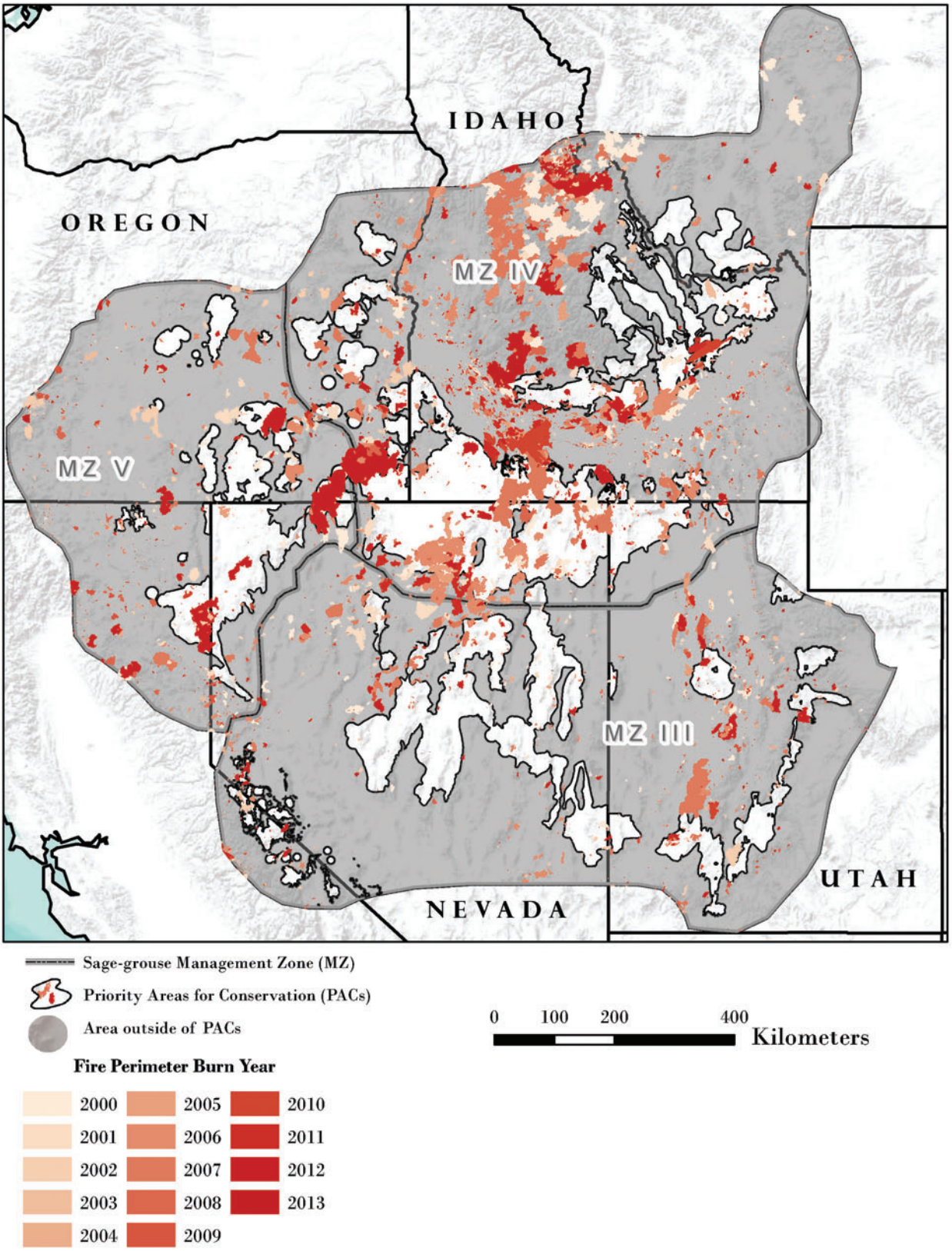

Figure 24. Fire perimeters (Walters et al. 2011; Butler and Bailey 2013) within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Ligher colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

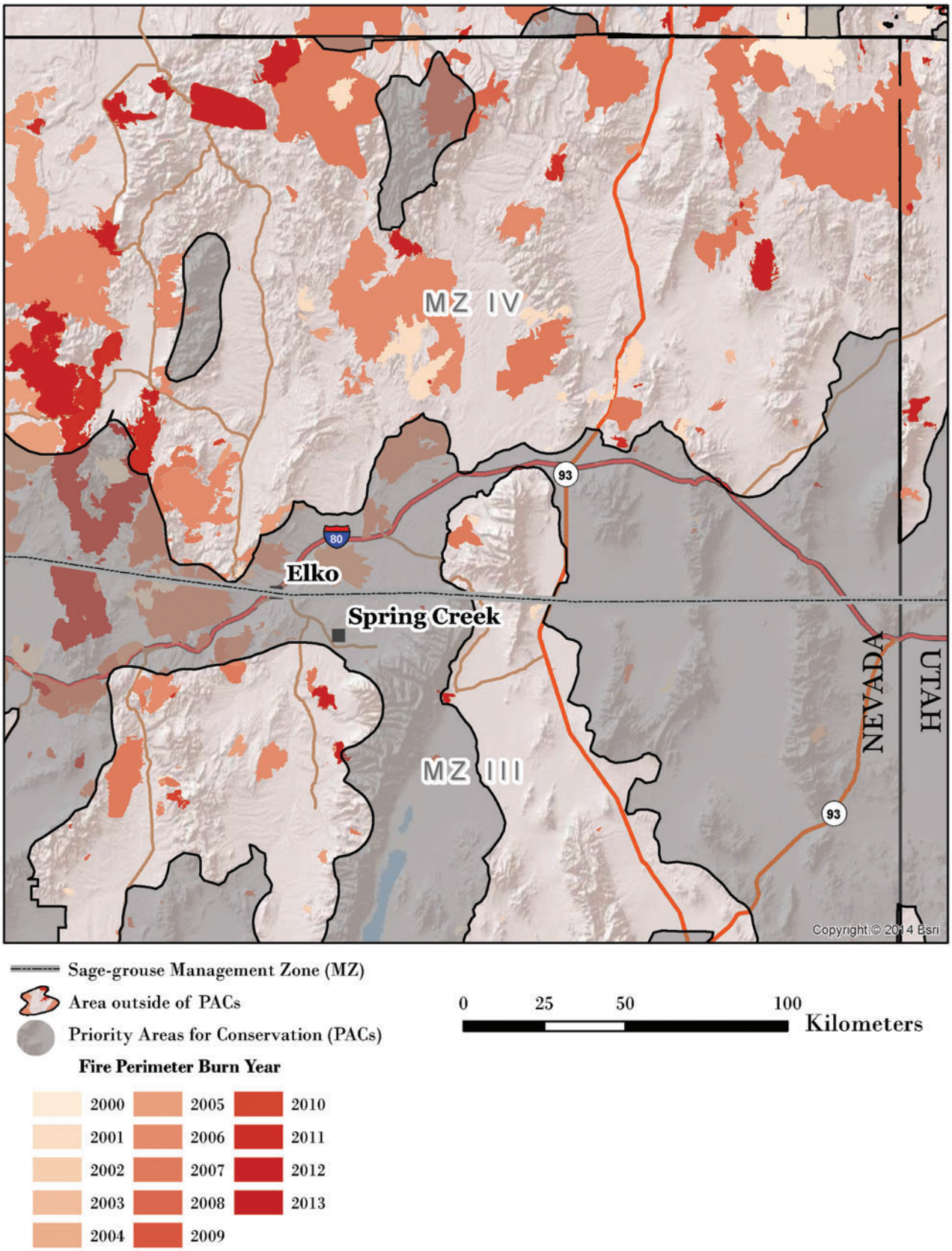

Figure 25. Fire perimeters (Walters et al. 2011; Butler and Bailey 2013) within the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

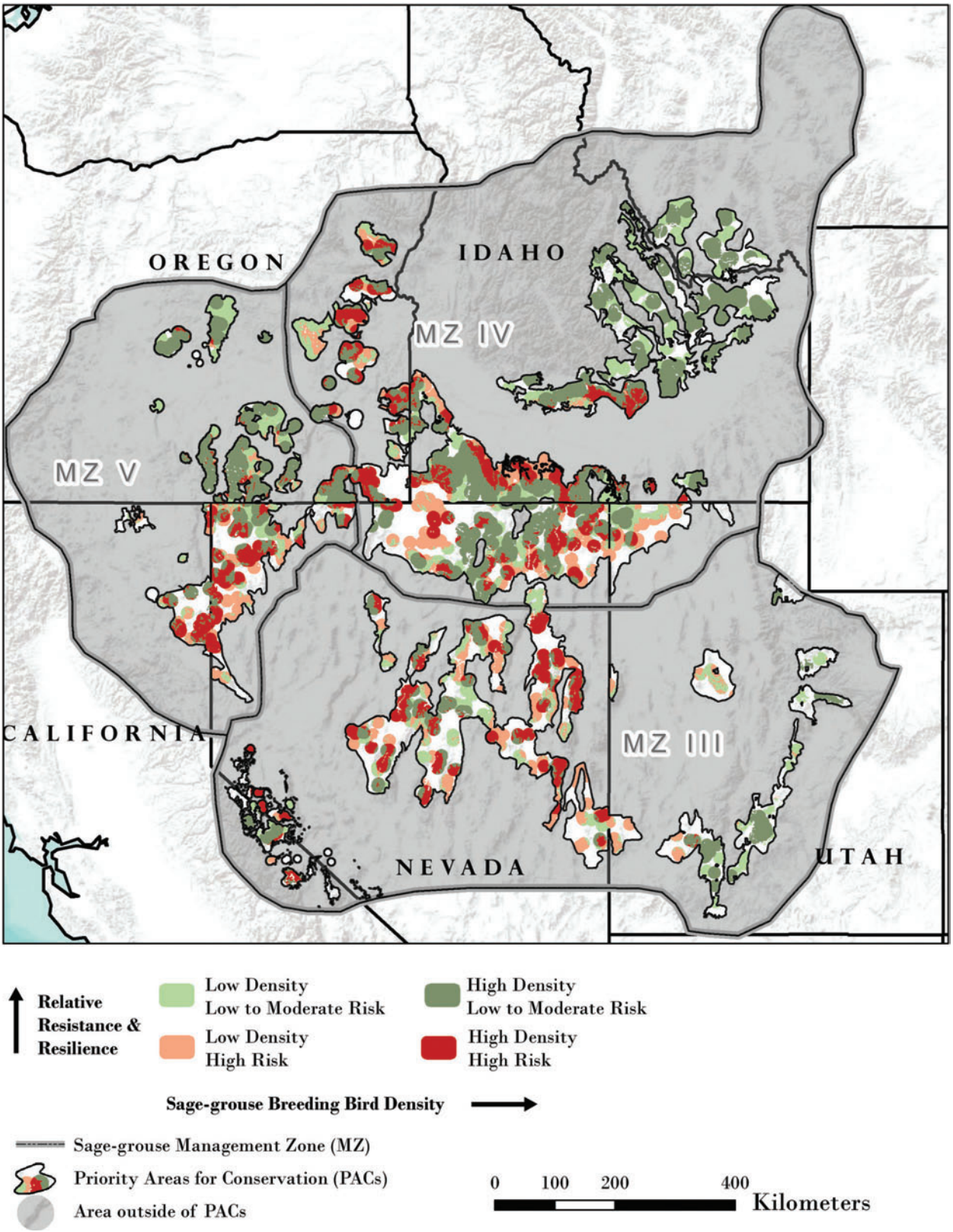

Figure 26. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to resilience and resistance within sage-grouse Management Zones III, IV, and V (Stiver et al. 2006). Relative resilience and resistance groups are derived from soil moisture and temperature classes (Soil Survey Staff 2014a, b) as described in text, and indicate risk of invasive annual grasses and wildfire. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

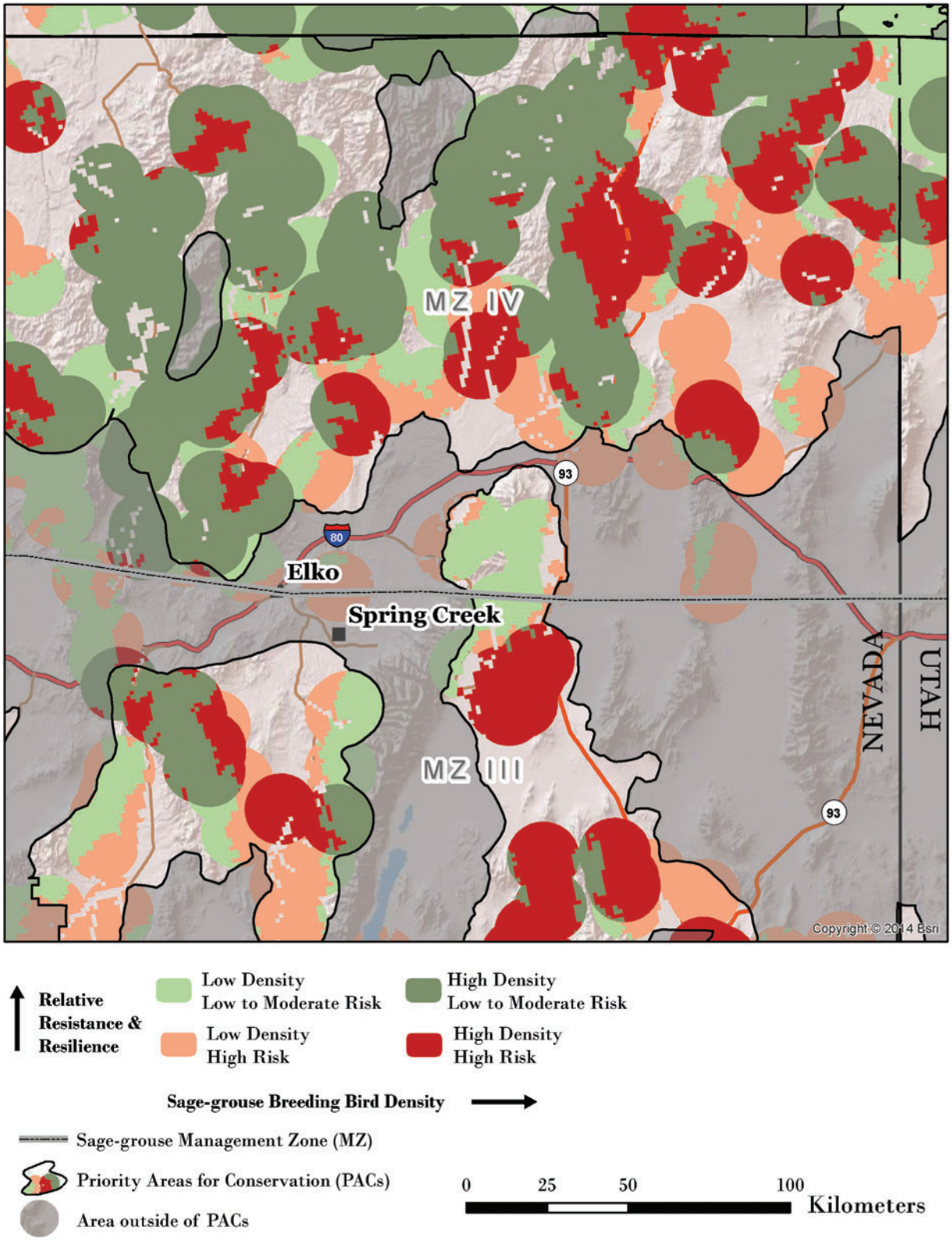

Figure 27. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to resilience and resistance in the northeast corner of Nevada. Relative resilience and resistance groups are derived from soil moisture and temperature classes (Soil Survey Staff 2014a, b) as described in text, and indicate risk of invasive annual grasses and wildfire. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

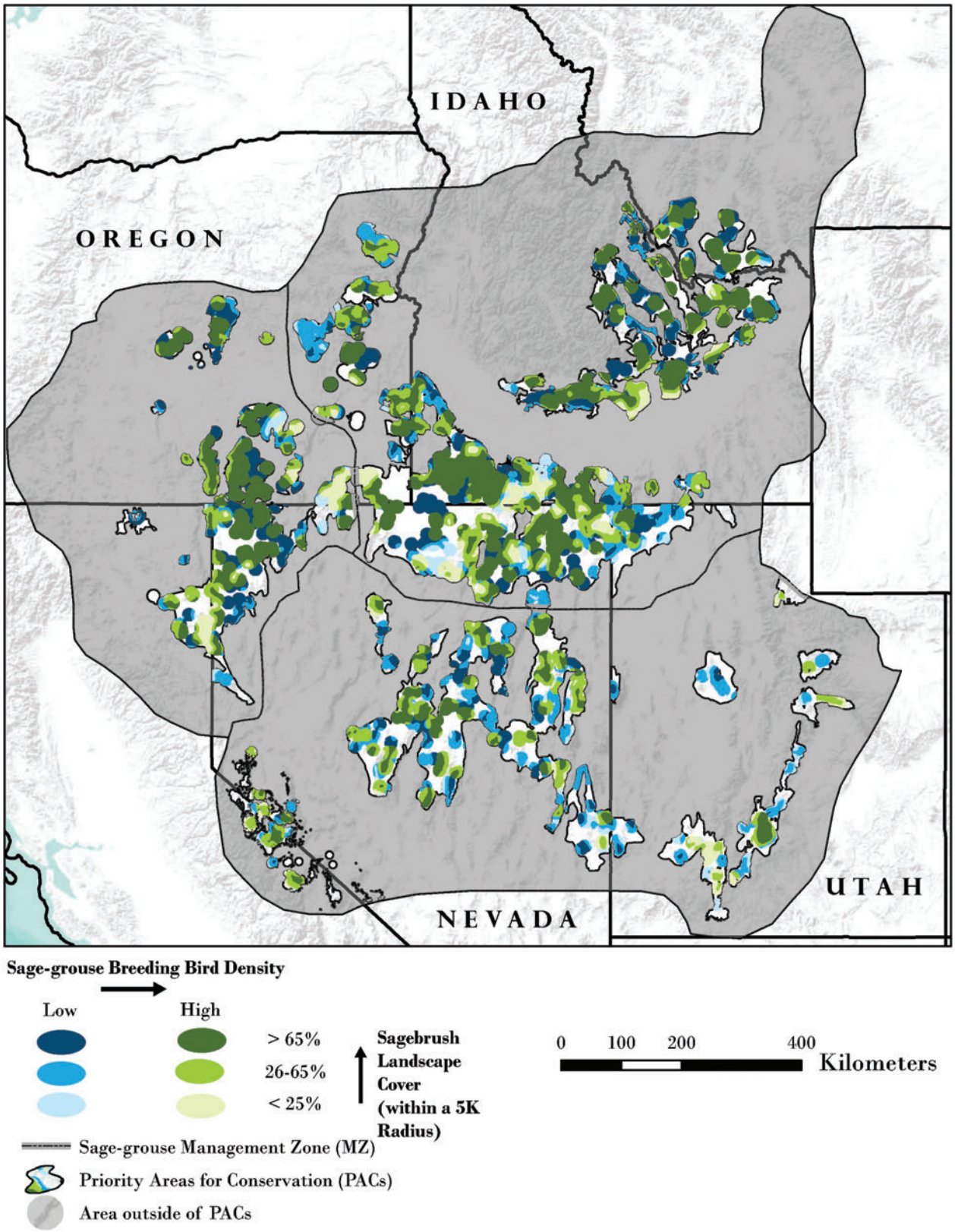

Figure 28. Sage-grouse breeding bird densities (Doherty et al. 2010) for high breeding bird densities (areas that contain 75% of known breeding bird populations) and low breeding bird densities (areas that contain all remaining breeding bird populations) relative to sagebrush cover. Lighter colored polygons within Management Zones delineate Priority Areas for Conservation (USFWS 2013).

Resilience and resistance and sagebrush cover combined with bird population density data provide land managers a way to evaluate trade-offs of particular management options at the landscape scale. For example, high density, low resilience and resistance landscapes with >65% sagebrush landscape cover may require immediate attention for conservation efforts because they currently support a high concentration of birds but have the lowest potential to recover to desired conditions post-fire and to resist invasive plants when disturbed. Similarly, high density but moderate-to-high resilience and resistance landscapes with 26-65% sagebrush cover may be priorities for preventative actions like conifer removal designed to increase the proportion of sagebrush cover and maintain ecosystem resilience and resistance. Mapping relative resilience and resistance and landscape cover of sagebrush for sage-grouse breeding areas should be viewed as a component of the assessment process that can help local managers allocate resources to accelerate planning and implementation.

Interpretations at the Management Zone (MZ) Scale: Western Portion of the Range

An examination of land cover and additional data layers for the western portion of the range reveals large differences among Management Zones (MZs) III, IV and V. MZs IV and V have larger areas with sagebrush cover >65% than MZ III (fig. 16). This may be partly explained by basin and range topography in MZ III, which is characterized by large differences in both environmental conditions and ecological types over relatively short distances. However, the cover of piñon and juniper in and adjacent to PACs in MZ III also is higher than in either MZ IV or V (fig. 22). The greater cover of piñon and juniper in MZ III appears to largely explain the smaller patches of sagebrush cover in the 26-65% and >65% categories.

Our capacity to quantify understory vegetation cover using remotely sensed data is currently limiting, but a visual examination of estimates for invasive annual grass (fig. 20; Peterson 2006, 2007) suggests a higher index (greater cover) in areas with relatively low resistance (warm soil temperatures) in all MZs (see fig. 18). This is consistent with current understanding of resistance to cheatgrass (Chambers et al. 2014; Chambers et al. *in press*). It is noteworthy that the invasive annual grass index is low for most of the central basin and range (central Nevada). Several factors may be contributing to the low index for this area including climate, the stage of piñon and juniper expansion and linked decrease in fire frequency, the relative lack of human development, and the relative lack of management treatments in recent decades (Wisdom et al. 2005; Miller et al. 2011). Not surprisingly, areas with a high annual grass index are outside or on the periphery of current PACs. However, it is likely that invasive annual grasses are present on many warmer sites and that they may increase following fire or other disturbances. In areas with low resistance to invasive annual grasses, they often exist in the understory of sagebrush ecosystems and are not detected by remote sensing platforms such as Landsat.

The number of hectares burned has been highest in MZ IV, adjacent areas in MZ V, and in areas with relatively low resilience and resistance in the northern portion of MZ III that have a high invasive annual grass index (figs. 18, 20, 24). A total of over 1.1 million hectares (2.7 million acres) burned in 2000 and 2006, while over 1.7 million hectares (4.2 million acres) burned in 2007 and 2012 and almost three quarters of these acres were in MZ IV (table 5). In some cases, these fires appear to be linked to the annual invasive grass index, but in others it clearly is not. At this point, there appears to be little relationship between cover of piñon and juniper and wildfire. Mega-fires comprised of hundreds of thousands of acres have burned in recent years, especially in MZ IV. These fires have occurred primarily in areas with low to moderate resilience and resistance and during periods with extreme burning conditions.

Table 5. The number of hectares (acres) burned in Management Zones III, IV, and V each year from 2000 to 2013.

Year	Management Zone III		Management Zone IV		Management Zone V		Total	
2000	155,159	(383,405)	868,118	(2,145,165)	88,871	(219,606)	1,112,148	(2,748,176)
2001	164,436	(406,330)	272,870	(674,276)	141,454	(349,541)	578,760	(1,430,147)
2002	85,969	(212,433)	100,308	(247,867)	113,555	(280,601)	299,833	(740,902)
2003	21,869	(54,038)	127,028	(313,892)	27,597	(68,192)	176,493	(436,123)
2004	20,477	(50,600)	11,344	(28,032)	13,037	(32,216)	44,858	(110,847)
2005	45,130	(111,520)	374,894	(926,382)	22,039	(54,458)	442,063	(1,092,360)
2006	198,762	(491,150)	860,368	(2,126,014)	117,452	(290,230)	1,176,582	(2,907,394)
2007	371,154	(917,140)	1,240,303	(3,064,853)	134,520	(332,406)	1,745,977	(4,314,399)
2008	14,015	(34,632)	109,151	(269,717)	43,949	(108,599)	167,115	(412,949)
2009	43,399	(107,242)	12,250	(30,271)	47,918	(118,408)	103,568	(255,921)
2010	31,597	(78,078)	280,662	(693,531)	21,940	(54,216)	334,200	(825,825)
2011	83,411	(206,114)	283,675	(700,977)	22,909	(56,608)	389,995	(963,699)
2012	203,680	(503,303)	946,514	(2,338,885)	574,308	(1,419,144)	1,724,501	(4,261,331)
2013	45,976	(113,610)	368,434	(910,419)	15,852	(39,170)	430,262	(1,063,199)
Total	1,485,034	(3,669,595)	5,855,920	(14,470,281)	1,385,400	(3,423,396)	8,726,354	(21,563,271)

Coupling breeding bird densities with landscape cover of sagebrush indicates that populations with low densities tend to occur in areas where sagebrush cover is in the 26-65% category, and few populations occur in areas with <25% sagebrush cover (fig. 27) (Knick et al. 2013). Combining the breeding bird densities with resilience and resistance indicates significant variability in risks among high density populations within PACs (fig. 26). A large proportion of remaining high density centers within PACs occurs on moderate-to-high resilience and resistance habitats, while low density/low resilience and resistance areas tend to occur along the periphery of PACs or are disproportionately located in MZ III and southern parts of MZ V.

Examination of other data layers suggests that different wildfire and invasive species threats exist across the western portion of the range, and that management should target the primary threats to sage-grouse habitat within focal areas. In MZs IV and V invasive annual grasses—especially on the periphery of the PACs—and wildfire are key threats. However, recent wildfires are not necessarily linked to invasive annual grasses. This suggests that management strategies for these MZs emphasize fire operations, fuels management focused on decreasing fire spread, and integrated strategies to control annual grasses and increase post-fire rehabilitation and restoration success. Differences in piñon and/or juniper landscape cover exist among MZs with 5,131,900 ha (12,681,202 ac) in MZ III, 528,377ha (1,305,649 ac) in MZ IV, and 558,880 ha (1,381,024 ac) in MZ V. Portions of MZs IV and V are still largely in early stages of juniper expansion indicating a need to address this threat before woodland succession progresses. Because of generally low resilience and resistance in MZ III, greater emphasis is needed on habitat conservation, specifically minimizing or eliminating stressors. Also, greater emphasis on reducing cover of piñon and juniper is needed to reduce woody fuels and increase sagebrush ecosystem resilience to fire by increasing the recovery potential of native understory species.

Interpretations at Regional and Local Land Management Scales: Northeast Nevada Example

The same land covers and data layers used to assess focal areas for sage-grouse habitat within MZs in the western portion of the species range can be used to evaluate focal areas for management in regional planning areas and land management planning units. The emphasis at the scale of the land planning area or management planning unit is on maintaining or increasing large contiguous areas of sagebrush habitat with covers in the 26-65% and especially >65% category. Resilience to disturbance and resistance to invasive annual grasses as indicated by soil temperature and moisture regimes is used to determine the most appropriate activities within the different cover categories. The sage-grouse habitat matrix in table 2 describes the capacity of areas with differing resilience and resistance to recover following disturbance and resist annual invasive grasses and provides the management implications for each of the different cover categories. Table 4 provides potential management strategies for the different sagebrush cover and resilience and resistance categories (cells) in the sage-grouse habitat matrix by agency program areas (fire operations, fuels management, post-fire rehabilitation, habitat restoration). Note that the guidelines in table 4 are related to the sage-grouse habitat matrix, and do not preclude other factors from consideration when determining management priorities for program areas.

Here, we provide an example of how to apply the concepts and tools discussed in this report by examining an important region identified in the MZ scale assessment. The northeastern corner of Nevada was selected to illustrate the diversity of sage-grouse habitat within planning areas and the need for proactive collaboration both within agencies and across jurisdictional boundaries in devising appropriate management strategies (figs. 17, 19, 21, 23, 25). This part of Nevada has large areas of invasive annual grasses and areas with piñon and juniper expansion, and it has experienced multiple large fires in the last decade. It includes a BLM Field Office, Forest Service (FS) land, State land, multiple private owners, and borders two States (fig. 29), which results in both complex ownership and natural complexity.

In the northeast corner of Nevada, an area 5,403,877 ha (13,353,271 ac) in size, numerous large fires have burned in and around PACs (fig. 25). Since 2000, a total of 1,144,317 ha (2,827,669 ac) have burned with the largest fires occurring in 2000, 2006, and 2007. This suggests that the primary management emphasis be on retaining existing areas of sagebrush in the 26-65% and especially >65% categories and promoting recovery of former sagebrush areas that have burned. Fire suppression in and around large, contiguous areas of sagebrush and also in and around successful habitat restoration or post-fire rehabilitation treatments is a first order priority. Fuels management also is a high priority and is focused on strategic placement of fuel breaks to reduce loss of large sagebrush stands by wildfire without jeopardizing existing habitat quality. Also, in the eastern portion of the area, piñon and juniper land cover comprises 471,645 ha (1,165,459 ac) (fig. 23). In this area, management priorities include (1) targeted tree removal in early to mid-phase (Phase I and II), post-settlement piñon and juniper expansion areas to maintain shrub/herbaceous cover and reduce fuel loads, and (2) targeted tree removal in later phase (Phase III) post-settlement piñon and juniper areas to reduce risk of high severity fire. In areas with moderate to high resilience and resistance, post-fire rehabilitation focuses on accelerating sagebrush establishment and recovery of perennial native herbaceous species. These areas often are capable of unassisted recovery and seeding is likely needed only in areas where perennial native herbaceous species have been depleted (Miller et al. 2013). Seeding introduced species can retard recovery of native perennial grasses and forbs that are important to sage-grouse and should be avoided in these areas (Knutson et al. 2014). Seeding or transplanting of sagebrush may be needed to accelerate establishment in focal areas.

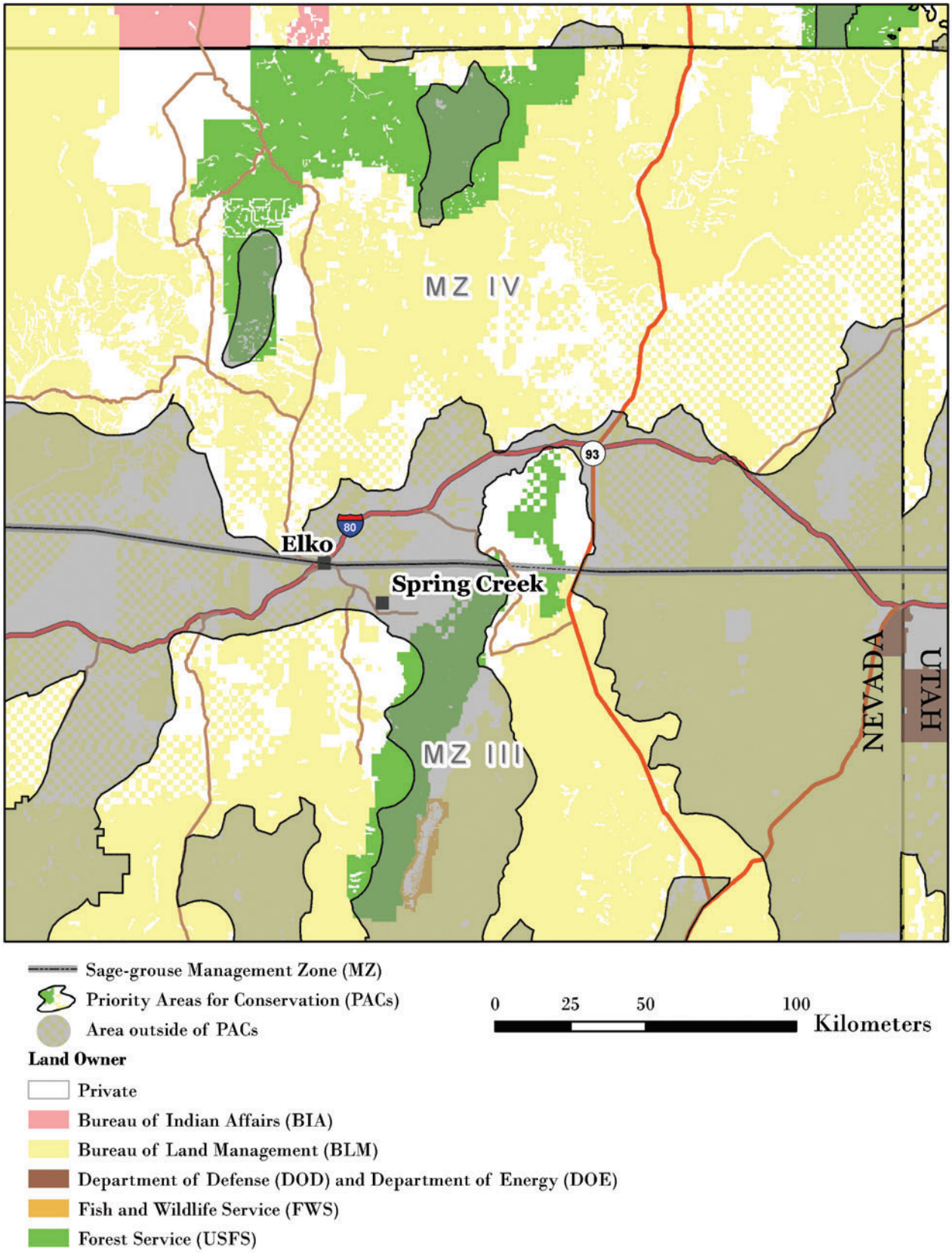

Figure 29. Land ownership for the northeast corner of Nevada. Lighter colored polygons delineate Priority Areas for Conservation (USFWS 2013).

In areas with lower resilience and resistance and high breeding bird densities, large, contiguous areas of sagebrush with intact understories are a high priority for conservation (figs. 17, 19, 27). In these areas, emphasis is on maintaining or increasing habitat conditions by minimizing stressors and disturbance. Post-fire rehabilitation and restoration activities focus on areas that increase connectivity among existing large areas of sagebrush. Because of low and variable precipitation, more than one intervention may be required to achieve restoration or rehabilitation goals. Appropriately managing livestock, wild horse and burro use (if applicable), and recreational use in focal areas is especially important to promote native perennial grass and forb growth and reproduction and to maintain or enhance resilience and resistance.

Determining the Most Appropriate Management Treatments at the Project Scale

Once focal areas and management priorities have been determined, potential treatment areas can be assessed to determine treatment feasibility and appropriate treatment methods. Different treatment options exist (figs. 30, 31) that differ in both suitability for a focal area and likely effectiveness. Field guides for sagebrush ecosystems and piñon and juniper expansion areas that incorporate resilience and resistance concepts are being developed to help guide managers through the process of determining both the suitability of an area for treatment and the most appropriate treatment. These guides are aligned with the different program areas and emphasize (1) fuel treatments (Miller et al. 2014a), (2) post-fire rehabilitation (Miller et al. 2014b), and (3) restoration (Pyke et al., in preparation). Additional information on implementing these types of management treatments is synthesized in Monsen et al. (2004) and Pyke (2011); additional information on treatment response is synthesized in Miller et al. (2013). In this section, we summarize the major steps in the process for determining the suitability of an area for treatment and the most appropriate treatment. We then provide an overview of two of the primary tools in the assessment process – ecological site descriptions (ESDs) and state and transition models (STMs). We conclude with a discussion of the importance of monitoring and adaptive management.

Steps in the process*:* Logical steps in the process of determining the suitability of an area for treatment and the most appropriate treatment(s) include (1) assessing the potential treatment area and identifying ecological sites, (2) determining the current successional state of the site, (3) selecting the appropriate action(s), and (4) monitoring and evaluation to determine post-treatment management. A general approach that uses questions to identify the information required in each step was developed (table 6). These questions can be modified to include the specific information needed for each program area and for treating different ecological sites. This format is used in the field guides described above.

Figure 30. Common vegetation treatments for sagebrush dominated ecosystems with relatively low resilience and resistance include seeding after wildfire in areas that lack sufficient native perennial grasses and forbs for recovery (top) (photo by Chad Boyd), and mowing sagebrush to reinvigorate native perennial grasses and forbs in the understory (bottom) (photo by Scott Schaff). Success of mowing treatments depends on having adequate perennial grasses and forbs on the site to resist invasive annual grasses and to promote recovery.

Figure 31. Vegetation treatments for sagebrush ecosystems exhibiting piñon and juniper expansion include cutting the trees with chainsaws and leaving them in place (top) (photo by Jeremy Roberts) and shredding them with a “bullhog” (middle) (photo by Bruce A. Roundy) on sites with relatively warm soils and moderately low resistance to cheatgrass. Prescribed fire (bottom) (photo by Jeanne C. Chambers) can be a viable treatment on sites with relatively cool and moist soils that have higher resilience to disturbance and resistance to invasive annual grasses. Treatment success depends on having adequate perennial grasses and forbs on the site to resist invasive annual grasses and promote recovery and will be highest on sites with relatively low densities of trees (Phase I to Phase II woodlands).

Table 6. General guidelines for conducting fuels management, fire rehabilitation, and restoration treatments (modified from Miller et al. 2007; Tausch et al. 2009; Pyke 2011; Chambers et al. 2013).

Steps in the process	Questions and considerations
I. Assess potential treatment area and identify ecological sites	1. Where are priority areas for fuels management, fire rehabilitation or restoration within the focal area? Consider sage-grouse habitat needs and resilience and resistance. 2. What are the topographic characteristics and soils of the area? Verify soils mapped to the location and determine soil temperature/moisture regimes. Collect information on soil texture, depth and basic chemistry for restoration projects. 3. How will topographic characteristics and soils affect vegetation recovery, plant establishment and erosion? Evaluate erosion risk based on topography and soil characteristics. 4. What are the potential native plant communities for the area? Match soil components to their correlated ESDs. This provides a list of potential species for the site(s).
II. Determine current state of the site	5. Is the area still within the reference state for the ecological site(s)?
III. Select appropriate action	6. How far do sites deviate from the reference state? How will treatment success be measured? 7. Do sufficient perennial shrubs and perennial grasses and forbs exist to facilitate recovery? 8. Are invasive species a minor component? 9. Do invasive species dominate the sites while native life forms are missing or severely under represented? If so, active restoration is required to restore habitat. 10. Are species from drier or warmer ecological sites present? Restoration with species from the drier or warmer sites should be considered. 11. Have soils or other aspects of the physical environment been altered? Sites may have crossed a threshold and represent a new ecological site type requiring new site-specific treatment/restoration approaches.
IV. Determine post-treatment management	12. How long should the sites be protected before land uses begin? In general, sites with lower resilience and resistance should be protected for longer periods. 13. How will monitoring be performed? Treatment effectiveness monitoring includes a complete set of measurements, analyses, and a report. 14. Are adjustments to the approach needed? Adaptive management is applied to future projects based on consistent findings from multiple locations.

Ecological site descriptions: ESDs and their associated STMs provide essential information for determining treatment feasibility and type of treatment. ESDs are part of a land classification system that describes the potential of a set of climate, topographic, and soil characteristics and natural disturbances to support a dynamic set of plant communities (Bestelmeyer et al. 2009; Stringham et al. 2003). NRCS soil survey data (http://soils.usda.gov/survey/), including soil temperature/moisture regimes and other soil characteristics, are integral to ESD development. ESDs have been developed by the NRCS and their partners to assist land management agencies and private land owners with making resource decisions, and are widely available for the Sage-grouse MZs except where soil surveys have not been completed (for a detailed description of ESDs and access to available ESDs see: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/). ESDs assist managers to step-down generalized vegetation dynamics, including the concepts of resilience and resistance, to local scales. For example, variability in soil characteristics and the local environment (e.g., average annual precipitation as indicated by soil moisture regime) can strongly influence both plant community resilience to fire as well as the resistance of a plant community to invasive annual grasses after fire (table 1). Within a particular ESD, there is a similar level of resilience to disturbance and resistance to invasive annuals and this information can be used to determine the most appropriate management actions.

State and transition models: STMs are a central component of ecological site descriptions that are widely used by managers to illustrate changes in plant communities and associated soil properties, causes of change, and effects of management interventions (Stringham et al. 2003; Briske et al. 2005; USDA NRCS 2007) including in sagebrush ecosystems (Forbis et al. 2006; Barbour et al. 2007; Boyd and Svejcar 2009; Holmes and Miller 2010; Chambers et al. *in press*). These models use ***state*** (a relatively stable set of plant communities that are resilient to disturbance) and ***transition*** (the drivers of change among alternative states) to describe the range in composition and function of plant communities within ESDs (Stringham and others 2003; see Appendix 1 for definitions). The reference state is based on the natural range of conditions associated with natural disturbance regimes and often includes several plant communities (***phases***) that differ in dominant plant species relative to type and time since disturbance (Caudle et al. 2013). Alternative states describe new sets of communities that result from factors such as inappropriate livestock use, invasion by annual grasses, or changes in fire regimes. Changes or transitions among states often are characterized by ***thresholds*** that may persist over time without active intervention, potentially causing irreversible changes in community composition, structure, and function. ***Restoration pathways*** are used to identify the environmental conditions and management actions required for return to a previous state. Detailed STMs that follow current interagency guidelines (Caudle et al. 2013), are aligned with the ecological types (table 1), and are generally applicable to MZs III (Southern Great Basin), IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin) are provided in Appendix 5.

A generalized STM to illustrate the use of STMs is shown in figure 32 for the warm and dry Wyoming big sagebrush ecological type. This ecological type occurs at relatively low elevations in the western part of the range and has low to moderate resilience to disturbance and management treatments and low resistance to invasion (table 1). This type is abundant in the western portion of the range, but as the STM suggests, it is highly susceptible to conversion to invasive annual grass and repeated fire and is difficult to restore. Intact sagebrush areas remaining in the reference state within this ecological type are a high priority for conservation. Invaded states or locations with intact sagebrush that lack adequate native perennial understory are a high priority for restoration where they bridge large, contiguous areas of sagebrush. However, practical methods to accomplish this are largely experimental and/or costly and further development, including adaptive science and management, is needed.

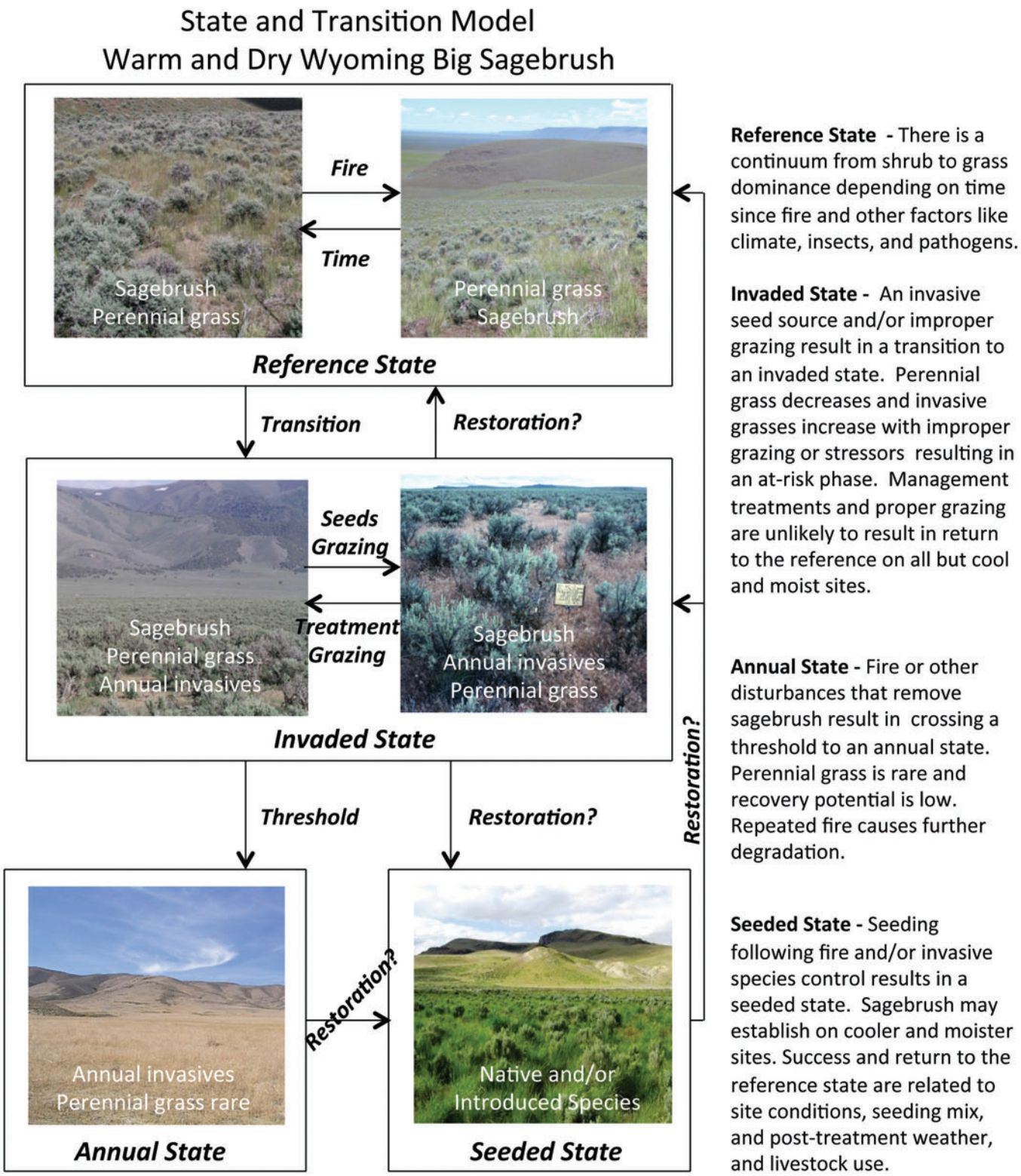

Figure 32. A state and transition model that illustrates vegetation dynamics and restoration pathways for the warm and dry, Wyoming big sagebrush ecological type. This ecological type occurs at relatively low elevations in the western part of the range and has low to moderate resilience to disturbance and management treatments and low resistance to invasion.

Monitoring and adaptive management: Monitoring programs designed to track ecosystem changes in response to both stressors and management actions can be used to increase understanding of ecosystem resilience and resistance, realign management approaches and treatments, and implement adaptive management (Reever-Morghan et al. 2006; Herrick et al. 2012). Information is increasing on likely changes in sagebrush ecosystems with additional stress and climate warming, but a large degree of uncertainty still exits. Currently, the NRCS National Resource Inventory is being used on private lands and is being implemented on public lands managed by BLM to monitor trends in vegetation attributes and land health at the landscape scale under the AIM (Assessment Inventory and Monitoring) strategy. Strategic placement of monitoring sites and repeated measurements of ecosystem status and trends (e.g., land cover type, ground cover, vegetation cover and height of native and invasive species, phase of tree expansion, soil and site stability, oddities) can be used to decrease uncertainty and increase effectiveness of management decisions. Ideally, monitoring sites span environmental/productivity gradients and sagebrush ecological types that characterize sage-grouse habitat. Of particular importance are (1) ecotones between ecological types where changes in response to climate are expected to be largest (Loehle 2000; Stohlgren et al. 2000), (2) ecological types with climatic conditions and soils that are exhibiting invasion and repeated fires, and (3) ecological types with climatic conditions and soils that are exhibiting tree expansion and increased fire risk. Monitoring the response of sagebrush ecosystems to management treatments, including both pre- and post-treatment data, is a first order priority because it provides information on treatment effectiveness that can be used to adjust methodologies.

Monitoring activities are most beneficial when consistent approaches are used among and within agencies to collect, analyze, and report monitoring data. Currently, effectiveness monitoring databases that are used by multiple agencies do not exist. However, several databases have been developed for tracking fire-related and invasive-species management activities. The National Fire Plan Operations and Reporting System (NFPORS) is an interdepartmental and interagency database that accounts for hazardous fuel reduction, burned area rehabilitation and community assistance activities. To our knowledge, NFPORS is not capable of storing and retrieving the type of effectiveness monitoring information that is needed for adaptive management. The FEAT FIREMON Integrated (FFI; https://www.frames.gov/partner-sites/ffi/ffi-home/) is a monitoring software tool designed to assist managers with collection, storage and analysis of ecological information. It was constructed through a complementary integration of the Fire Ecology Assessment Tool (FEAT) and FIREMON. This tool allows the user to select among multiple techniques for effectiveness monitoring. If effectiveness monitoring techniques were agreed on by the agencies, FFI does provide databases with standard structures that could be used in inter-agency effectiveness monitoring. Also, the National Invasive Species Information Management System (NISIMS) is designed to reduce redundant data entry regarding invasive species inventory, management and effectiveness monitoring with the goal of providing information that can be used to determine effective treatments for invasive species. However, NISIMS is currently available only within the BLM.

Common databases can be used by agency partners to record and share monitoring data. The Land Treatment Digital Library (LTDL [USGS 2010]) provides a method of archiving and collecting common information for land treatments and might be used as a framework for data storage and retrieval. Provided databases are relational (maintain a common field for connecting them), creating single corporate databases is not necessary. However, barriers that hinder database access within and among agencies and governmental departments may need to be lowered while still maintaining adequate data security. The LTDL has demonstrated how

this can work by accessing a variety of databases to populate useful information relating to land treatments.

For effectiveness of treatments to be easily useable for adaptive management, the agencies involved will need to agree on monitoring methods and a common data storage and retrieval system. Once data can be retrieved, similar treatment projects can be evaluated to determine how well they achieve objectives for sage-grouse habitat, such as the criteria outlined in documents like the Habitat Assessment Framework (Stiver et al. 2006). Results of monitoring activities on treatment effectiveness are most useful when shared across jurisdictional boundaries, and several mechanisms are currently in place to improve information sharing (e.g., the Great Basin Fire Science Delivery Project; www.gbfiresci.org).

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Appendix 1. Definitions of Terms Used in This Document

At-Risk Community Phase — A community phase that can be designated within the reference state and also in alternative states. This community phase is the most vulnerable to transition to an alternative state (Caudle et al. 2013).

Community Phase — A unique assemblage of plants and associated soil properties that can occur within a state (Caudle et al. 2013).

Ecological Site (ES) — An Ecological Site (ES) is a conceptual division of the landscape that is defined as a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances (Caudle et al. 2013).

Ecological Site Descriptions (ESD) — The documentation of the characteristics of an ecological site. The documentation includes the data used to define the distinctive properties and characteristics of the ecological site; the biotic and abiotic characteristics that differentiate the site (i.e., climate, topography, soil characteristics, plant communities); and the ecological dynamics of the site that describes how changes in disturbance processes and management can affect the site. An ESD also provides interpretations about the land uses and ecosystem services that a particular ecological site can support and management alternatives for achieving land management (Caudle et al. 2013).

Ecological Type — A category of land with a distinctive (i.e., mappable) combination of landscape elements. The elements making up an ecological type are climate, geology, geomorphology, soils, and potential natural vegetation. Ecological types differ from each other in their ability to produce vegetation and respond to management and natural disturbances (Caudle et al. 2013).

Historical Range of Variability — Range of variability in disturbances, stressors, and ecosystem attributes that allows for maintenance of ecosystem resilience and resistance and that can be used to provide management targets (modified from Jackson 2006).

Resilience — Ability of a species and/or its habitat to recover from stresses and disturbances. Resilient ecosystems regain their fundamental structure, processes, and functioning when altered by stresses like increased CO_2 , nitrogen deposition, and drought and to disturbances like land development and fire (Allen et al. 2005; Holling 1973).

Resistance — Capacity of an ecosystem to retain its fundamental structure, processes and functioning (or remain largely unchanged) despite stresses, disturbances, or invasive species (Folke et al. 2004).

Resistance to Invasion — Abiotic and biotic attributes and ecological processes of an ecosystem that limit the population growth of an invading species (D'Antonio and Thomsen 2004**)**.

Restoration Pathways — Restoration pathways describe the environmental conditions and practices that are required for a state to recover that has undergone a transition (Caudle et al. 2013).

State — A state is a suite of community phases and their inherent soil properties that interact with the abiotic and biotic environment to produce persistent functional and structural attributes associated with a characteristic range of variability (adapted from Briske et al. 2008).

State-and-Transition Model — A method to organize and communicate complex information about the relationships between vegetation, soil, animals, hydrology, disturbances (fire, lack of fire, grazing and browsing, drought, unusually wet periods, insects and disease), and management actions on an ecological site (Caudle et al. 2013).

Thresholds — Conditions sufficient to modify ecosystem structure and function beyond the limits of ecological resilience, resulting in the formation of alternative states (Briske et al. 2008).

Transition — Transitions describe the biotic or abiotic variables or events, acting independently or in combination, that contributes directly to loss of state resilience and result in shifts between states. Transitions are often triggered by disturbances, including natural events (climatic events or fire) and/or management actions (grazing, burning, fire suppression). They can occur quickly as in the case of catastrophic events like fire or flood, or over a long period of time as in the case of a gradual shift in climate patterns or repeated stresses like frequent fires (Caudle et al. 2013).

Appendix 2. An Explanation of the Use of Landscape Measures to Describe Sagebrush Habitat

Understanding landscape concepts of plant cover relative to typical management unit concepts of plant cover is important for prioritizing lands for management of sage-grouse. Ground cover measurements of sagebrush made at a management unit (for example, line-intercept measurements) should not be confused for landscape cover and may not relate well to landscape cover since the areas of examination differ vastly (square meters for management units and square kilometers for landscapes).

A landscape is defined rather arbitrarily as a large area in total spatial extent, somewhere in size between sites (acres or square miles) and regions (100,000s of square miles). The basic unit of a landscape is a patch, which is defined as a bounded area characterized by a similar set of conditions. A habitat patch, for example, may be the polygonal area on a map representing a single land cover type. Landscapes are composed of a mosaic of patches. The arrangement of these patches (the landscape configuration or pattern) has a large influence on the way a landscape functions and for landscape species, such as sage-grouse, sagebrush habitat patches are extremely important for predicting if this bird will be present within the area (Connelly et al. 2011).

Remotely sensed data of land cover is typically used to represent landscapes. These data may combine several sources of data and may include ancillary data, such as elevation, to improve the interpretation of data. These data are organized into pixels that contain a size or grain of land area. For example, LandSat Thematic Mapper spectral data used in determining vegetation cover generally have pixels that represent ground areas of 900 m^2 (30- x 30-m). Each pixel's spectral signature can be interpreted to determine what type of vegetation dominates that pixel. Groups of adjacent pixels with the same dominant vegetation are clustered together into polygons that form patches.

Landscape cover of sagebrush is determined initially by using this vegetation cover map, but a 'rolling window' of a predetermined size (e.g., 5 km^2 or 5,556 pixels that are 30- by 30-m in size) is moved across the region one pixel at a time. The central pixel of the 'window' is reassigned a value for the proportion of pixels where sagebrush is the dominant vegetation. The process is repeated until pixels within the region are completely reassigned to represent the landscape cover of sagebrush within for the region drawn from a 5 km^2 window.

Appendix 3. An Explanation of Soil Temperature and Moisture Regimes Used to Describe Sagebrush Ecosystems

Soil climate regimes (temperature and moisture) are used in Soil Taxonomy to classify soils; they are important to consider in land management decisions, in part, because of the significant influence on the amounts and kinds of vegetation that soils support. Soil temperature and moisture regimes are assigned to soil map unit components as part of the National Cooperative Soil Survey program. Soil survey spatial and tabular data for the Sage-grouse Management Zones (Stiver et al. 2006) were obtained for each State within the zones at the Geospatial Data Gateway (http://datagateway.nrcs.usda.gov/). Gridded Soil Survey Geographic (gSSURGO) file geodatabases were used to display a 10-meter raster dataset. Multiple soil components made up a soil map unit, and soil moisture and temperature regimes were linked to individual soil map components. Soil components with the same soil moisture and temperature class regime were aggregated, and the dominant soil moisture and temperature regime within each soil map unit was used to characterize the temperature and moisture regime. Only temperature and moisture regimes applicable to sagebrush ecosystems were displayed.

Abbreviated definitions of each soil temperature and moisture regime class are listed below. Complete descriptions can be found in *Keys to Soil Taxonsomy, 11th edition*, available at ftp://ftp-fc.sc.egov.usda.gov/NSSC/Soil_Taxonomy/keys/2010_Keys_to_Soil_Taxonomy.pdf.

Soil temperature regimes	
Cryic (Cold)	Soils that have a mean annual soil temperature of <8 °C, and do not have permafrost, at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Frigid (Cool)	Soils that have a mean annual soil temperature of <8 °C and the difference between mean summer and mean winter soil temperatures is >6 °C at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Mesic (Warm)	Soils that have a mean annual soil temperature of 8-15 °C and the difference between mean summer and mean winter soil temperatures is >6 °C at a depth of 50 cm below the surface or at a restrictive feature, whichever is shallower.
Soil moisture regimes	
Ustic (summer precipitation)	Generally there is some plant-available moisture during the growing season, although significant periods of drought may occur. Summer precipitation allows presence of warm season plant species.
Xeric (Moist; generally mapped at >12 inches mean annual precipitation)	Characteristic of arid regions. The soil is dry for at least half the growing season and moist for less than 90 consecutive days.
Aridic (Dry; generally mapped at <12 inches mean annual precipitation)	Characteristic of arid regions. The soil is dry for at least half the growing season and moist for less than 90 consecutive days.

Note: Soil moisture regimes are further divided into moisture subclasses, which are often used to indicate soils that are transitional to another moisture regime. For example, a soil with an Aridic moisture regime and a Xeric moisture subclass may be described as "Aridic bordering on Xeric." Understanding these gradients becomes increasingly important when making interpretations and decisions at the site scale where aspect, slope, and soils affect the actual moisture regime on that site. More information on taxonomic moisture subclasses is available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053576.

Appendix 4. Data Sources for the Maps in This Report

Dataset	Citation	Link
Geomac fire perimeters	Walters, S.P.; Schneider, N.J.; Guthrie, J.D. 2011. Geospatial Multi-Agency Coordination (GeoMAC) wildland fire perimeters, 2008. Data Series 612. Washington, DC: U.S. Department of the Interior, U.S. Geological Survey.6 p.	http://pubs.er.usgs.gov/publication/ds612
WFDSS fire perimeters	Butler, B. B.; Bailey, A. 2013. Disturbance history (Historical wildland fires). Updated 8/9/2013. Wildland Fire Decision Support System. Online: https://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml [Accessed 5 March 2014].	https://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml or https://wfdss.usgs.gov/wfdss/WFDSSData_Downloads.shtml
Piñon and juniper land cover	U.S. Geological Survery (USGS) National Gap Analysis Program. 2004. Provisional digital land cover map for the southwestern United States. Version 1.0. Logan, UT: Utah State University, College of Natural Resources, RS/GIS Laboratory.	http://earth.gis.usu.edu/swgap/landcover.html
Piñon and juniper land cover	U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 13 March 2014].	http://www.landfire.gov/NationalProductDescriptions21.php
Nevada invasive annual grass index	Peterson, E. B. 2006. A map of invasive annual grasses in Nevada derived from multitemporal Landsat 5 TM imagery. Carson City, NV: State of Nevada, Department of Conservation and Natural Resources, Nevada Natural Heritage Program.	http://heritage.nv.gov/node/167
Owhyee upland annual grass index	Peterson, E. B. 2007. A map of annual grasses in the Owyhee Uplands, Spring 2006, derived from multitemporal Landsat 5 TM imagery. Carson City, NV: State of Nevada, Department of Conservation and Natural Resources, Nevada Natural Heritage Program.	http://heritage.nv.gov/sites/default/files/library/anngrowy_text_print.pdf
Soil data (SSURGO)	Soil Survey Staff. 2014a. Soil Survey Geographic (SSURGO) Database. United States Department of Agriculture, Natural Resources Conservation Service. Online: http://sdmdataaccess.nrcs.usda.gov/. [Accessed 3 March 2014a].	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053627
Soil data (STATSGO)	Soil Survey Staff. 2014b. U.S. General Soil Map (STATSGO2) Database. United States Department of Agriculture, Natural Resources Conservation Service. Online: http://sdmdataaccess.nrcs.usda.gov/. [Accessed 3 March 2014b].	

Soil temperature and moisture regime data	Campbell, S. B. 2014. Soil temperature and moisture regime data for the range of greater sage-grouse. Data product. Portland, OR: USDA Natural Resources Conservation Service. Online: https://www.sciencebase.gov/catalog/folder/537f8be5e4b021317a872f1b?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal [Accessed 17 June 2014].	https://www.sciencebase.gov/catalog/folder/537f8be5e4b021317a872f1b?community=LC+MAP+-+Landscape+Conservation+Management+and+Analysis+Portal
Sage-grouse management zones	Stiver, S. J.; Apa, A. D.; Bohne, J. R.; Bunnell, S. D.; Deibert, P. A.; Gardner, S. C.; Hilliard, M. A.; McCarthy, C. W.; Schroeder, M. A. 2006. Greater Sage-grouse Comprehensive Conservation Strategy. Unpublished report on file at: Western Association of Fish and Wildlife Agencies, Cheyenne, WY.	
Breeding bird densities	Doherty, K. E.; Tack, J. D.; Evans, J. S.; Naugle, D. E. 2010. Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.	http://scholar.google.com/scholar?q=doherty+2010+breeding+bird&hl=en&as_sdt=0&as_vis=1&oi=scholart&sa=X&ei=JqQbU7HUAqfD2QW8xYFY&ved=0CCUQgQMwAA
Sagebrush land cover	U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: http://landfire.cr.usgs.gov/viewer/. [Accessed 13 March 2014].	http://www.landfire.gov/NationalProductDescriptions21.php

Appendix 5. State-and-transition models (STMs) for five generalized ecological types for big sagebrush (from Chambers et al. *in press*; Miller et al. 2014 a, b)

These STMs represent groupings of ecological sites that are characterized by Wyoming or mountain big sagebrush, span a range of soil moisture/temperature regimes (warm/dry to cold/moist), and characterize a large portion of Management Zones III (Southern Great Basin), IV (Snake River Plains), V (Northern Great Basin), and VI (Columbia Basin). Large boxes illustrate states that are comprised of community phases (smaller boxes). Transitions among states are shown with arrows starting with T; restoration pathways are shown with arrows starting with R. The "at risk" community phase is most vulnerable to transition to an alternative state. Precipitation Zone is designated as PZ.

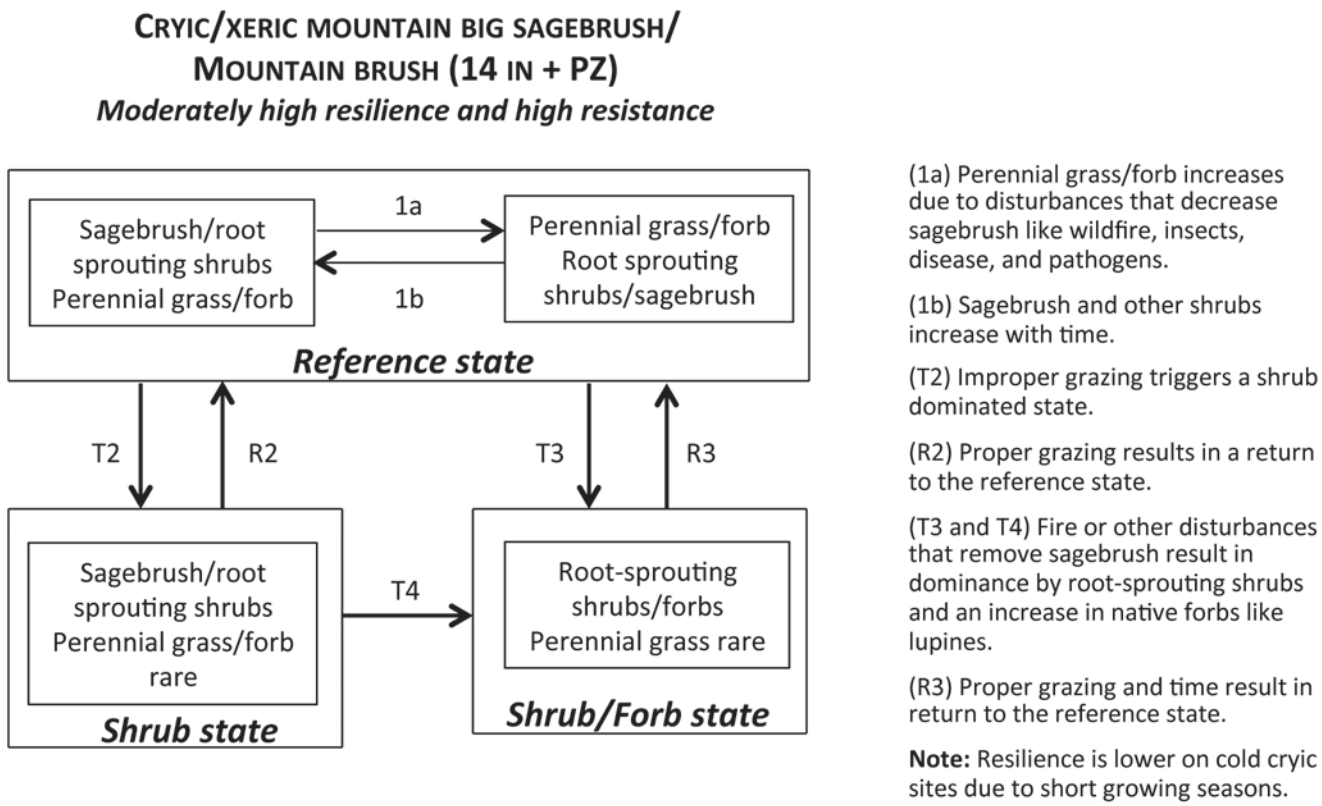
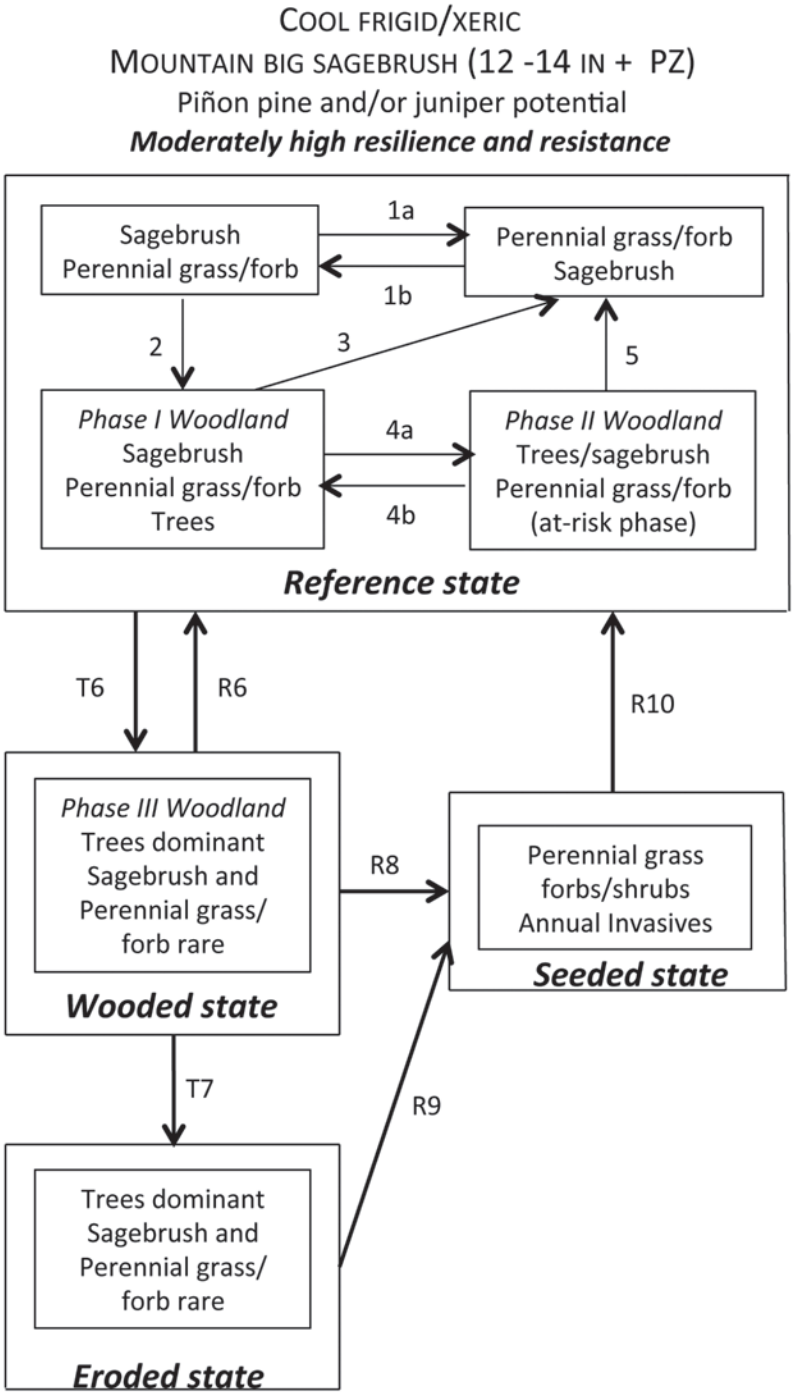


Figure A.5A. STM for a cryic/xeric mountain big sagebrush/mountain brush ecological type characterized by moderately high resilience and high resistance.



(1a) Disturbances such as wildfire, insects, disease, and pathogens result in less sagebrush and more perennial grass/forb.

(1b) Sagebrush increases with time .

(2) Time combined with seed sources for piñon and/or juniper trigger a Phase I Woodland.

(3 and 5) Fire and or fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance.

(4a) Increasing tree abundance results in a Phase II woodland with depleted perennial grass/forb and shrubs and an at-risk phase.

(4b) Fire surrogates (herbicides and/or mechanical treatments) that remove trees may restore perennial grass/forb and sagebrush dominance.

(T6) Infilling of trees and/or improper grazing can result in a biotic threshold crossing to a wooded state with increased risk of high severity crown fires .

(R6) Fire, herbicides and/or mechanical treatments that remove trees may restore perennial grass/forb and sagebrush dominance.

(T7) An irreversible abiotic threshold crossing to an eroded state can occur depending on soils, slope, and understory species.

(R8 and R9) Seeding after fire may be required on sites with depleted perennial grass/forb, but seeding with aggressive introduced species can decrease native perennial grass/forb. Annual invasives are typically rare. Seeded eroded states may have lower productivity.

(R10) Depending on seed mix and grazing, return to the reference state may be possible if an irreversible threshold has not been crossed.

Figure A.5B. STM for a cool frigid/xeric mountain big sagebrush ecological type that has piñon pine and/or juniper potential and is characterized by moderately high resilience and resistance.

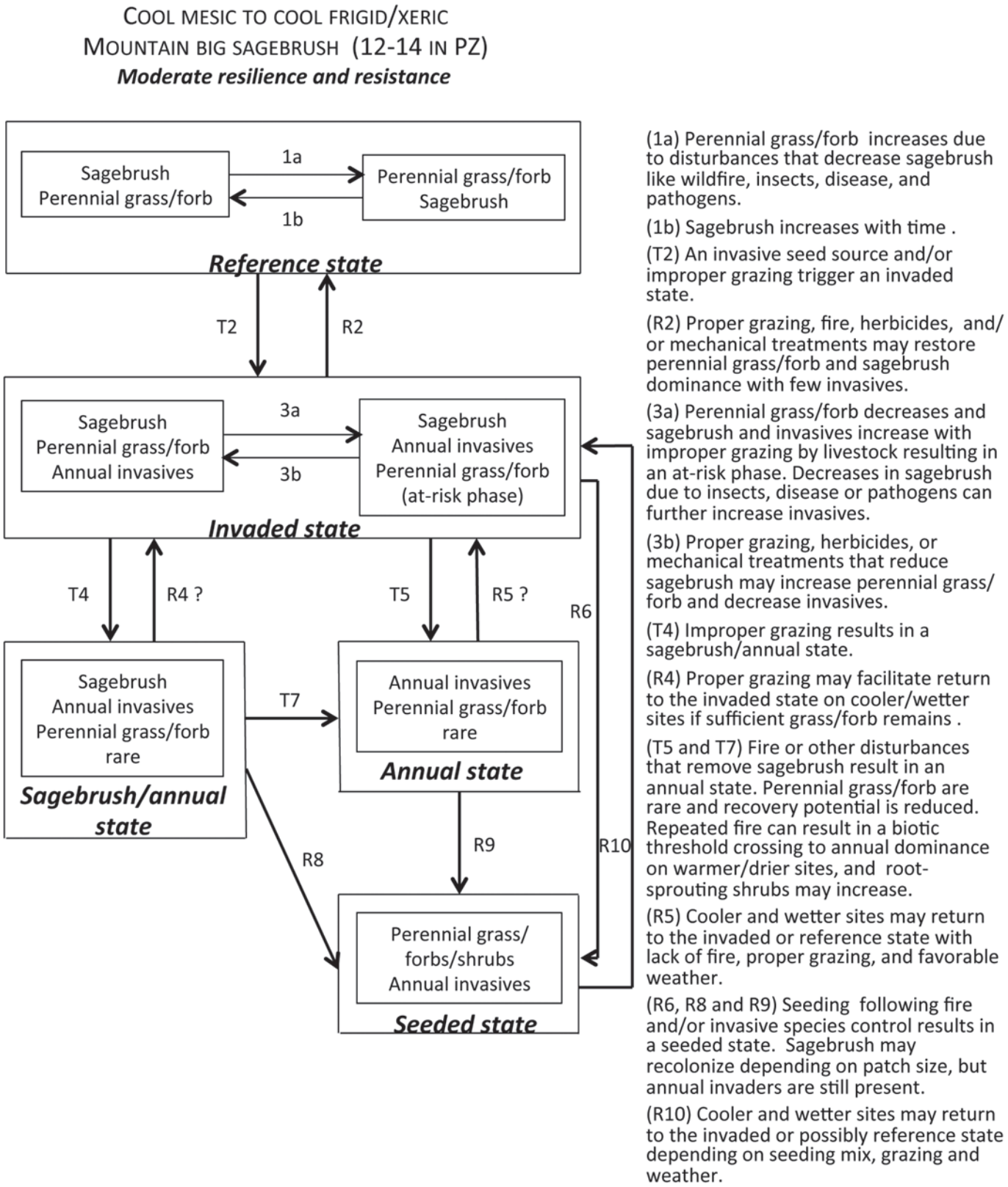


Figure A.5C. STM for a cool mesic to cool frigid/xeric mountain big sagebrush ecological type that is characterized by moderate resilience and resistance.

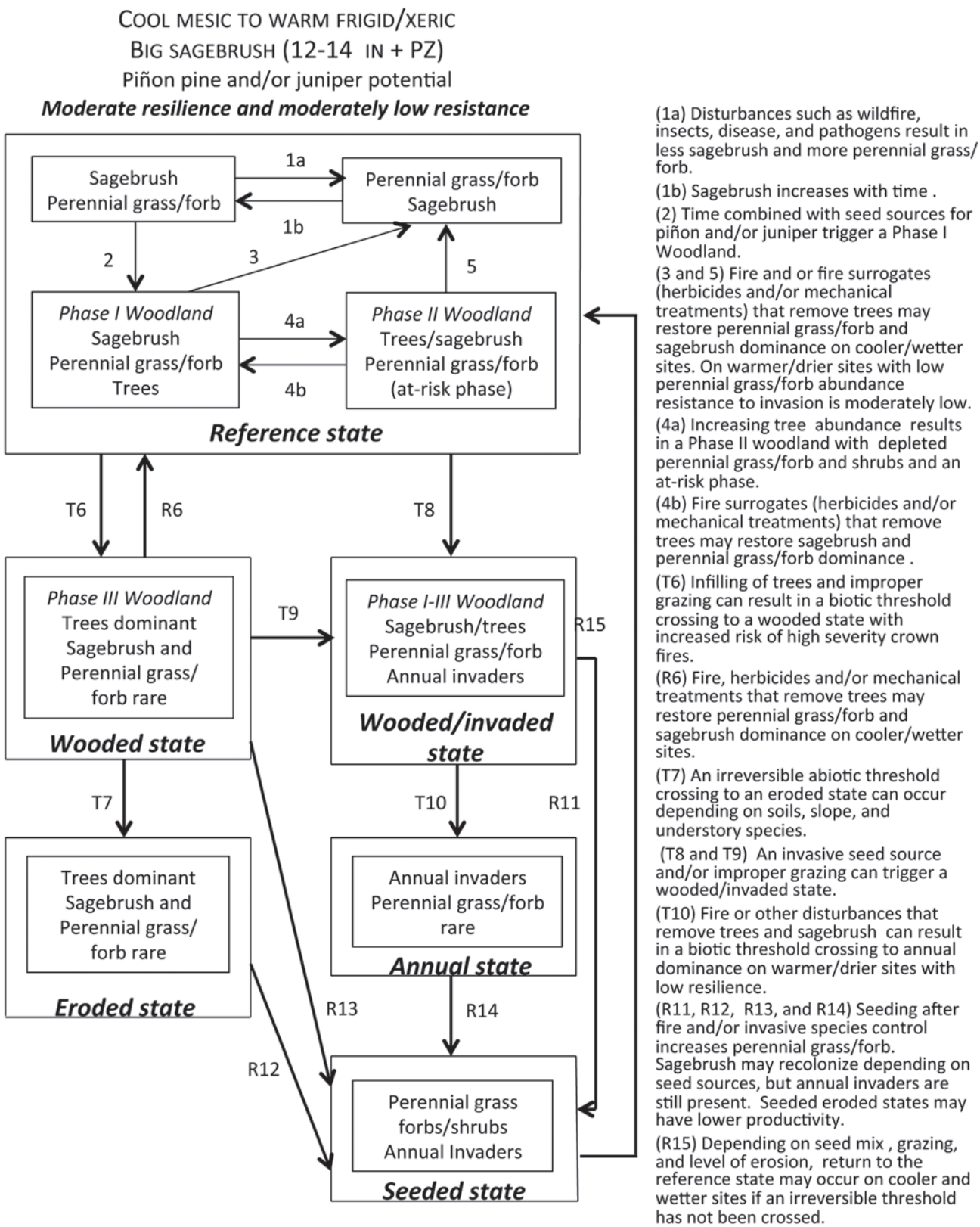
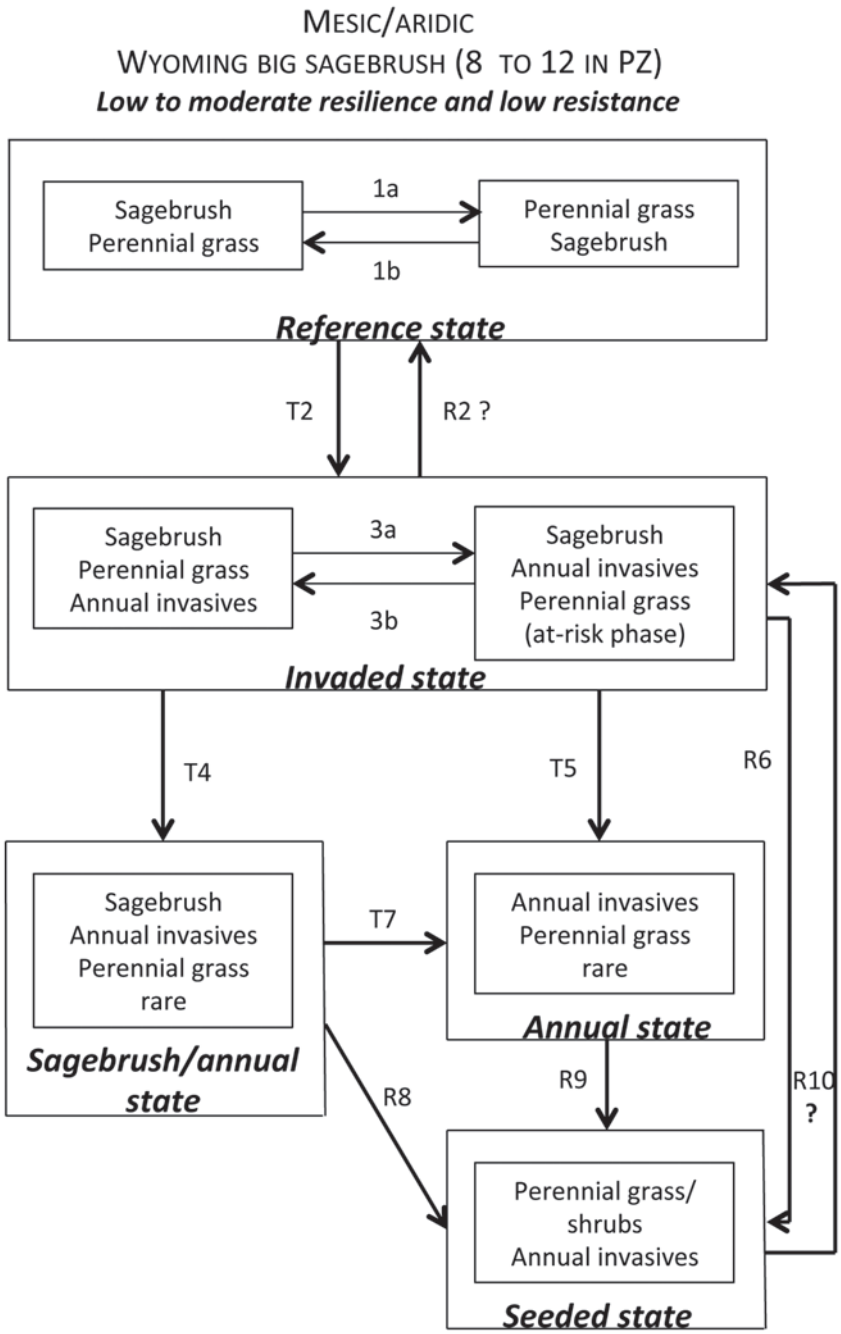


Figure A.5D. STM for a cool mesic to warm frigid/xeric mountain big sagebrush ecological type type that has piñon pine and/or juniper potential and is characterized by moderate resilience and moderately low resistance.



(1a) Perennial grass increases due to disturbances that decrease sagebrush like wildfire, insects, disease, and pathogens.
(1b) Sagebrush increases with time .
(T2) An invasive seed source and/or improper grazing trigger an invaded state.
(R2) Proper grazing, fire, herbicides and/or mechanical treatments are unlikely to result in return to the reference state on all but the coolest and wettest sites.
(3a) Perennial grass decreases and both sagebrush and invasives increase with improper grazing resulting in an at-risk phase. Decreases in sagebrush due to insects, disease or pathogens can further increase invasives.
(3b) Proper grazing and herbicides or mechanical treatments that reduce sagebrush may restore perennial grass and decrease invaders on wetter sites (10-12”). Outcomes are less certain on drier sites (8-10”) and/or low abundance of perennial grass.
(T4) Improper grazing triggers a largely irreversible threshold to a sagebrush/annual state.
(T 5 and T7) Fire or other disturbances that remove sagebrush result in an annual state. Perennial grass is rare and recovery potential is low due to low precipitation, mesic soil temperatures, and competition from annual invasives. Repeated fire can cause further degradation.
(R6, R8 and R9) Seeding following fire and/or invasive species control results in a seeded state. Sagebrush may recolonize depending on patch size, but annual invasives are still present.
(R10) Seeding effectiveness and return to the invaded state are related to site conditions, seeding mix, and post-treatment weather.

Figure A.5E. STM for a mesic/aridic Wyoming big sagebrush ecological type with low to moderate resilience and low resistance.

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Appendix K – Attachment 2

Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment

June 2014

Introduction and Background

The purpose of this assessment is to identify priority habitat areas and management strategies to reduce the threats to Greater Sage-Grouse resulting from impacts of invasive annual grasses, wildfires, and conifer expansion. The Conservation Objectives Team (COT) report (USFWS 2013) and other scientific publications identify wildfire and conversion of sagebrush habitat to invasive annual grass dominated vegetative communities as two of the primary threats to the sustainability of Greater Sage-Grouse (*Centrocercus urophasianus*, hereafter sage-grouse) in the western portion of the species range. For the purposes of this assessment protocol, invasive species are limited to, and hereafter referred to, as **invasive annual grasses** (e.g., primarily cheatgrass [*Bromus tectorum*]). Conifer expansion (also called encroachment) is also addressed in this assessment.

The United States Fish and Wildlife Service (USFWS) will consider the amelioration of impacts, location and extent of treatments, degree of fire risk reduction, locations for suppression priorities, and other proactive measures to conserve sage-grouse in their 2015 listing decision. This determination will be made based in part upon information contained in the United States (US) Department of the Interior, Bureau of Land Management (BLM) resource management plan (RMP) amendments and Forest Service land resource management plan (LRMP) amendments, including this assessment.

This assessment is based in part on National Resources Conservation Service (NRCS) soil surveys that include geospatial information on soil temperature and moisture regimes associated with resistance and resiliency properties (see following section on *Soil Temperature and Moisture Regimes)*. While this assessment is applicable across the range of sage-grouse, the analysis is limited to Western Association of Fish and Wildlife Management Agencies' (WAFWA) Management Zones III, IV, and V (roughly the Great Basin region) because of the significant issues associated with invasive annual grasses and the high level of wildfires in this region. The utility of this assessment process is dependent on incorporating improved information and geospatial data as it becomes available. Although the resistance and resilience concepts have broad applications (e.g., infrastructure development), this assessment is limited to developing strategies to reduce threats to sage-grouse habitat (e.g., invasive annual grasses and wildfires).

Draft Greater Sage-Grouse Environmental Impact Statements (EISs) contain a suggested framework in the appendices ("Draft Greater Sage-Grouse Wildland Fire and Invasive Species Assessment") that provided a consistent approach to conduct these assessments. The current protocol was developed by the Fire and Invasive Species Team (FIAT), a team of wildland fire specialists and other resource specialists and managers, to specifically incorporate resistance to invasive annual grasses and resilience after disturbance principles into the assessment protocol. In October 2013, the BLM, Forest Service, and USFWS agreed to incorporate this approach into the final EISs.

The cornerstone of the FIAT protocol is recent scientific research on resistance and resilience of Great Basin ecosystems (Chambers et al. *In press*) and the USFWS-sponsored project with the Western Association of Fish and Wildlife Agencies (WAFWA) to assemble an interdisciplinary team to provide additional information on wildland fire and invasive plants and to develop strategies for addressing

these issues. This interagency collaboration between rangeland scientists, fire specialists, and sage-grouse biologists resulted in the development of a strategic, multi-scale approach for employing ecosystem resilience and resistance concepts to manage threats to sage-grouse habitats from wildfire and invasive annual grasses (Chambers et al. *In prep.*). This paper is being published as a Forest Service Rocky Mountain Research Station General Technical Report and is available at www._____. It serves as the reference and basis for the protocol described in this assessment.

The assessment process sets the stage for:

- Identifying important sage-grouse occupied habitats and baseline data layers important in defining and prioritizing sage-grouse habitats
- Assessing the resistance to invasive annual grasses and resilience after disturbance and prioritizing focal habitats for conservation and restoration
- Identifying geospatially explicit management strategies to conserve sage-grouse habitats

Management strategies are types of actions or treatments that managers typically implement to resolve resource issues. They can be divided into proactive approaches (e.g., fuels management and habitat recovery/restoration) and reactive approaches (e.g., fire operations and post-fire rehabilitation). Proactive management strategies can favorably modify wildfire behavior and restore or improve desirable habitat with greater resistance to invasive annual grasses and/or resilience after disturbances such as wildfires. Reactive management strategies are employed to reduce the loss of sage-grouse habitat from wildfires or stabilize soils and reduce impacts of invasive annual grasses in sage-grouse habitat after wildfires. Proactive management strategies will result in long-term sage-grouse habitat improvement and stability, while reactive management strategies are essential to reducing current impacts of wildfires on sage-grouse habitat, thus maintaining long-term habitat stability. Management strategies include:

Proactive Strategies-

1. **Fuels Management** includes projects that are designed to change vegetation composition and/or structure to modify fire behavior characteristics for the purpose of aiding in fire suppression and reducing fire extent.

2. **Habitat Restoration/Recovery**
    a. Recovery, referred to as passive restoration (Pyke 2011), is focused on changes in land use (e.g., improved livestock grazing practices) to achieve a desired outcome where the plant community has not crossed a biotic or physical threshold.
    b. Restoration is equivalent to active restoration (Pyke 2011) and is needed when desired species or structural groups are poorly represented in the community and reseeding, often preceded by removal of undesirable species, is required. Note: The Fuels Management program supports recovery/restoration projects through its objective to restore and maintain resilient landscapes.

Reactive Strategies-

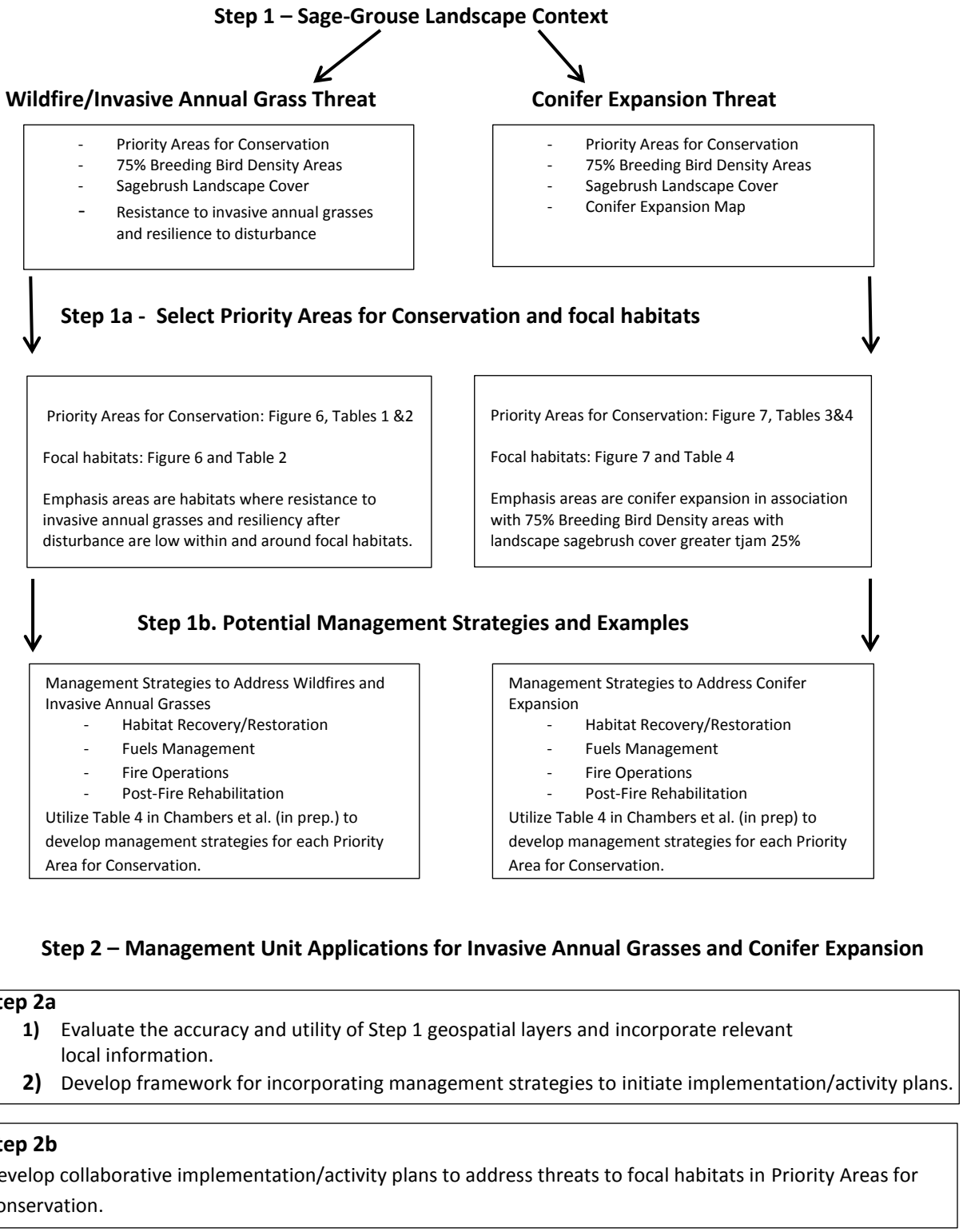
3. **Fire Operations** includes preparedness, prevention, and suppression activities. When discussing specific components of fire operations, the terms fire preparedness, fire prevention and fire suppression are used.

4. **Post-Fire Rehabilitation** includes the BLM's Emergency Stabilization and Rehabilitation (ES&R) Program and the Forest Service's Burned Area Emergency Response (BAER) Program. Policy limits application of funds from 1 to 3 years, thus treatments to restore or enhance habitat after this period of time are considered habitat recovery/restoration.

The assessment process included two steps with sub-elements. First, important Priority Areas for Conservation (PACs) and focal habitats are identified (**Step 1a**). Second, potential management **strategies** (described above) are identified to conserve or restore focal habitats threatened by wildfires, invasive annual grasses, and conifer expansion (primarily pinyon pine and/or juniper species; **Step 1b**). Focal habitats are the portions of a PAC with important habitat characteristics, bird populations, and threats (e.g., wildfires, invasive annual grasses, and conifer expansion) where this assessment will be applied. Areas adjacent to or near the focal habitats can be considered for management treatments such as fire control and fuels management if these locations can reduce wildfire impacts to focal habitats. Soil temperature and moisture regimes are used to characterize capacity for resistance to invasive annual grasses and resilience after disturbance (primarily wildfires) within focal habitats to assist in identifying appropriate management strategies, especially in areas with good habitat characteristics that have low recovery potential following disturbance. Soil moisture and temperature regime relationships have not been quantified to the same degree as for conifer expansion; however, Chambers et al. (*In prep.*) discuss preliminary correlations between these two variables.

The results of Steps 1a and 1b, along with associated geospatial data files, are available to local management units to complete Step 2 of the assessment process. Step 2 is conducted by local management units to address wildfire, invasive annual grasses, and conifer expansion in or near focal habitat areas. First, local information and geospatial data are collected and evaluated to apply and improve on Step 1 focal habitat area geospatial data (**Step 2a**). Second, focal habitat activity and implementation plans are developed and include prioritized management **tactics and treatments** to implement effective, fuels management, habitat recovery/restoration, fire operations, and post-fire rehabilitation strategies (**Step 2b**). This assessment will work best if Step 2b is done across management units (internal and externally across BLM and Forest Service administrative units and with other entities). **Figure 1**, Assessment Flow Chart, contains an illustration of the steps in the assessment process.

This analysis does not necessarily address the full suite of actions needed to maintain the current distribution and connectivity of sage-grouse habitats across the Great Basin because resources available to the federal agencies are limited at this time. Future efforts designed to maintain and connect habitats across the range will be needed as current focal areas are addressed and additional resources become available.



Step 2 – Management Unit Applications for Invasive Annual Grasses and Conifer Expansion

Step 2a

1) Evaluate the accuracy and utility of Step 1 geospatial layers and incorporate relevant local information.
2) Develop framework for incorporating management strategies to initiate implementation/activity plans.

Step 2b

Develop collaborative implementation/activity plans to address threats to focal habitats in Priority Areas for Conservation.

Figure 1, Assessment Flow Chart

Step 1

The first component of the Wildfire and Invasive Annual Grasses Assessment describes the factors that collectively provide the sage-grouse landscape context. Step 1a provides this context by discussing PACs, breeding bird density (BBD), soil temperature and moisture regimes (indicators of resistance to annual grasses and resilience after disturbance), landscape sagebrush cover, and conifer expansion. See Chambers et al. (2014 in prep.) for a detailed description of Invasive Annual Grass and Wildfire threats to sage-grouse habitat. Priority PACs and focal habitats are derived from the information provided in this sage-grouse landscape context section.

Step 1a- Sage-grouse landscape context

This component of the assessment identifies important PACs and associated focal habitats where wildfire, invasive annual grasses, and conifer expansion pose the most significant threats to sage-grouse.

The primary focus of this assessment is on sage-grouse populations across the WAFWA Management Zones III, IV, and V (**Figure 2**, Current PACs for WAFWA Management Zones III, IV, and V). Sage-grouse are considered a landscape species that require very large areas to meet their annual life history needs. Sage-grouse are highly clumped in their distribution (Doherty et al. 2010), and the amount of landscape cover in sagebrush is an important predictor of sage-grouse persistence in these population centers (Knick et al. 2013). States have used this information combined with local knowledge to identify PACs to help guide long-term conservation efforts. FIAT used data sets that were available across the three management zones as an initial step for prioritizing selected PACs and identifying focal habitats for fire and invasive annual grasses and conifer expansion assessments. These data sets (also described in Chambers et al. *In prep.*) include:

Priority Areas for Conservation (PACs)

PACs have been identified by states as key areas that are necessary to maintain redundant, representative, and resilient sage-grouse populations (USFWS 2013; see Figure 2). A primary objective is to minimize threats within PACs (e.g., wildfire and invasive annual grasses impacts) to ensure the long-term viability of sage-grouse and its habitats. A secondary priority is to conserve sage-grouse habitats outside of PACs since they may also be important for habitat connectivity between PACs (genetic and habitat linkages), habitat restoration and population expansion opportunities, and flexibility for managing habitat changes that may result from climate change. PACs have also been identified by the USFWS as one of the reporting geographic areas that will be considered during listing determinations for sage-grouse.

The combination of PACs with BBD data (described below) assists us in identifying connectivity between populations. PAC boundaries may be modified in the future requiring adjustments in focal habitat areas and management strategy priorities.

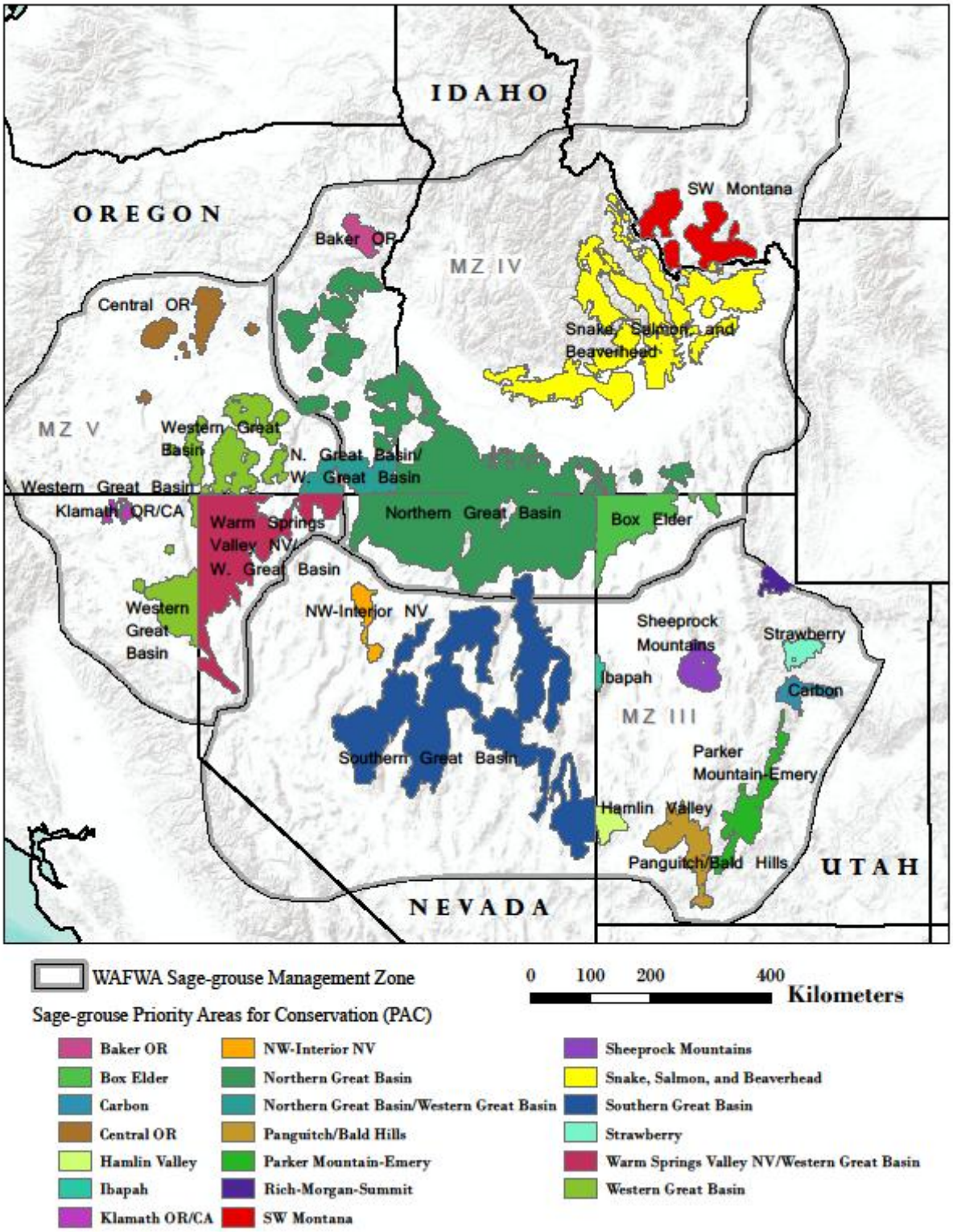


Figure 2, Current PACs for WAFWA Management Zones III, IV, and V. Bi-State sage-grouse populations were not included for this analysis and are being addressed in separate planning efforts.

Breeding Bird Density

Doherty et al. (2010) provided a useful framework for identifying population concentration centers in their range-wide BBD mapping. FIAT used maximum counts of males on leks (4,885 males) to delineate breeding bird density areas that contain 25, 50, 75, and 100 percent of the known breeding population. Leks were then mapped according to abundance values and buffered by 4 to 5.2 miles (6.4 to 8.5 kilometers) to delineate nesting areas. Findings showed that while sage-grouse occupy extremely large landscapes, their breeding distribution is highly aggregated in comparably smaller identifiable population centers; 25 percent of the known population occurs within 3.9 percent (7.2 million acres [2.92 million hectares]) of the species range, and 75 percent of birds are within 27 percent of the species range (50.5 million acres [20.4 million hectares]; Doherty et al. 2010). See **Figures 3**, Sage-Grouse Breeding Bird Density Thresholds.

This analysis places emphasis on breeding habitats because little broad/mid-scale data exists for associated brood-rearing (summer) and winter habitat use areas. Finer scale seasonal habitat use data should be incorporated (or, if not available studies, should be conducted) at local levels to ensure management actions encompass all seasonal habitat requirements. Federal administrative units should consult with state wildlife agencies for additional seasonal habitat information.

For this assessment, FIAT chose to use the 75 percent BBD as an indicator of high bird density areas that informed the approach used by state wildlife agencies to initially identify PACs. Range-wide BBD areas provide a means to further prioritize actions within relatively large PACs to maintain bird distribution and abundance. FIAT used state level BBD data from Doherty et al. (2010) instead of range-wide model results to ensure important breeding areas in Management Zones III, IV, and V were not underweighted due to relatively higher bird densities in the eastern portion of the range. BBD areas of 75 to 100 percent are included in Appendix 1 to provide context for local management units when making decisions concerning connectivity between populations and PACs.

Note that breeding density areas were identified using best available information in 2009, so this range-wide data does not reflect the most current lek count information and changes in conditions since the original analysis. Subsequent analysis should use the most current information available. Also, BBD areas should not be viewed as rigid boundaries but rather as a means to regionally prioritize landscapes where step down assessments and actions should be implemented quickly to conserve the most birds.

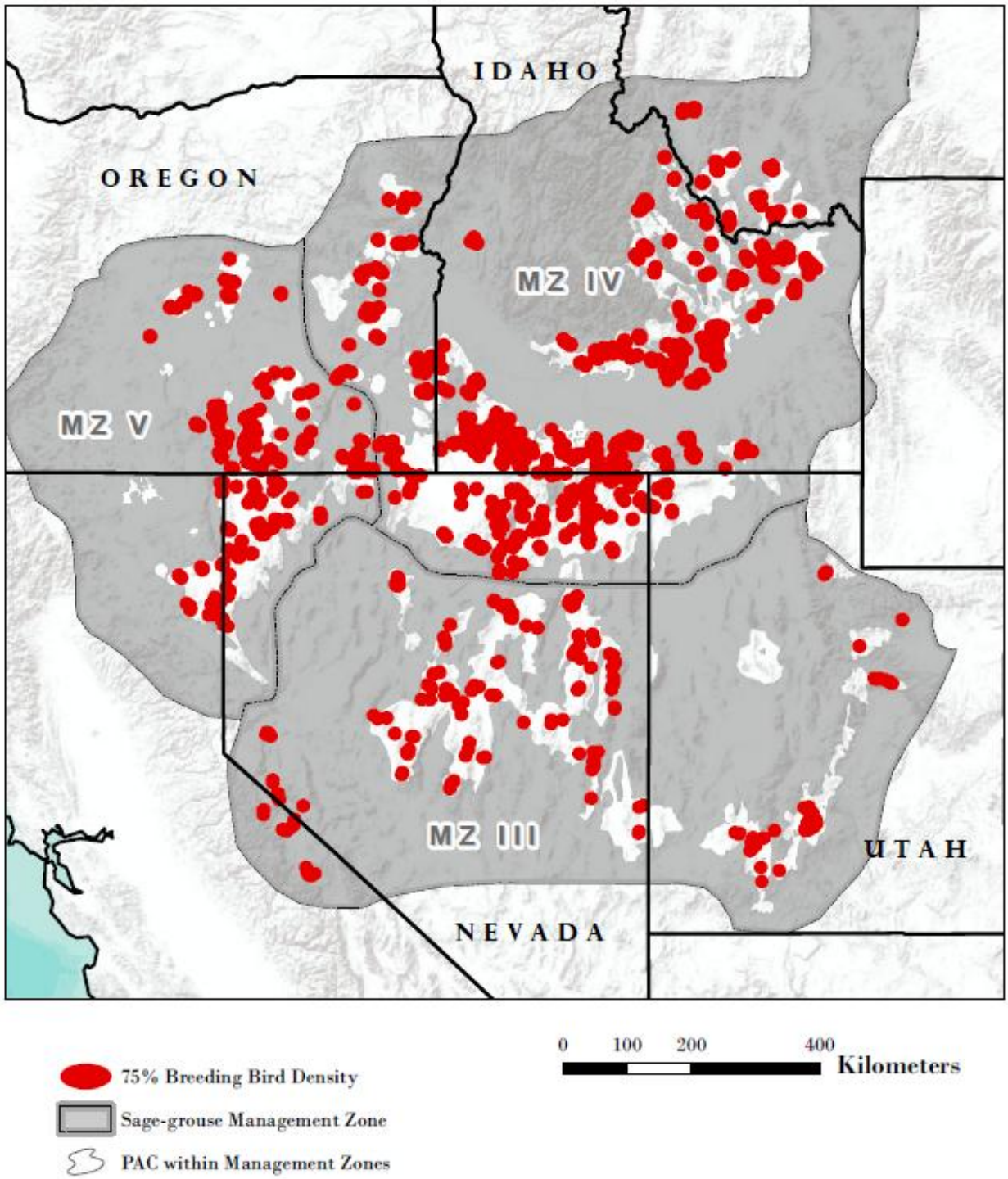


Figure 3, Sage-Grouse Breeding Bird Density Thresholds for 75% of the breeding birds, Management Zones, and PACs. Breeding bird density of 75 to 100% is shown in Appendix 1 to provide context for local management units when making decisions concerning connectivity between populations and PACs.

Soil Temperature and Moisture Regimes

Invasive annual grasses and wildfires can be tied to management strategies through an understanding of resistance and resilience concepts. Invasive annual grasses has significantly reduced sage-grouse habitat throughout large portions of its range (Miller et al. 2011). While abandoned leks were linked to increased nonnative annual grass presence, active leks were associated with less annual grassland cover than in the surrounding landscape (Knick et al. 2013). Invasive annual grasses also increases fire frequency, which directly threatens sage-grouse habitat and further promotes the establishment of invasive annual grasses (Balch et al. 2013). This nonnative annual grass and fire feedback loop can result in conversion from sagebrush shrublands to annual grasslands (Davies 2011).

In cold desert shrublands, vegetation community resistance to invasive annual grasses, especially cheatgrass, and resilience following disturbance is strongly influenced by soil temperature and moisture regimes (Chambers et al. 2007; Meyer et al. 2001). Generally, cooler and moister soil temperature/moisture regimes are associated with more resilient vegetation communities as indicated by increases in vegetation productivity and ability to compete and recover from disturbance along elevation gradients (Chambers et al. 2007; Chambers et al. *in press*). Also, colder soil temperatures are associated with more resistant communities due to limitations on invasive annual grass growth and reproduction. Thus, communities with warm and dry soil temperature and moisture regimes tend to have relatively low resilience and resistance. Communities with cool and dry soil temperature and moisture regimes also can have relatively low resilience and resistance with the degree of resistance to cheatgrass depending on soil temperature (see Figure 9 in Chambers et al. *In prep.*). A continuum in resistance and resilience exists across soil temperature and moisture regimes that will need to be considered when developing implementation or activity plans in Step 2. These relationships can be used to help prioritize management actions within sage-grouse habitat using broadly available data.

To capture relative resistance and resilience to disturbance and invasive annual grasses across the landscape, soil temperature and moisture regime information (described in greater detail in Chambers et al. *In prep.*) were obtained from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) data. Where gaps in this coverage existed, the NRCS US General Soil Map (STATSGO2) data was used (Soil Survey Staff 2014; see Appendix 1). The STATSGO2 database includes soils mapped at a 1:250,000-scale; the SSURGO database includes soils mapped at the 1:20,000 scale. Interpretations made from soil temperature and moisture regimes from the STATSGO2 database will not have the same level of accuracy as those made from the SSURGO database.

Areas characterized by warm and dry soil temperature and moisture regimes (low relative resistance and resilience) were intersected with sage-grouse breeding habitat and sagebrush landscape cover to identify candidate areas (emphasis areas) for potential management actions that mitigate threats from invasive annual grasses and wildfire (**Figure 4**, Soil Moisture and Temperature Regimes for Management Zones III, IV, and V, and **Figure 5**, Intersection of High Density (75% BBD) Populations). These data layers provide the baseline information considered important in prioritizing areas where conservation and management actions could be developed to address invasive annual grasses in a scientifically defensible manner (see Table 4 in Chambers et al. *In prep.*).

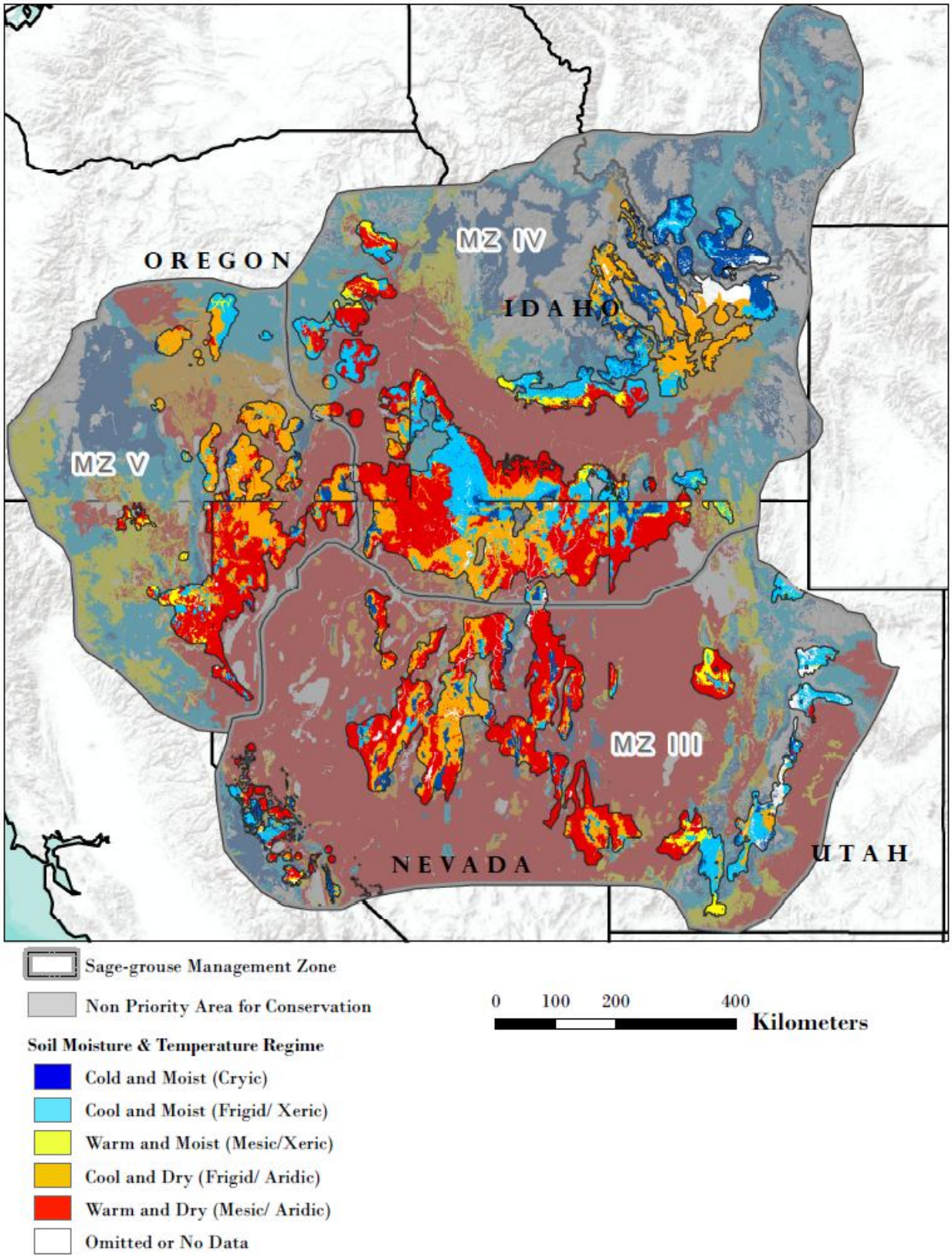


Figure 4, Soil Moisture and Temperature Regimes for Management Zones III, IV, and V

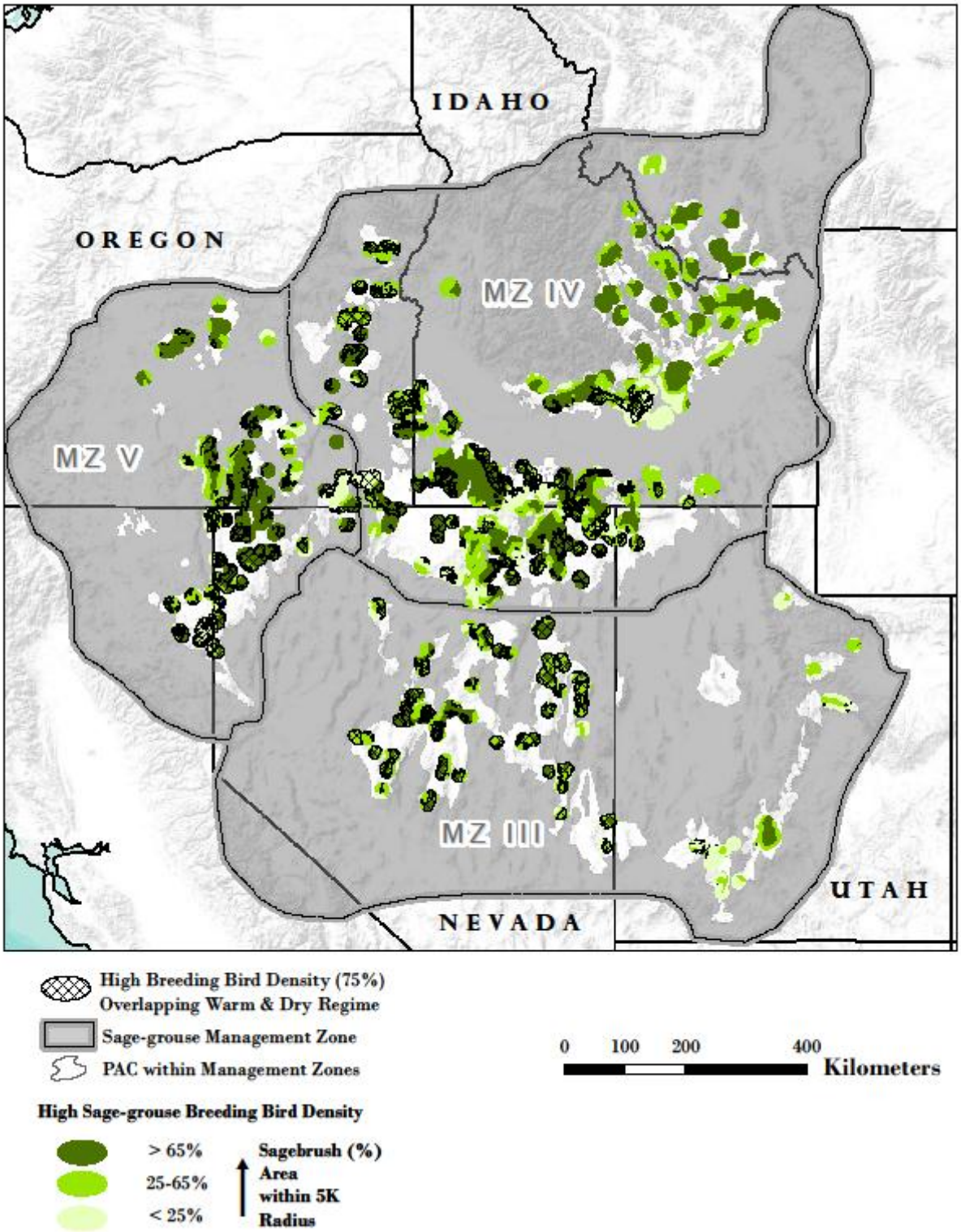


Figure 5, Intersection of High Density (75% BBD) Populations. The warm and dry sites and the proportion of these habitats in the three sagebrush landscape cover classes by management zone, and PACs within the Great Basin.

Sagebrush Landscape Cover

The amount of the landscape in sagebrush cover is closely related to the probability of maintaining active sage-grouse leks, and is used as one of the primary indicators of sage-grouse habitat potential at landscape scales (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). For purposes of prioritizing landscapes for sage-grouse habitat management, FIAT used less than or equal to 25 percent sagebrush landscape cover as a level below which there is a low probability of maintaining sage-grouse leks, and greater than or equal to 65 percent as the level above which there is a high probability of sustaining sage-grouse populations with further increases of landscape cover of sagebrush (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Increases in landscape cover of sagebrush have a constant positive relationship with sage-grouse lek probability at between about 25 percent and 65 percent landscape sagebrush cover (Knick et al. 2013). It is important to note that these data and interpretations relate only to persistence (i.e., whether or not a lek remains active), and it is likely that higher proportions of sagebrush cover may be required for population growth.

For the purposes of delineating sagebrush habitat relative to sage-grouse requirements for landscape cover of sagebrush, FIAT calculated the percentage of landscape sagebrush cover (Landfire 2013) within a 3-mile (5-kilometer) radius of each 98-foot by 98-foot (30 meter by 30 meter) pixel in Management Zones III, IV, and V (see Appendix 2 in Chambers et al. (*In prep.*) for how landscape sagebrush cover was calculated). FIAT then grouped the percentage of landscape sagebrush cover into each of the selected categories (0 to 25 percent, 25 to 65 percent, 65 to 100 percent; **Figure 6**, Sagebrush Landscape Cover and Fire Perimeters for the Analysis Area). Landfire data was based on 2000 satellite imagery so wildfire perimeters after that date were incorporated into this layer to better reflect landscape sagebrush cover. Burned areas were assumed to fall into the 0 to 25 percent landscape cover class.

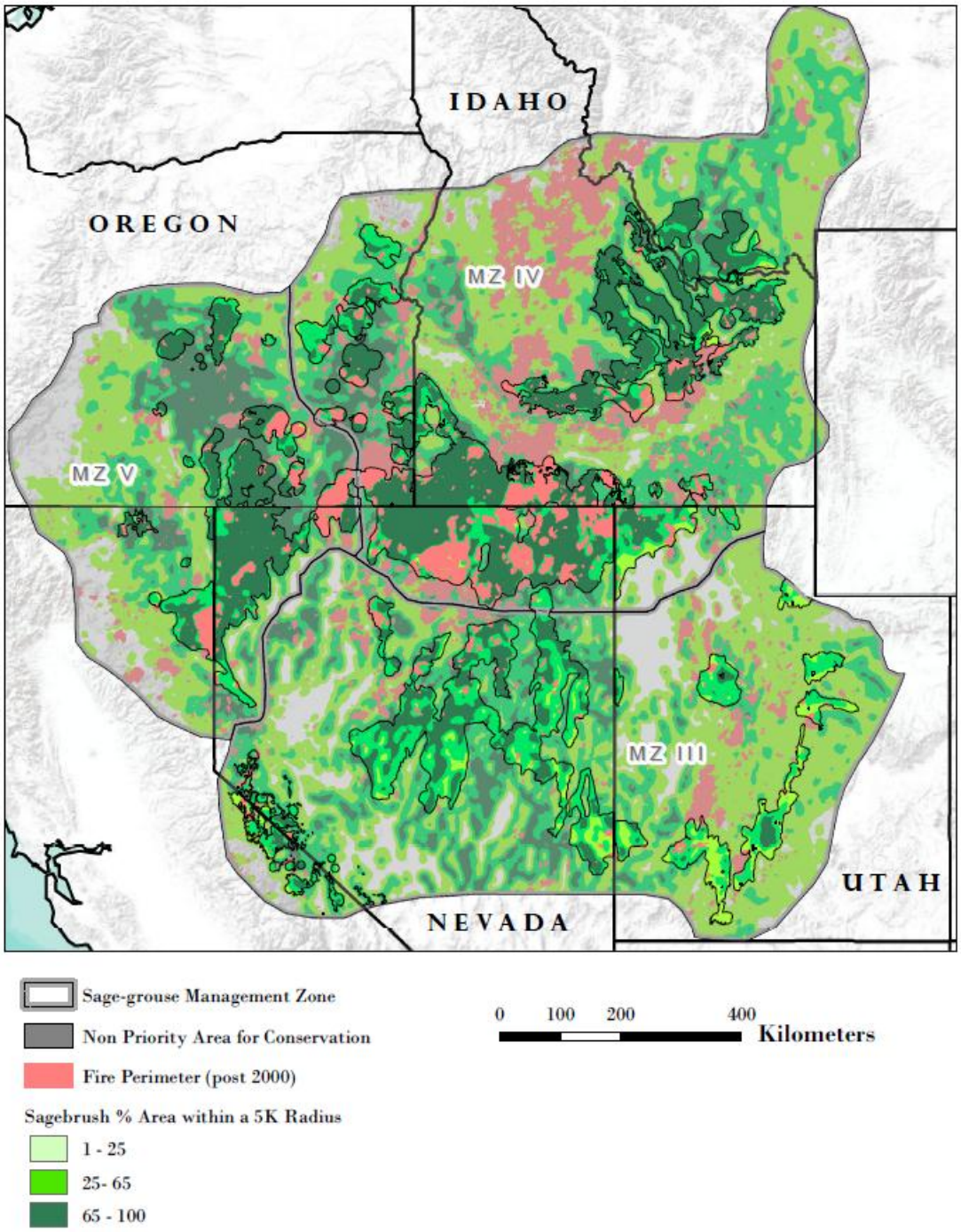


Figure 6, Sagebrush Landscape Cover and Fire Perimeters (post-2000) for the Analysis Area

Conifer Expansion

Conifer expansion into sagebrush landscapes also directly reduces sage-grouse habitat by displacing shrubs and herbaceous understory as well as by providing perches for avian predators. Conifer expansion also leads to larger, more severe fires in sagebrush systems by increasing woody fuel loads (Miller 2013). Sage-grouse populations have been shown to be impacted by even low levels of conifer expansion (Baruch-Mordo et al. 2013). Active sage-grouse leks persist in regions of relatively low conifer woodland and are threatened by conifer expansion (Baruch-Mordo et al. 2013; Knick et al. 2013).

To estimate where sage-grouse breeding habitat faces the largest threat of conifer expansion, FIAT used a risk model developed by Manier et al. (2013) that locates regions where sagebrush landscapes occur within 250 meters of conifer woodland (**Figure 7**, Modeled Conifer Expansion for PACs with Greater Than 25% Sagebrush Landscape Cover In and Around 75% BBD). Although the model is coarse, it is available for the entirety of the three sage-grouse management zones analyzed. FIAT encourages using more accurate conifer expansion data in Step 2.

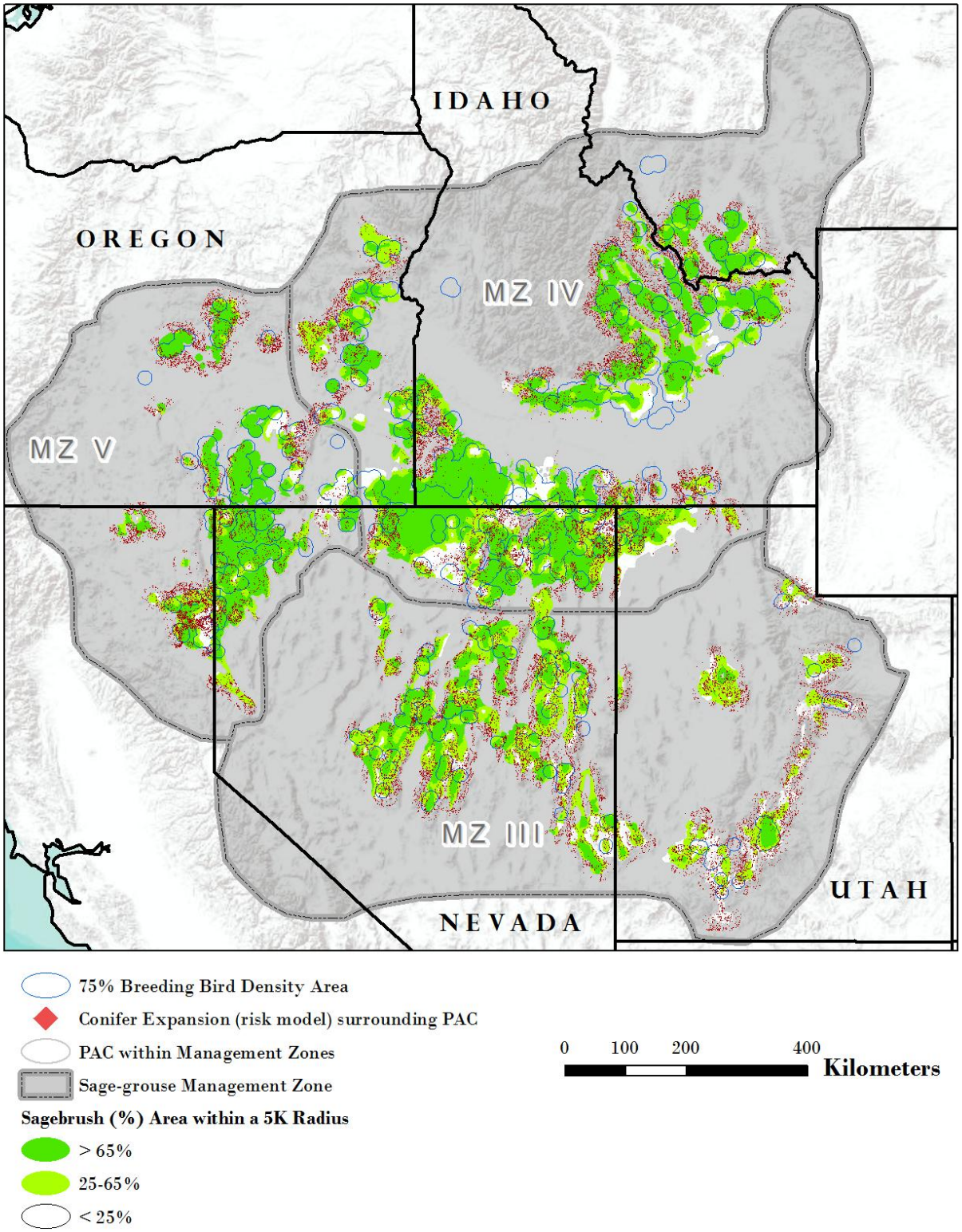


Figure 7, Modeled Conifer Expansion for PACs with Greater Than 25% Sagebrush Landscape Cover In and Around 75% BBD

Step 1a. Identifying PACs and focal habitats

A primary goal for the conservation of sage-grouse populations is the identification of important habitats needed to ensure the persistence and recovery of the species. Loss of habitat, and by inference populations, in these habitats would likely imperil the species in the Great Basin. The first objective is to protect and restore those habitats that provide assurances for retaining large well connected populations.

PACs and the 75 percent BBD maps were used to provide a first-tier stratification (e.g., focal habitats) for prioritizing areas where conservation actions could be especially important for sage-grouse populations. Although these areas are a subset of the larger sage-grouse habitats, they are readily identifiable and include habitats (e.g., breeding and nesting habitats that are considered critical for survival; Connelly et al. 2000; Holloran et al. 2005; Connelly et al. 2011) and necessary for the recovery of the species across its range.

The prioritization of habitats for conservation purposes was based on the several primary threats to remaining sage-grouse populations in the Great Basin including the loss of sagebrush habitats to wildfire and invasive annual grasses, and conifer expansion. The first, and probably the most urgent threat for sage-grouse, is the loss of sagebrush habitat due to wildfire and invasive annual species (e.g., cheatgrass; See Figure 11 in Chambers et al. [*In prep.*]). Areas of highest concern are those with low resistance to cheatgrass and low resilience after disturbance (warm/dry and some cool/dry temperature and moisture regimes sites) that are either **within or in close proximity** to remaining high density populations of sage-grouse (Figure 5). Sagebrush habitats (greater than 25 percent sagebrush landscape cover) prone to conifer expansion, particularly pinyon pine and/or juniper, are also a management concern when within or adjacent to high density sage-grouse populations (Figure 7).

Because these two threats occur primarily at different points along an elevational gradient and are associated with different soil temperature and moisture regimes, separate approaches are used to select PACs and focal habitats for each.

High Density Populations at Highest Risk from <u>Wildfire and Invasive Annual Grasses</u>

PACs in Management Zones III, IV, and V. were evaluated on the basis of high density (75 percent) BBDs, sagebrush landscape cover, and soil temperature and moisture regimes to identify initial PACs that are a priority for assessments and associated focal habitats. **Figure 8**, High Priority PACs with High Density Sage-Grouse Populations (75% BBD), displays the results of the analysis focusing on the intersection of high density (75 percent BBD) populations, the warm and dry sites, and the proportion of these habitats in the three sagebrush landscape cover classes by management zone, and PACs within the Great Basin. **Table 1**, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Warm/ Dry Sites, and Percentage of Habitat in Sagebrush Landscape Cover Classes, displays quantitative outputs of this analysis. The table allows a comparison of these data, and assists in selecting five PACs that provide the greatest contribution to high density sage-grouse populations, and the amounts (acres and proportion) within those PACs of sagebrush cover classes associated with warm and dry soil temperature and moisture regimes.

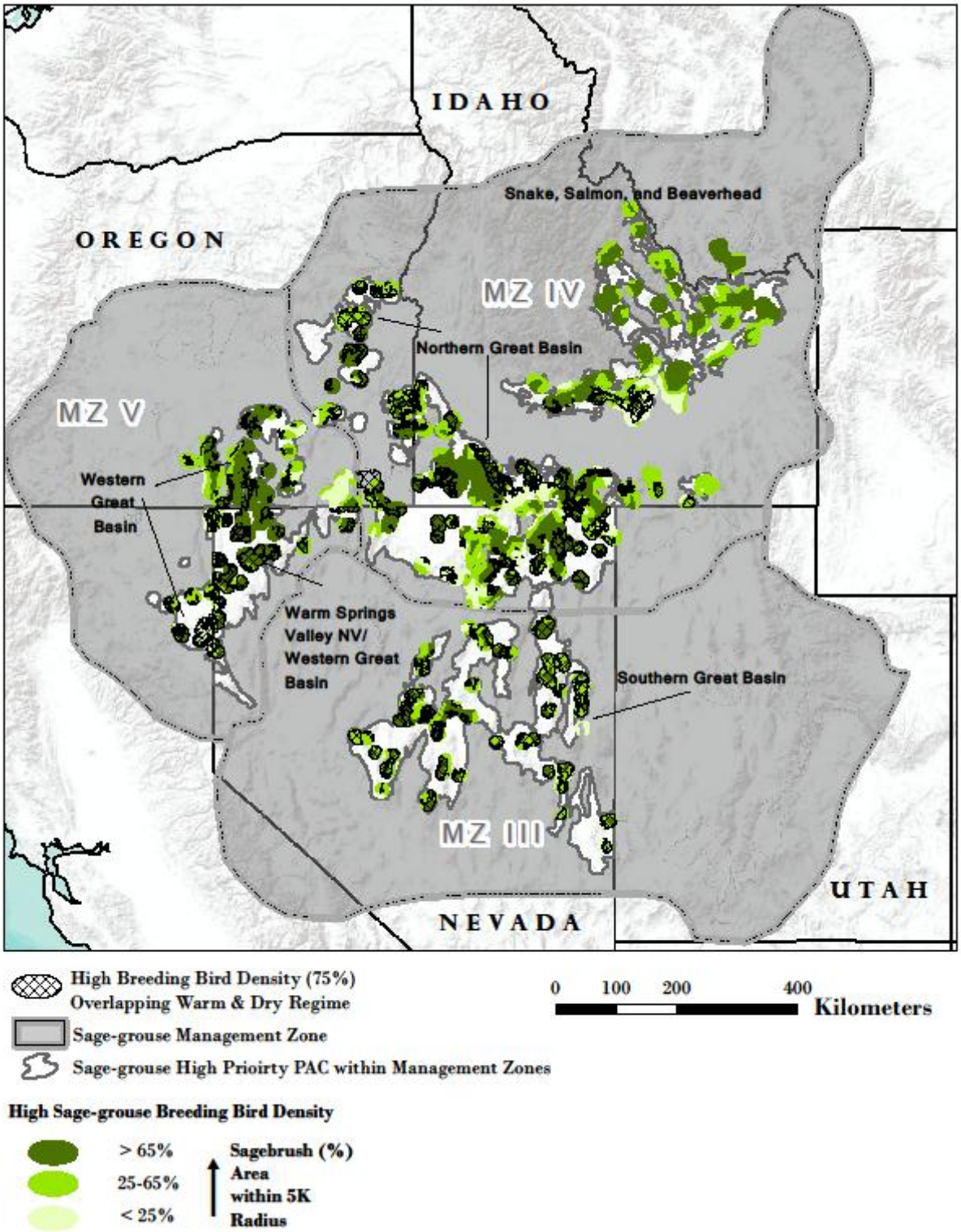


Figure 8, High Priority PACs with High Density Sage-Grouse Populations (75% BBD) sagebrush landscape cover classes, and areas with low resistance and resilience relative to wildfires and invasive annual species.

Table 1, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Warm/ Dry Sites, and Percentage of Habitat in Sagebrush Landscape Cover Classes

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	Total PAC Acres	Breeding Bird Density (75%) Acres	Percent of Breeding Bird Density (75%) Area within PAC	Warm and Dry Soil Moisture & Temperature Regime within Breeding Bird Density (75%) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	57%	179551 (2%)	674554 (9%)	1745163 (24%)
3	Southern Great Basin	9461355	3146056	33%	42596 (1%)	792780 (25%)	1062091 (34%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	52%	68107 (2%)	89146 (3%)	95970 (3%)
5	Western Great Basin	3177253	2084626	66%	149399 (7%)	140141 (7%)	202767 (10%)
5	Warm Springs Valley NV/Western Great Basin	3520937	1558166	44%	31458 (2%)	207365 (13%)	741353 (48%)
4	SW Montana	1369076	659475	48%	0 (0%)	0 (0%)	0 (0%)
4	Northern Great Basin/Western Great Basin	1065124	624581	59%	114222 (18%)	85258 (14%)	116513 (19%)
5	Central OR	813699	451755	56%	0 (0%)	6211 (1%)	16463 (4%)
3	Panguitch/Bald Hills	1135785	352258	31%	6883 (2%)	5821 (2%)	0 (0%)
3	Parker Mountain-Emery	1122491	308845	28%	0 (0%)	127 (0%)	0 (0%)
4	Box Elder	1519454	292658	19%	22 (0%)	43325 (15%)	23913 (8%)
4	Baker OR	336540	184813	55%	0 (0%)	46459 (25%)	36214 (20%)
3	NW-Interior NV	371557	108256	29%	576 (1%)	17117 (16%)	25173 (23%)
3	Carbon	355723	97734	27%	255 (0%)	180 (0%)	0 (0%)
3	Strawberry	323219	52635	16%	0 (0%)	0 (0%)	0 (0%)
3	Rich-Morgan-Summit	217033	37005	17%	0 (0%)	0 (0%)	0 (0%)
3	Hamlin Valley	341270	3244	1%	0 (0%)	139 (4%)	3105 (96%)
3	Ibapah	98574	0	0%	0 (NA)	0 (NA)	0 (NA)
3	Sheeprock Mountains	611374	0	0%	0 (NA)	0 (NA)	0 (NA)
5	Klamath OR/CA	162667	0	0%	0 (NA)	0 (NA)	0 (NA)

* Numbers in parenthesis indicate the percent of acres relative to total acres of breeding bird density (75%)

These five PACs comprise 90 percent and 95 percent of remaining PAC sagebrush landscape cover in the 25 to 65 percent and greater than or equal to 65 percent sagebrush landscape cover classes, respectively, of the 75 percent BBD associated with low resistance/resilience habitats. The 75 percent BBD habitats in the Northern, Southern Great Basin, and Warm Spring PACs appear particularly important for two reasons. They represent a significant part of the remaining habitats for the Great Basin metapopulation, and they have the greatest amount of low resiliency habitat remaining that still functions as sage-grouse habitat.

An examination of the 5 selected PACs shows that the sum of the 75 percent BBD within these PACs is 16,995,496 acres (**Table 2**, PACs with the Highest Acres and Proportions of 75% BBD acres, and Acres and Proportions of 75% BBD Acres within the Warm/Dry Soil Temperature and Moisture Class). These are the **focal habitats**. These five PACs constitute 84 percent of the 75 percent BBD low resiliency habitats for all Management Zones III, IV, and V PACs. Within and immediately around these focal habitats, 5,751,293 acres are in high BBD areas with landscape sagebrush cover in the 25-65 percent and ≥ 65 percent classes and in the warm and dry soil temperature and moisture regimes. These are the habitats in the most danger to loss due to their low resistance to invasive annual grasses and low resilience following wildfire. Within the focal habitats in the high priority PACs, low resistance and resilience areas (cross-hatched areas in Figure 8) are a high priority (emphasis area) for implementing management strategies. Applying management strategies outside the emphasis areas are appropriate if the application of fire operations and fuels management activities will be more effective in addressing wildfire threats.

Table 2, PACs with the Highest Acres and Proportions of 75% BBD acres, and Acres and Proportions of 75% BBD Acres within the Warm/Dry Soil Temperature and Moisture Class (see Figure 8)

PAC	PAC Acres	Acres of 75% BBD in PAC (**focal habitat**)	Proportion of 75% BBD within PACs	Warm & Dry Soils within 75% BBD by Sagebrush Landscape Cover Classes Greater Than 25%*	
				25-65%	>65%
Northern Great Basin	13,045,515	7,383,442	0.57	674,517(9%)	1,745,163(24%)
Southern Great Basin	9,461,355	3,146,056	0.33	792,780(25%)	1,062,091(34%)
Snake, Salmon, and Beaverhead	5,477,014	2,823,205	0.52	89,146(3%)	95,970(3%)
Warm Springs Valley NV/Western Great Basin	3,520,937	1,558,166	0.44	207,365(13%)	741,353(48%)
Western Great Basin	3,177,253	2,084,626	0.66	140,141(7%)	202,767(10%)
Total for 5 PACS	**34,682,074**	**16,995,496**	**0.49**	**1,903,949**	**3,847,344**

***** This category represents the emphasis areas for applying appropriate management strategies in or near the focal habitats due to the lower probability of recovery after disturbance and higher probability of invasive annual grasses and existing wildfire threats.

High Density Sage-Grouse Habitats at Risk from Conifer Expansion

PACs, sagebrush landscape cover, and the 75 percent BBD data were also used in conjunction with the conifer expansion data (Mainer et al. 2013) to provide an initial stratification to determine PACs where conifer removal would benefit important sagebrush habitats. Conifer expansion threats are primarily western juniper in the northern Great Basin and pinyon pine/Utah juniper in the southern Great Basin.

Figure 7 displays results of the analysis focusing on the intersection of the 75 percent BBD, and modeled conifer expansion areas within two sagebrush landscape cover classes by management zone and PACs within the Great Basin. To identify high density sage-grouse areas affected by conifer expansion, the amount and proportion of acres estimated to be affected were calculated by sagebrush cover class to assist in the identification of the focal habitats (**Table 3)**. **Table 4**, displays quantitative outputs of this analysis using the 25 to 65 percent and greater than 65 percent landscape sagebrush cover classes for the PACs. Thus, **focal habitats** for addressing conifer expansion are the areas within and near conifer expansion in sagebrush landscape cover classes of 25 to 65 percent and greater than 65 percent. Conifer expansion in these two sagebrush landscape cover classes in the 75 percent BBD areas constitutes an emphasis area for treatments to address conifer expansion. Landscapes with less than 25 percent sagebrush cover may require significant additional management actions to restore sagebrush on those landscapes and therefore were considered a lower priority for this analysis. Focal habitats are identified in Table 4 and displayed in **Figure 9**.

Table 3 assists in identifying those PACs that provide the greatest contribution to high density sage-grouse populations, and the amounts (acres and proportion) within those PACs of sagebrush cover classes associated with modelled conifer expansion areas. Although there are uncertainties associated with the model, the results help managers identify specific geographic areas where treatments in conifer (pinyon and/or juniper) could benefit existing important sage-grouse populations.

The results of the screening revealed 5 PACs that contribute substantially to the 75 percent BBD habitats and are currently impacted most by conifer expansion (primarily pinyon pine and/or juniper; Table 4 and Figure 9). Four of the five PACs identified as high priority for conifer expansion treatments were also high priorities for wildfires and invasive annual grass threats. This is likely due to the size of the PACs and the relative importance of these PACs for maintaining the Great Basin sage-grouse meta-populations. As expected, the locations of high density sage-grouse habitats affected by conifer expansion differ spatially from those associated with low resilience habitats within and among the PACs, primarily due to differences in the biophysical settings (e.g., elevation and rainfall) that contribute to threats from invasive annual grasses and wildfires.

Three PACs (Snake/Salmon/Beaverhead, Southwest Montana, and Northern Great Basin/Western Great Basin) ranked high due to their relatively large proportion of high density breeding habitats (Table 3), but were not selected since the threat of conifer expansion was relatively low. One PAC, (Snake/Salmon/Beaverhead, was identified as a potential high priority area but was dismissed because results of the conifer expansion model likely overestimated impacts due to the adjacent conifer forests in this region. The COT Report also identified conifers as a “threat present but localized” in these areas, whereas, the top five PACs prioritized all have conifers identified as a widespread priority threat to address (USFWS 2013).

Table 3, Relative Ranking of PACs Based on High Density (75% BBD) Populations, Modeled Conifer Expansion, and Percentage of Habitats in Sagebrush Landscape Cover Classes

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	PAC acres	Breeding Bird Density (75%) Acres	Relative Proportion of Breeding Bird Density Area within PAC	Conifer Expansion (Modeled) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	0.57	188502 (1%)	512949 (4%)	442480 (3%)
3	Southern Great Basin	9461355	3146056	0.33	108657 (1%)	738624 (8%)	237828 (3%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	0.52	4209 (0%)	92173 (2%)	216803 (4%)
5	Western Great Basin	3177253	2084626	0.66	87963 (3%)	184618 (6%)	126177 (4%)
5	Warm Springs Valley NV/Western Great I	3520937	1558166	0.44	37148 (1%)	107025 (3%)	217101 (6%)
4	SW Montana	1369076	659475	0.48	1428 (0%)	34765 (3%)	39215 (3%)
4	Northern Great Basin/Western Great Bas	1065124	624581	0.59	12101 (1%)	2247 (0%)	6161 (1%)
5	Central OR	813699	451755	0.56	3191 (0%)	44937 (6%)	59624 (7%)
3	Panguitch/Bald Hills	1135785	352258	0.31	89141 (8%)	75157 (7%)	2563 (0%)
3	Parker Mountain-Emery	1122491	308845	0.28	84719 (8%)	83441 (7%)	7469 (1%)
4	Box Elder	1519454	292658	0.19	8531 (1%)	114376 (8%)	57645 (4%)
4	Baker OR	336540	184813	0.55	945 (0%)	15263 (5%)	195 (0%)
3	NW-Interior NV	371557	108256	0.29	7929 (2%)	29440 (8%)	11813 (3%)
3	Carbon	355723	97734	0.27	15968 (4%)	34446 (10%)	283 (0%)
3	Strawberry	323219	52635	0.16	7916 (2%)	27340 (8%)	1075 (0%)
3	Rich-Morgan-Summit	217033	37005	0.17	11685 (5%)	14280 (7%)	238 (0%)
3	Hamlin Valley	341270	3244	0.01	11321 (3%)	29960 (9%)	6243 (2%)
3	Ibapah	98574	0	0.00	195 (0%)	6770 (7%)	1039 (1%)
5	Klamath OR/CA	162667	0	0.00	1 (0%)	1533 (1%)	15302 (9%)
3	Sheeprock Mountains	611374	0	0.00	16744 (3%)	78580 (13%)	11878 (2%)

* Numbers in parenthesis indicate the proportion of acres relative to total PAC acres

Table 4, PACS with the Highest Acres and Proportions of 75% BBD acres and Estimated Conifer Expansion within Sagebrush Landscape Cover Classes (25-65 percent and ≥65 percent; see Figure 9)

PAC	PAC Acres	Acres 75% BBD in PAC	Prop. 75% BBD within PACs	Conifer Expansion by Landscape Sagebrush Cover Classes 25-65% and ≥65%* Focal Habitat	
				25-65%	≥65%
Northern Great Basin	13,045,515	7,383,442	0.57	512,949 (4%)	442,480 (3%)
Southern Great Basin	9,461,355	3,146,056	0.33	738,624 (8%)	237,828 (3%)
Warm Springs Valley NV/Western Great Basin	3,520,937	1,558,166	0.44	107,025 (3%)	217,101 (6%)
Western Great Basin	3,177,253	2,084,626	0.66	184,618 (6%)	126,177 (4%)
Central Oregon	813,699	451,755	0.56	44,937 (6%)	59,624 (7%)
Total for 5 PACS	**30,018,759**	**14,624,045**	**0.49**	**1,588,153 (5%)**	**1,083,210 (4%)**
*Numbers in parenthesis represent the percent of total PAC acres for each class.					

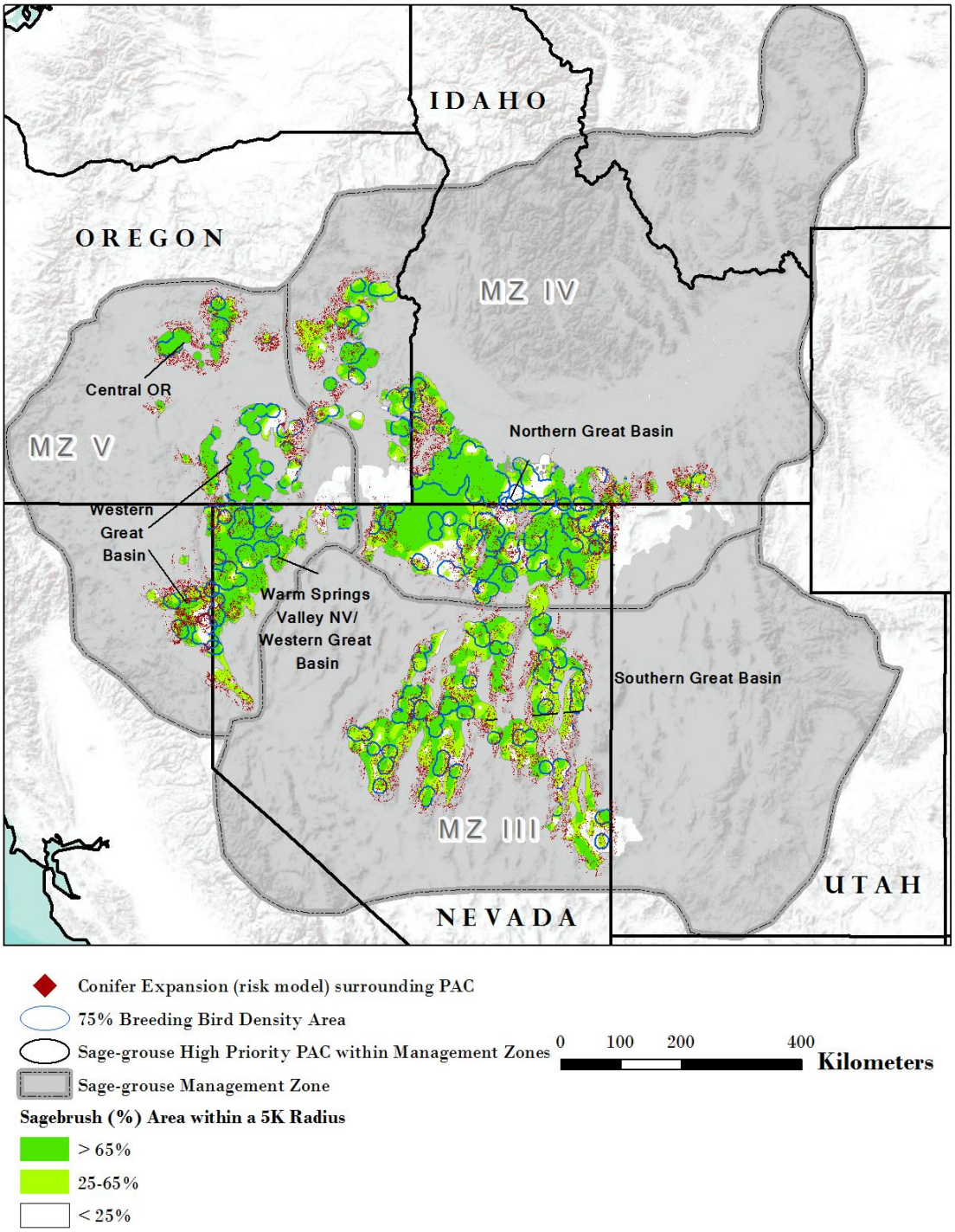


Figure 9, Five PACs Significantly Impacted by Conifer Expansion that contribute substantially to the 75% BBD and that have sagebrush landscape cover greater than 25%.

While the coarse-scale conifer expansion data used in this analysis likely over estimates the extent of the pinyon pine and/or juniper threat, results suggest that far fewer acres are currently affected by conifers than might be at risk from fire and invasive annual grasses impacts. Conifer expansion into sage-grouse habitats occurs at a slower rate, allowing more time for treatment, but early action may be needed to prevent population level impacts on sage-grouse (Baruch-Mordo et al. 2013). Furthermore, conifer expansion is primarily occurring on cooler and moister sites that are more resilient and where restoration is more likely to be effective (Miller et al. 2011), providing managers the opportunity to potentially offset at least some habitat loss expected to continue in less resilient ecosystems. While the available data set used to estimate conifer expansion provides only a coarse assessment of the problem, considerable efforts are currently underway to map conifers across sage-grouse range. These maps are expected to be available in the near future and should be used by land managers to better target project level conifer removal.

FIAT cautions against using the plotted locations of estimated conifer expansion for local management decisions due to the coarse-scale nature of this range-wide data set. Conifer expansion estimates are primarily provided here to aid in judging the relative scope of the threat in each PAC.

Step 1b. Potential Management Strategies

Potential management **strategies** (e.g., fuels management, habitat recovery/restoration, fire operations, post-fire rehabilitation) to conserve or restore Step 1 focal habitats are described below to assist local management units to initiate Step 2. These examples are illustrative and do not contain the full range of management strategies that may be required to address wildfires, invasive annual grasses, and conifer expansion within PACs and associated focal habitats. In general, the priority for applying management strategies is to first maintain or conserve intact habitat and second to strategically restore habitat (after a wildfire or proactively to reconnect habitat). Management strategies will differ when applying the protocol to:

Wildfire and Invasive Annual Grass. (See PACs identified in Table 2 and focal habitats shown in Figure 8). Focal habitats, as they relate to wildfires and invasive annual grasses, are defined as sage-grouse habitat in priority PACs within 75 percent BBD. Within these focal habitats, sagebrush communities with low resilience to disturbance and resistance to invasive annual grasses (warm and dry soil temperature and moisture regimes) are an emphasis area for management actions. Appendix 5 (A) in Chambers et al. (*In prep.*) includes a generalized state and transition model with an invasive annual grass component and warm and dry soil temperature and moisture regime associated with 8 to 12 inches of annual precipitation. This state and transition models is useful in developing management strategies to deal with annual grass issues as it contains useful restoration pathways.

Burn Probability is another tool that can be used to assist managers to identify the relative likelihood of large fire occurrence across the landscape within PACs and focal habitats. Burn probability raster data were generated by the Missoula Fire Lab using the large fire simulator - FSim - developed for use in the national Interagency **Fire Program Analysis (FPA)** project. FSim uses historical weather data and LANDFIRE fuel model data to simulate fires burning. Using these simulated fires, an overall burn probability is returned by FSim for each 270m pixel. The burn probability data was overlaid spatially with PACs, soil data, and shrub cover data. The majority of the high and very high burn probability acres lie within the top 5 PACs and are within areas with >25% sagebrush cover. Several of the other PACs have a greater overall percentage of the warm/dry soil regime with high/very high burn probability (northern great basin, baker, and NW interior NV) but the total acres are relatively few. Areas identified with high and very high burn probability are most likely to experience large fires given fire history, fuels, weather and topography. Results are displayed in the table 5 and Figure 10.

Table 5, Percentages of sage-grouse PAC areas with high and very high burn probability, 75% BBD within PAC, 75% BBD and warm dry/temperature regime, and 75% BBD and warm dry/temperature and warm dry/temperature with high and very high burn probability.

Sage Grouse Mangement Zone	*Sage-grouse Priority Area for Conservation (PAC) Name*	*Total PAC Acres*	*High, very high burn probability (percent of PAC acres)*	*75% BBD within PAC (percent PAC acres)*	*75% BBD and warm and dry soil/temperature regime ~~acres~~ (percent PAC acres)*	*75% BBD and warm and dry soil/temperature regime with high, very high burn probability (percent PAC acres)*
4	*Northern Great basin*	*13,045,415*	*86%*	*57%*	*19%*	*17%*
3	*Southern Great Basin*	*9,461,355*	*48%*	*33%*	*20%*	*9%*
4	*Snake, Salmon, and Beaverhead*	*5,477,014*	*68%*	*52%*	*5%*	*4%*
5	*Western Great Basin*	*3,177,253*	*61%*	*66%*	*15%*	*12%*
5	*Warm Springs Valley /Western Great Basin*	*3,520,937*	*30%*	*44%*	*28%*	*9%*
4	*SW Montana*	*1,369,076*	*1%*	*48%*	*0%*	*0%*
4	*Northern Great Basin/Western Great Basin*	*1,065,124*	*82%*	*59%*	*30%*	*22%*
5	*Central Oregon*	*813,699*	*71%*	*56%*	*3%*	*2%*
3	*Panguitch/Bald Hills*	*1,135,785*	*70%*	*31%*	*1%*	*1%*
3	*Parker Mountain-Emery*	*1,122,491*	*28%*	*28%*	*0%*	*0%*
4	*Box Elder*	*1,519,454*	*61%*	*19%*	*4%*	*2%*
4	*Baker Oregon*	*336,540*	*74%*	*55%*	*25%*	*21%*
3	*NW-Interior NV*	*371,557*	*99%*	*29%*	*12%*	*11%*
3	*Carbon*	*355,723*	*22%*	*27%*	*0%*	*0%*
3	*Strawberry*	*323,219*	*26%*	*16%*	*0%*	*0%*
3	*Rich-Morgan-Summit*	*217,033*	*79%*	*17%*	*0%*	*0%*
3	*Hamlin Valley*	*341,270*	*60%*	*1%*	*1%*	*0%*
3	*Ibapah*	*98,574*	*0%*	*0%*	*0%*	*0%*
3	*Sheeprock Mountains*	*611,374*	*98%*	*0%*	*0%*	*0%*
5	*Klamath OR/CA*	*162,667*	*98%*	*0%*	*0%*	*0%*

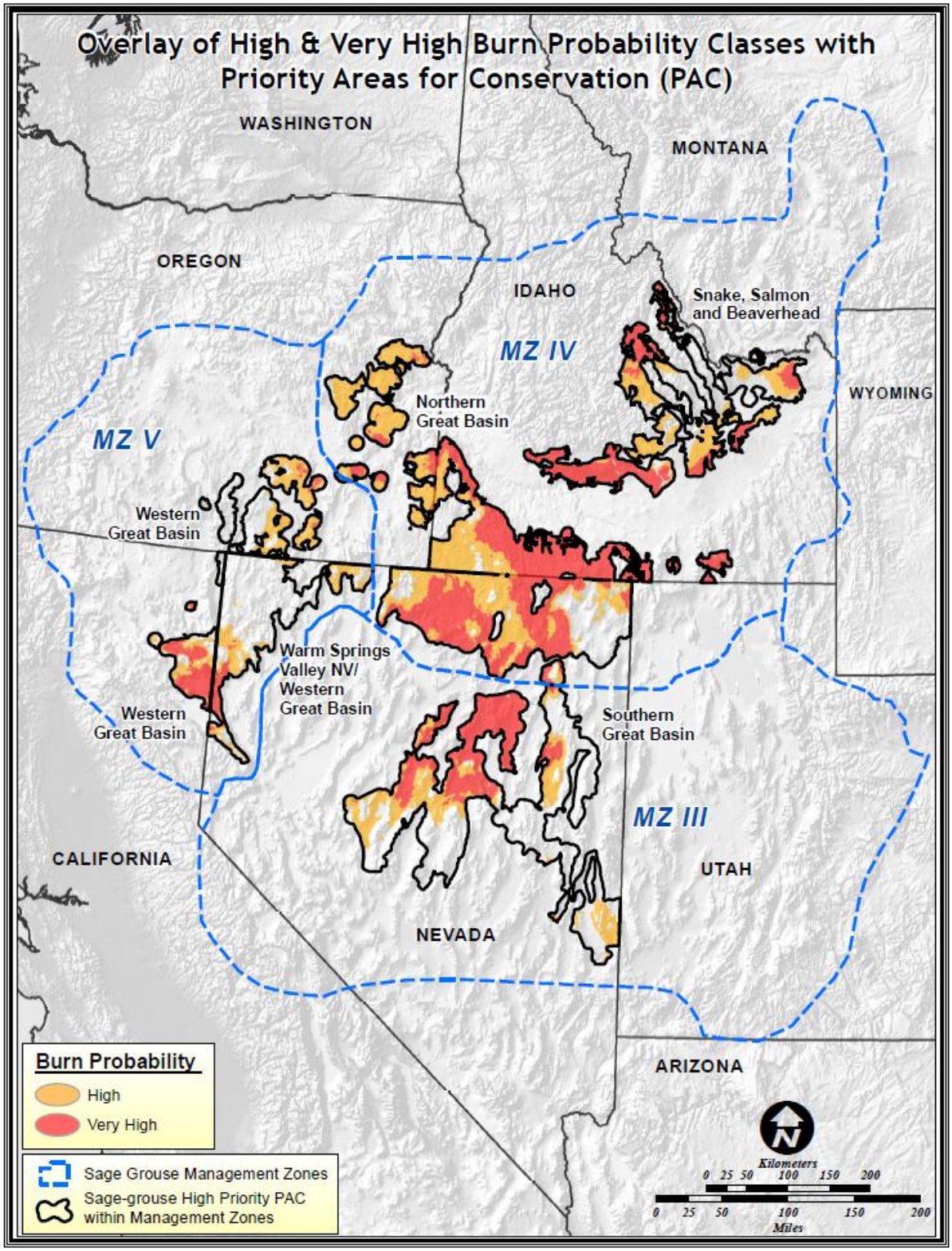


Figure 10, Burn Probability (high and very high) in priority invasive annual grass and wildfire PACs. .

Conifer Expansion. (See priority PACs for assessment identified in Table 4 and focal habitats shown in Figure 9). Focal habitats, as they relate to conifer expansion, are defined as sage-grouse habitat in a priority PAC with sagebrush landscape cover between 25 and 100 percent that is either near or in a conifer expansion area. The relationship between conifer expansion and resilience to disturbance and resistance to expansion is not documented to the same degree as with invasive annual grasses. However, Appendix 5 (D. and E.) in Chambers et al. (*In prep.*) includes two generalized state and transition models for conifer expansion with warm to cool and soil temperature regimes associated with precipitation ranges from 12 to 14 or more inches of annual precipitation. These state and transition models are useful in developing management strategies to deal with conifer expansion as they contain useful restoration pathways.

Chambers et al. (*In prep.*) is recommended for review at this point for information on applying resistance and resilience concepts along with sage-grouse habitat characteristics to develop management strategies to address wildfires, invasive annual grasses, and conifer expansion. The following tables are recommended for use in developing management strategies in or near focal habitats:

Table 1. Soil temperature and moisture regimes relationship to vegetation types and resistance and resilience.
Table 2. Sage-grouse habitat matrix showing the relationship between landscape sagebrush cover and resistance and resilience.
Table 3. Potential management strategies based on sage-grouse habitat requirements and resistance and resilience.
Table 4. Management strategies (fire suppression, fuels management, post-fire rehabilitation, and habitat restoration) associated with each cell in the sage-grouse habitat matrix (Table 2).

The "Putting it all together" section of the Chambers et al. (*In prep.*) also contains a case study from Northeast Nevada illustrating applications of management strategies to address the conservation, protection, and restoration of sage-grouse habitat.

To further assist in understanding Step 1b, examples of general priorities for management strategies are provided below and illustrated in Appendix 3 and 4:

1. Fuels Management: Projects that are designed to change vegetation composition and/or structure to modify potential fire behavior for the purpose of improving fire suppression effectiveness and limiting fire spread and intensity.
    a. Identify priorities and potential measures to reduce the threats to sage-grouse habitat resulting from changes in invasive annual grasses (primary focus on exotic annual grasses and conifer encroachment) and wildland fires. Place high priority on areas dominated by invasive annual grasses that are near or adjacent to low resistance and resilience habitats that are still intact.

   b. Areas on or near perimeter of successful post-fire rehabilitation and habitat restoration projects where threats of subsequent fire are present are important for consideration.
   c. Fuels management can be a high priority in large tracts of intact sagebrush if impacts on sage-grouse populations are minimal and outweighed by the potential benefits of reduced wildfire impacts in area being protected.

2. Habitat Recovery/Restoration Recovery (passive restoration) is a high priority in intact sagebrush stands to improve resistance and resilience before a disturbance. For example, where understory perennial herbaceous species are limited, improved livestock grazing practices can increase the abundance of these species and promote increased resistance to annual grasses.
   a. Habitat restoration is important where habitat connectivity issues are present within focal habitats.
   b. Pinyon pine and/or juniper removal in Phase I and II stands adjacent to large, contiguous areas of sagebrush (greater than 25 percent sagebrush landscape cover) is a priority.

3. Fire Operations (includes preparedness, prevention and suppression activities).
   a. Higher priority should be placed on areas with greater than 65 percent cover than on areas with 25 to 65 percent cover, followed by 0 to 25 percent cover (these categories are continuums not discrete thresholds).
   b. Higher priority should be placed on lower resistance/resilience habitats compared with higher resistance/resilience habitats.
   c. Fire operations in areas restored or post-fire rehabilitation treatment where subsequent wildfires can have detrimental effect on investment and recovery of habitat are important for consideration.
   d. Fire operations (suppression) are especially important in low elevation winter sagebrush habitat with low resistance and resiliency.
4. Post-Fire Rehabilitation
   a. High priority should be placed on supporting short-term natural recovery and long-term persistence in higher resistance and resiliency habitats (with appropriate management applied).
   b. High priority should be placed on reseeding in moderate to low resistance and resiliency habitats, but only if competition from invasive annual grasses, if present, can be controlled prior to seeding.

Step 2

Step 2 is carried out by local management units using the Step 1 geospatial data, focal habitats, and the associated management strategies. Step 2 includes evaluating the availability and accuracy of local information and geospatial data used to develop local management strategies in or near focal habitats (Step 2a).

It also involves developing focal habitat activity/implementation plans that include prioritized management tactics and treatments to implement effective fuels management, habitat recovery/restoration, fire operations, and post-fire rehabilitation (Step 2b). These activity/implementation plans will serve as the basis for NEPA analysis of site-specific projects.

Step 2a- Review of Step 1 Data and Incorporation of Local Information

Evaluate the accuracy and utility of Step 1 geospatial layers for focal habitats by incorporating more accurate or locally relevant:

- Vegetation maps (especially sagebrush cover)
- Updated or higher resolution conifer expansion layers (if applicable)
- Soil survey and ecological site descriptions
- Weather station, including Remote Automatic Weather Stations, data
- PACs, focal habitats, winter habitats, sage-grouse population distributions (i.e., more recent BBD surveys)
- Maps of cheatgrass and other invasive annual grasses that degrade sage-grouse habitat
- Wildfire polygons including perimeters and unburned islands within burn polygons
- Treatment locations and success (consult US Geological Survey Land Treatment Digital Library at http://ltdl.wr.usgs.gov/). The Land Treatment Digital Library allows the user to search on treatment results on an ecological site basis.
- Models and tools to help inform management strategies. For example, data which characterizes wildfire potential can help identify risk to focal habitats and help plan fire suppression and fuels management strategies to address these risks.
- Rapid Ecoregional Assessments
- Land Use Plans
- Appropriate monitoring or inventory information
- Any other geospatial data or models that could improve the accuracy of the assessment process

It is essential that subregional or local information and geospatial data be subjected to a quality control assessment to ensure that it is appropriate to use in developing Step 2b activity and implementation plans. Since PACs and focal habitats usually transcend multiple administrative boundaries, a collaborative approach is highly recommended for Step 2a.

A series of questions tied to the management strategies described in the Introduction section follows to assist managers in developing the framework to complete Step 2b (development of activity/implementation plans). The questions that follow apply to the focal habitats (and buffer areas around focal areas where management strategies may be more effectively applied) and will help in developing coordinated implementation/activity plans. These questions should not limit the scope of the assessment and additional questions relative to local situations are encouraged. These questions portray the minimum degree of specificity for focal habitats in order for offices to complete Step 2a.

Fuels Management

1. Where are the priority fuels management areas (spatially defined treatment opportunity areas that consider fire risk, fuels conditions, and focal habitats [including areas adjacent to focal habitats])?
2. Based on fire risk to focal habitats, what types of fuels treatments should be implemented to reduce this threat (for example, linear features that can be used as anchors during suppression operations)?
3. Considering resistance/resilience concepts and the landscape context from Step 1, where should treatments be applied in and around focal habitats to:
   a. Constrain fire spread?
   b. Reduce the extent of conifer expansion?
   c. Augment future suppression efforts by creating fuel breaks or anchors for suppression?
4. Based on opportunities for fire to improve/restore focal habitats, what types of fuels treatments should be implemented to compliment managed wildfire by modifying fire behavior and effects?
5. Are there opportunities to utilize a coordinated fuels management approach across jurisdictional boundaries?
6. What fuel reduction techniques will be most effective that are within acceptable impact ranges of local sage-grouse populations, including but not limited to grazing, prescribed fire, chemical, and biological and mechanical treatments? Will combinations of these techniques improve effectiveness (e.g., using livestock to graze fine fuels in a mowed fuel break in sagebrush)?

Habitat Recovery/Restoration

1. Are there opportunities for habitat restoration treatments to protect, enhance or maintain sage-grouse focal habitat especially to restore connectivity of focal area habitat?
2. Considering the resistance and resilience GIS data layer (Figure 4) and the Sage-Grouse Habitat Matrix (Chambers et al. *In prep.*; Table 2), where and why would passive or active restoration treatments be used?
3. What are the risks and opportunities of restoring habitat with low resistance and resilience including the warm/dry and cool/dry soil moisture/temperature regime areas?
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries to effectively complete habitat restoration in focal habitats?

Fire Operations

1. Where are priority fire management areas (spatially defined polygons having the highest need for preparedness and suppression action)?

2. Where are the greatest wildfire risks to focal habitats considering trends in fire occurrence and fuel conditions (see Figure 10)?
3. Where do opportunities exist that could enhance or improve suppression capability in and around focal habitats?
    a) For example, increased water availability through installation of helicopter refill wells or water storage tanks.
    b) Decreased response time through pre-positioned resources or staffing remote stations.
4. Should wildfire be managed (per land use plan objectives) for improving focal habitat (e.g., reducing conifer expansion), and if so where, and under what conditions?
5. How can fire management be coordinated across jurisdictional boundaries to reduce risk or to improve focal habitats?

Post-fire Rehabilitation

1. Where are areas that are a high priority for post-fire rehabilitation to improve habitat connectivity if a wildfire occurs?
2. Which areas are more conducive (higher resistance and/or resilience) to recovery and may not need reseeding after a wildfire?
3. What opportunities to build in fire resistant fuel breaks to reduce the likelihood of future wildfires impacts on seeded or recovering areas?
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries to implement rehabilitation practices?

The outcome of Step 2a is the assembly of the pertinent information and GIS layers to assist managers in developing implementation or activity plans to address wildfires, invasive annual grasses, and conifer expansion in focal habitats. Activity plans generally refer to plans where management of a resource is changed (livestock grazing plans) whereas implementation plans are generally associated with treatments.

Step 2b- Preparation of Activity/Implementation Plans

Activity/implementation plans are prepared to implement the appropriate management strategies within and adjacent to focal habitats. Since focal habitats cross jurisdictional boundaries, it is especially important that a collaborative approach be used to develop implementation/activity plans. The process of identifying partners and creating collaborative teams to develop these plans is a function of state, regional, and local managers and is not addressed as part of this step.

Implementation/activity plans are required to:

1. Address issues in and around focal habitats related to wildfires, invasive annual grasses, and conifer expansion

2. Use resistance to invasive annual grasses and resilience after disturbance (where appropriate) as part of the selection process for implementing management strategies
3. Emphasize application of management strategies within or near focal habitats with low resistance and resilience (warm/dry and cool/dry soil moisture/temperature regimes) invasive annual grasses and wildfires
4. Use the best available local information to inform the assessment process
5. Encourage collaboration and coordination with focal habitats across jurisdictional boundaries
6. Be adaptive to changing conditions, disturbances, and modifications of PAC boundaries

FIAT recommends considering other factors, such as adaptive management for climate change, local sagebrush mortality due to aroga moth or other pests, and cheatgrass die-off areas in developing activity/implementation plans. The latter two factors could influence where and what kind of management strategies may be needed to address the loss of habitat or changes in fuel characteristics (e.g., load and flammability) associated with these mortality events.

The following recommendations are provided to assist in the preparation of activity/implementation plans:

Fuels Management

1. Spatially delineate priority areas for fuel management treatments per Step 2a information considering:
    a. Linear fuel breaks along roads
    b. Other linear fuel breaks to create anchor points
    c. Prescribed burning which would meet objectives identified in the Fish and Wildlife Service's Conservation Objectives Team (COT) report
    d. Mechanical (e.g., treatment of conifer expansion into sagebrush communities)
    e. Other mechanical, biological, or chemical treatments
    f. If they exist, spatially delineated areas where fuel treatments would increase the ability to use fire to improve/enhance focal habitats.
2. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of fuels treatments.
3. Quantify a projected level of treatment within or near focal habitats.
    a. Identify treatments (projects) to be planned within or near focal habitats.
    b. Include a priority and proposed work plan for proposed treatments.

Habitat Recovery/Restoration

1. Spatially delineate priority areas for restoration, using criteria established in Step 2a. Priority areas for restoration should be delineated by treatment methods:
    a. Seeding priority areas
    b. Invasive annual grasses priority treatment areas (herbicide, mechanical, biological, combination)

    c. Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding).
    d. Include tables, maps or appropriate info.
2. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of restoration treatments.
3. Include a priority or implementation schedule for proposed restoration treatment

Fire Operations

1. Spatially delineate priority areas for fire suppression, based upon criteria established in Step 2a. Priority areas for fire operations should be delineated by type, such as:
    a. Initial attack priority areas
    b. Resource pre-positioning and staging priority areas
2. Spatially delineate areas where opportunities exist to enhance or improve suppression capability.
3. Spatially delineate areas where wildfire can be managed to achieve land use plan and COT objectives.

Post-Fire Rehabilitation

1. Spatially delineate priority areas for post-fire rehabilitation using criteria in Step 2a.
2. Priority areas for post-fire rehabilitation should be based on resistance and resiliency and pre-fire landscape sagebrush cover and include consideration of:
    a. Seeding priority areas
    b. Invasive annual grasses priority treatment areas (herbicide, mechanical, biological (herbivory or seeding),
    c. Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding)
3. Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of post-fire rehabilitation treatments.

This completes the assessment process and sets the stage for more detailed project planning and NEPA associated with implementing on-the-ground treatments and management changes.

Members of the FIAT Development and Review teams are listed in Appendix 5.

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Appendix L

Baseline Disturbance Inventory

APPENDIX L
BASELINE DISTURBANCE INVENTORY

INTRODUCTION

The purpose of the baseline disturbance inventory is to quantitatively assess the location, magnitude, and extent of existing surface disturbance to Greater Sage-Grouse (GRSG) habitats and populations in Utah. Understanding these factors and being able to compare differences between areas across the Utah sub-regional planning area provides overarching biological information that informs planning. Baseline disturbance information provides the decision maker with the information needed to understand more site-specific conditions and the environmental consequences of land-use planning decisions.

Therefore, we collected geospatial data representing the disturbances to GRSG as identified by scientific research and outlined in the 2010 US Fish and Wildlife Service listing decision. We measured the impacts to mapped occupied GRSG range and populations through applying buffer distances representing the footprint associated with most surface disturbing activities.

METHODOLOGY

Geospatial data were acquired for all threats identified in the US Fish and Wildlife Service listing decision that can be represented spatially. These data were acquired, as available, from both internal (BLM and Forest Service) and external sources. All data were considered the best available at the time of data collection. Data compiled from other sources were the most current available based on the supplying office, agency, or organization. Additionally, mineral materials, coal, locatable minerals, and phosphate polygons and portions of transmission and telephone lines were digitized using satellite imagery and the BLM's Master Title Plats. After data collection was complete and new features were digitized, input datasets were preprocessed. Preprocessing steps included buffering, dissolving, merging and other formatting tasks. Buffers were developed for each resource based on the amount of disturbance typically associated with their respective authorizations. Finally, all datasets were clipped to the mapped occupied range within named GRSG population areas and sorted by the population areas for analyses.

ASSUMPTIONS AND LIMITATIONS

The data and information included here were the most accurate available at the time of analysis; however, these data and associated risk assessments remain based in present knowledge. Spatial data informing these analyses were compiled to establish a consistent information and analytical basis across the Utah sub-regional planning area. This analysis takes into consideration all lands within Utah's mapped occupied range, including areas of non-habitat, potential habitat, and existing habitat. Wyoming lands in the analysis area and their estimated disturbances can be explored in the Baseline Environmental Report (Manier et al. 2013). The threats and their respective areas of influence can be found in **Table L.1**, Area of Influence by Decision Threat.

Table L.1
Area of Influence by Decision Threat

FWS Listing Decision Threat	Estimated Disturbance
Oil and Gas Wells	3 acres
Coal Mines	Polygon Area/Actual Footprint
Locatable Minerals	Polygon Area/Actual Footprint
Mineral Materials	Polygon Area/Actual Footprint
Roads	8 - 240.2 feet
Railroads	30.8 feet
Power lines	12 - 90 feet
Communication Towers	2.5 acres
Telephone lines	12 feet
Phosphate Mines	Polygon Area/Actual Footprint

Certain threats were omitted from the analysis due to lack of detailed information or absence in mapped occupied range. Pipelines were not included due to the non-inclusion of construction years in the national dataset. While areas that have been previously disturbed by pipelines may not have regained their habitat value, based on limitations in the data, we are unable to identify whether successful reclamation has occurred. Threats such as solar, wind, and geothermal are not found in the analysis since they are not present in mapped occupied range. Additionally, agriculture and urbanization were not taken into consideration as part of the baseline disturbance inventory. However, these were accounted for in the EIS when estimating the amount of habitat available or percent sagebrush on the landscape.

In addition, the buffer distances in this analysis include the following assumptions:

- Road buffers for primary and secondary roads were determined using the BLM Manual 9113 as a reference.
- Transmission line disturbance is equal to the width of the cross-arm for all datasets that were acquired from internal and external sources. Cross-arm widths typically differ by line size and were determined using NEPA related transmission documents such as Sigurd to Red Butte, Transwest Express, and Energy Gateway West EISs.

- Digitized transmission and telephone lines were given a buffer distance equal to that of a 138 kV line under the assumption that they were not large enough to include in earlier datasets.
- Remaining disturbances that were not digitized (oil and gas wells, railroads, communication towers) and their buffers are associated with the area of influence distances stated in the Baseline Environmental Report (Manier et al. 2013).

The baseline disturbance inventory is an analysis tool that allows the BLM to compare and contrast the impacts of the alternatives. The information presented in this document will not be used for plan implementation. During plan implementation disturbance will be calculated and monitored as described in **Appendix C**, Greater Sage-Grouse Monitoring Framework.

DISTURBANCES IN POPULATION AREAS

Geospatial analysis conducted using individual data layers indicates that presently, all population areas are under 3 percent disturbance with the state's total disturbance at 0.9 percent (64,115 acres). While all population areas are under the 3 percent disturbance cap, one individual sub-unit, Gordon Creek, located within the Carbon Population Area exceeded the disturbance threshold with 3.7 percent. Percent Disturbance for all population areas, including notable sub-units can be found in **Table L.2**, Percent Disturbance in Occupied Range by Population Area.

Table L.2
Percent Disturbance in Occupied Range by Population Area

Population Area	Disturbance Acres	Percent Disturbance
Uintah	21,940	1.4%
3 Corners/Browns Park	936	1.0%
Diamond Mountain	7,060	2.4%
Blue Mountain	460	0.8%
Deadman's Bench	3,430	2.5%
East Bench	2,849	2.5%
Book Cliffs	1,944	0.7%
Halfway Hollow	2,701	1.0%
South Slope Uintah	2,319	0.9%
Carbon	6,989	1.4%
Anthro	1,000	1.2%
West Tavaputs	746	0.7%
Emma Park	2,382	1.4%
Gordon Creek	1,946	3.7%
Scofield	915	1.2%
Emery	495	0.5%
Parker Mountain	6,665	0.8%
Panguitch	3,972	1.2%
Bald Hills	4,231	1.2%
Hamlin Valley	1,095	0.8%
Sheeprocks	6,446	0.8%
Ibapah	536	0.6%

Table L.2
Percent Disturbance in Occupied Range by Population Area

Population Area	Disturbance Acres	Percent Disturbance
Box Elder	3,855	0.4%
Rich	7,961	0.6%
Strawberry	697	0.4%
Lucerne	144	0.4%
Utah Statewide	**65,031**	**0.9%**

Over 85 percent of the disturbances consisted of oil and gas wells, transmission lines, and roads. Roads are the most common disturbance throughout mapped occupied range. All population areas, except Carbon, have roads as the largest disturbance with an average of 58 percent when the population area is excluded. With 17 percent of the total disturbance statewide, oil and gas wells are the dominant disturbance in the Carbon population area, accounting for more than 36 percent of its total. **Table L.3**, Percent Disturbance by Decision Threat, breaks down each disturbance discussed. The additional 0.71 percent of disturbance in the total represents areas of overlap.

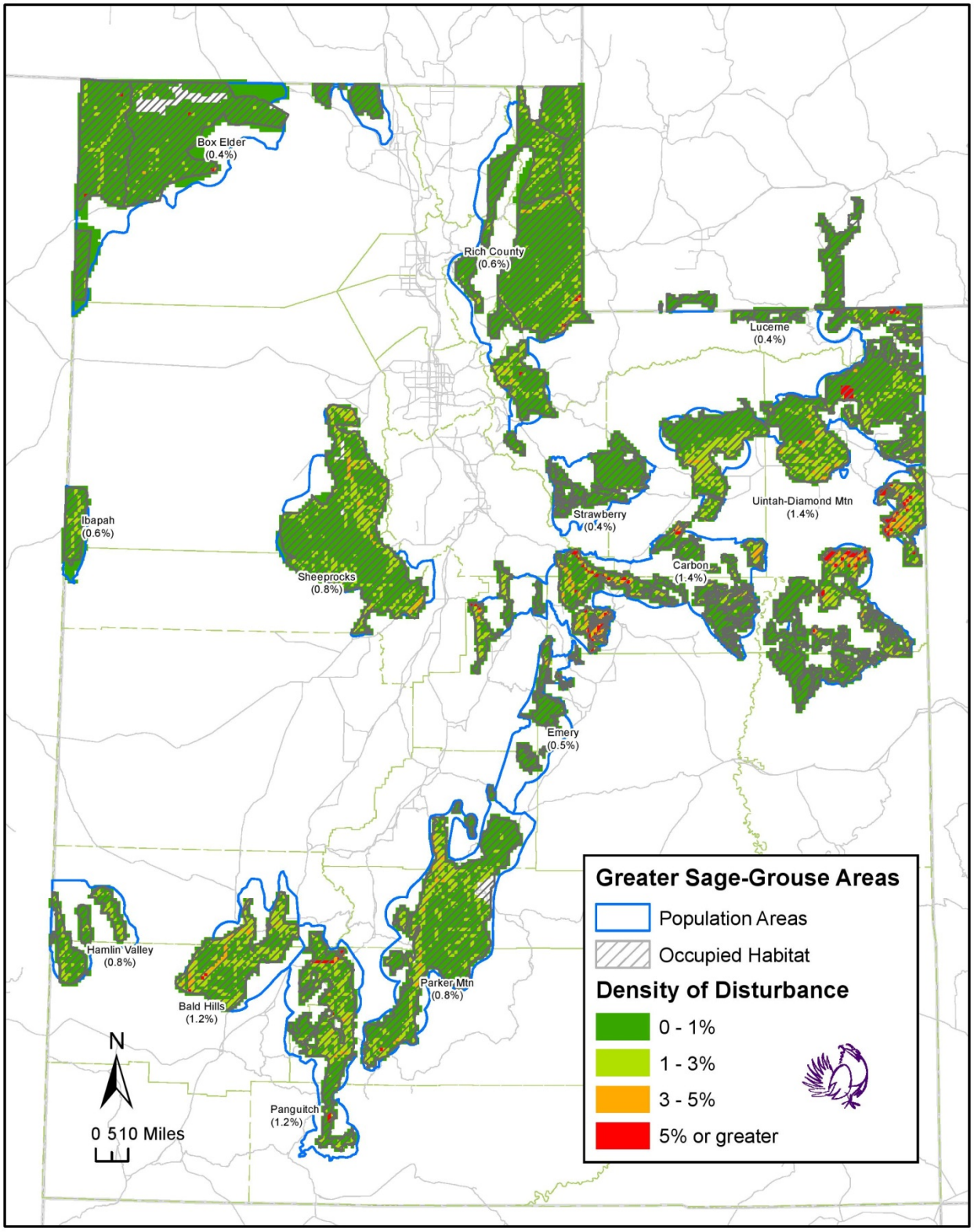
Table L.3
Percent Disturbance by Decision Threat

FWS Listing Decision Threat	Percent Disturbance
Oil and Gas Wells	17.39%
Coal Mines	0.70%
Locatable Minerals	0.34%
Mineral Materials	1.71%
Roads	55.98%
Railroads	1.86%
Power lines	12.78%
Communication Towers/Telephone Lines	1.38%
Phosphate Mines	8.36%
Total	**100.71%**

Map 1, Surface Disturbance in Occupied Habitat (Excluding Fire), shows the density of surface disturbance in mapped occupied range. However, it should be noted that the percent disturbance values associated with each population area do not reflect an even distribution of surface disturbance over the total landscape of their respective population areas. Therefore, in order to more precisely show where the disturbance is taking place, the analysis was done using density of disturbance per square mile throughout the entire mapped occupied range. This method also proved to be more favorable than presenting the actual on-ground disturbances due to the small statewide scale.

Surface Disturbance in Occupied Habitat (Excluding Fire)

Map 1



ADDITIONAL ANALYSIS

In addition to the analysis described earlier, we examined fire history because fire would be included in the disturbance calculations under Alternative C and Alternative E. In an effort to calculate fire related disturbance we looked at the last 10 years of fires in mapped occupied range. We elected to only look at the last 10 years of data on the basis that geospatial fire data is most accurate within this timeframe.

When fire history data was added we found that 87 percent of the 136,000 plus acres of fire-related disturbance were in the Box Elder, Bald Hills, and Uintah population areas. Box Elder and Bald Hills were the only population areas to exceed the 3 percent threshold when fire history was added to the calculations. Bald Hills saw the most dramatic increase from 1.2 percent to 12.8 percent after more than 40,000 acres of fire-related disturbance was added to its total. The state's total disturbance moved closer to the threshold, rising from 0.9 to 2.8 percent.

In addition to considering fire history, for comparative purposes, we also calculate disturbance using LANDFIRE developed areas to see how it matched up with our analysis, which was conducted using individual data layers. Our intent was to replicate the process used by Knick (Knick et al. 2013), but rather than limiting the evaluation area to within 5 kilometers (3.1 miles) of leks, we expanded it to include all mapped occupied range. Ultimately, the data used in Knick's analysis is less detailed than information used for our site-specific analysis due to its large pixel sizes. While LANDFIRE development acres exceed our disturbance inventory values for population areas in the southern part of the state, the opposite is the case for those area located in the north. Regardless of the level of detail, the LANDFIRE development inventory also did not surpass the 3 percent threshold.

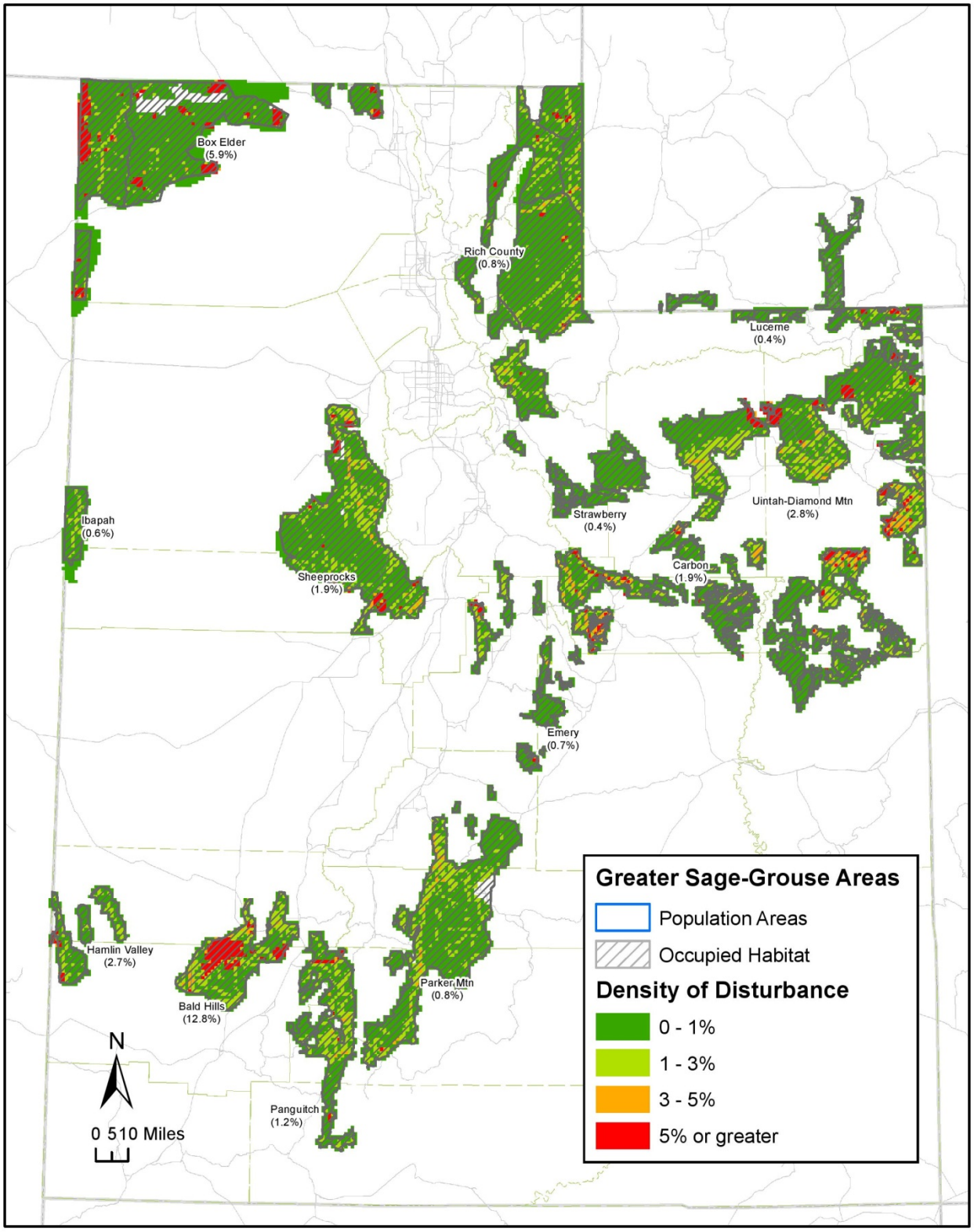
Below in **Table L.4**, Percent Disturbance in Mapped Occupied Range, is the percent disturbance findings from each of the three analyses discussed in this appendix. **Map 2**, Surface Disturbance in Occupied Habitat (Including Fire), and **Map 3**, Surface Disturbance in Occupied Habitat (LANDFIRE), are also included to display density of disturbance for the fire history and LANDFIRE analyses.

Table L.4
Percent Disturbance in Mapped Occupied Range

Population Area	Percent Disturbance Using Individual Data Layers and Excluding Fire	Percent Disturbance Including Fire History	Percent Disturbance using LANDFIRE Developed Areas
Uintah	1.4%	2.8%	0.9%
3 Corners/Browns Park	1.0%	1.4%	0.2%
Diamond Mountain	2.4%	3.3%	0.9%
Blue Mountain	0.8%	1.0%	0.4%
Deadman's Bench	2.5%	2.6%	0.6%
East Bench	2.5%	2.5%	0.0%
Book Cliffs	0.7%	0.8%	0.0%
Halfway Hollow	1.0%	5.3%	1.8%
South Slope Uintah	0.9%	3.4%	1.6%
Carbon	1.4%	2.0%	1.5%
Anthro	1.2%	1.2%	0.5%
West Tavaputs	0.7%	0.8%	0.9%
Emma Park	1.4%	1.6%	1.3%
Gordon Creek	3.7%	3.7%	0.4%
Scofield	1.2%	4.1%	0.3%
Emery	0.5%	0.8%	1.1%
Parker Mountain	0.8%	0.8%	2.3%
Panguitch	1.2%	1.2%	2.9%
Bald Hills	1.2%	12.8%	1.8%
Hamlin Valley	0.8%	2.7%	0.6%
Sheeprocks	0.8%	1.9%	0.8%
Ibapah	0.6%	0.6%	0.7%
Box Elder	0.4%	5.9%	0.4%
Rich	0.6%	0.8%	1.7%
Strawberry	0.4%	0.4%	1.4%
Lucerne	0.4%	0.4%	0.4%
Utah Statewide	**0.9%**	**2.8%**	**1.3%**

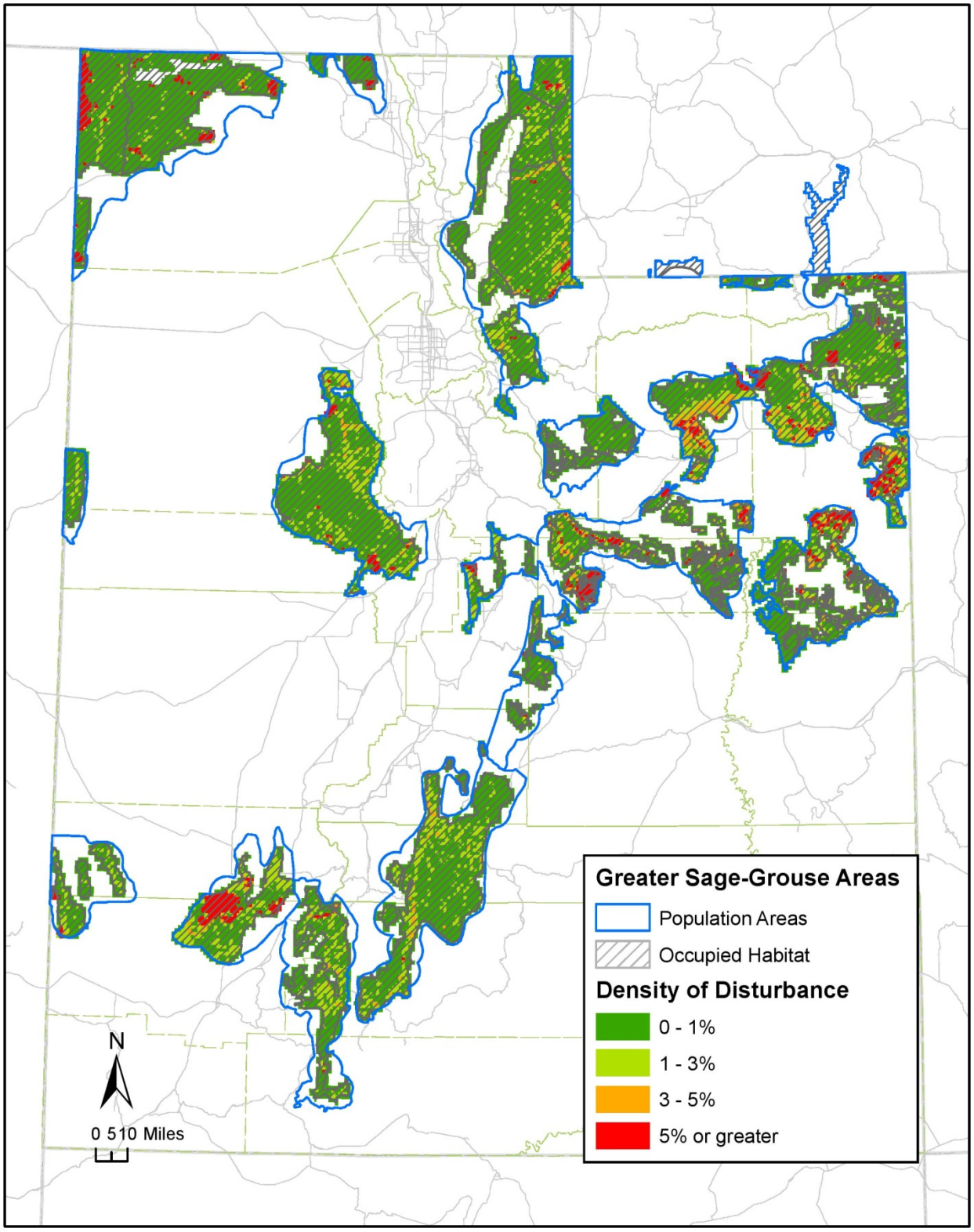
Surface Disturbance in Occupied Habitat (Including Fire)

Map 2



Surface Disturbance in Occupied Habitat (Landfire)

Map 3



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Appendix M

Predation of Greater Sage-Grouse in the Utah Sub-Regional Planning Area

APPENDIX M
PREDATION OF GREATER SAGE-GROUSE IN THE UTAH SUB-REGIONAL PLANNING AREA

During the Draft EIS public comment period, BLM and Forest Service received extensive public comments that provided information on predation and its impacts on GRSG in the Utah Sub-regional planning area. Within the Draft EIS, predator control, which is an issue directly related to predation, was identified as an issued considered but eliminated from detailed analysis. As discussed in **Section 1.6.3**, predator control was not considered for detailed analysis because it is a state-regulated action. This land use plan amendment is focused on increasing GRSG conservation for programs and activities under BLM and Forest Service management authority.

While the BLM and Forest Service maintain that predator control is subject to state regulation, based on the number of comments received during the Draft EIS, the BLM and Forest Service have included in the Final EIS additional information regarding predators in the Utah sub-regional planning area and the potential impacts of predation on GRSG.

Predation is one of five specific Endangered Species Act listing criteria; however, the USFWS did not identify predation as a significant threat to GRSG populations in their 2010 decision to list the species as warranted for protection under the Endangered Species Act. Though USFWS did not list predation as a significant threat, they did note that predation can be a threat at localized levels as documented in the Strawberry Valley, which provides habitat for a Utah GRSG population.

In the listing determination, the USFWS acknowledged that increasing patterns of landscape fragmentation are likely contributing to general increases in predation on the species where predators may be limiting GRSG populations because of intense habitat alteration and fragmentation. Despite the USFWS document stating that predation is not a significant threat to GRSG populations in Utah, the public remains concerned about the influence of predators on GRSG conservation.

Predators that are native to sagebrush ecosystems have always preyed upon GRSG. The species that prey on GRSG tend to be generalists that take prey opportunistically but do not focus

solely or preferentially on GRSG (Hagen 2011). Predators (native and non-native) of juvenile and adult GRSG include coyote, red fox, American badger, bobcat, golden eagles, and other raptors (Schroeder and Baydack 2001; Hagen 2011). Younger birds can also be taken by common ravens, northern harriers, ground squirrels, and weasels. Nest predators include coyote, American badger, common raven, red fox, and black-billed magpie (Schroeder and Baydack 2001; Hagen 2011). Smaller predators of GRSG, such as red fox or skunks, can also serve as prey to larger predators such as coyotes.

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

Human-altered landscapes have contributed to significant increases over historical numbers in some predator abundances, particularly red fox and ravens (Coates and Delehanty 2010; Sauer et al. 2012). The influx of predators in altered sagebrush habitat can lead to decreased annual recruitment of GRSG (Schroeder and Baydack 2001; Coates 2007; Hagen 2011). GRSG in altered systems are also typically forced to nest in less suitable or marginal habitats where predators can more easily detect nesting birds (Connelly et al. 2004). In Strawberry Valley, Utah, low GRSG survival was attributed to the presence and unusually high density of non-native red fox that were likely able to survive in the area because of anthropogenic activity (Baxter et al. 2007). Holloran (2005) attributed increased nest depredation rates on GRSG to high corvid abundance in western Wyoming; the latter was influenced by anthropogenic structures associated with natural gas development. In the same area, Bui (2009) found ravens used road networks, fences, power lines, and other infrastructure associated with development. Bui et al. (2010) also detected a negative association between raven presence and GRSG nest and brood fate. Coates and Delehanty (2010) found increased raven density in northeastern Nevada was associated with decreased GRSG nest success, especially in areas with relatively lower shrub density. Habitat fragmentation, infrastructure, water development, human-subsided food sources, weather, urban development, and improper grazing can increase predation pressure on GRSG. Providing water in amounts, seasons, or distributions greater than reference conditions may draw more human-subsidized predators into an area, which could increase GRSG predation. Additionally, human-subsidized food sources, such as road kill, dead livestock, garbage, and pet food, may draw more human-subsidized predators into an area, which could also increase GRSG predation by supporting non-native predators and/or populations of native predators at levels higher than natural. GRSG populations demonstrate short-term annual and cyclic fluctuations, which are influenced by weather patterns such as drought and the composition and abundance of predators. Longer term trends in GRSG population abundance

and distribution can be a function of habitat loss or deterioration (Garton et al. 2011). The majority of Utah's GRSG populations are expected to persist over the next 100 years, if habitat conditions remain consistent (Garton et al. 2011).

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

Ongoing control efforts of mammalian and avian predators (except raptors) in southwestern Colorado designed to increase recruitment in a small population of Gunnison's sage-grouse may be showing some success but sample sizes are extremely low (five chicks monitored/year; Colorado Parks and Wildlife, pers. comm.). Raven removal in northeastern Nevada resulted in short-term reductions in raven populations; however, other individuals re-populated the vacated habitat within a year (Coates 2007). Badger predation may also have compensated somewhat for decreases in raven numbers (Coates 2007). Predation by ravens on GRSG in southwestern Wyoming was attributed primarily to territorial pairs, not groups of juveniles, sub-adults, and non-breeding birds (Bui et al. 2010). Thus, the removal of raven groups at foraging sites is unlikely to influence GRSG nest success, and the removal of territorial pairs will likely have only short-term effects until the habitat is re-occupied by a new pair.

GRSG are part of the sagebrush grassland ecosystem that comprises an interlinked web of plant and animal species, including herbivores and carnivores. As one of many prey species in sagebrush habitats, GRSG are adapted to predation and in unaltered systems will persist indefinitely with predation pressure (Hagen 2011). The influence of predation on GRSG population dynamics only becomes a problem when vital rates, especially nest, chick, and hen survival, are consistently reduced below naturally occurring levels (Taylor et al. 2012). Naturally-occurring variability in vital rates is a function of annual variation in conditions (e.g., weather, vegetation cover quality, predator abundance) and is expected with a species that shows cyclic tendencies. Based on a number of research projects, reported vital rates for GRSG populations in Utah vary within range-wide estimates, suggesting predation rates are within the range of normal variability (**Table M.1**, Vital Rates for Greater Sage-Grouse from Utah Studies). Range-wide estimates are only provided for nest success, chick survival, and hen survival. Utah has collected more detailed information on various vitality rates. In some cases, this information is included in **Table M.1**.

Because Utah vital rates are within the range of normal variability, predation does not appear to be a specific localized threat, except in the Strawberry population area, where the effects of predation on the GRSG populations have been documented. Given that predation does not constitute a specific localized threat, this is not carried forward for detailed analysis in the Proposed LUPA/Final EIS.

Table M.1
Vital Rates for Greater Sage-Grouse from Utah Studies

Vital Rate	Range of Normal Variability	Utah Rates	Study Years	Location	Reference
Nest Success*					
	15-86%	66%	2009	Wildcat Knolls	Perkins 2010
		55%	2009	Horn Mountain	Perkins 2010
		48-71%	1998-2006	Parker Mountain	Dahlgren 2009
		50%	2003	Parker Mountain	Dahlgren 2006
		80%	2004	Parker Mountain	Dahlgren 2006
		67%	2003-2005	Strawberry Valley	Baxter 2007
		25%	2003-2005	Strawberry Valley	Hennefer 2007
		15.1-19.1%	2010-2012	Box Elder	Graham 2013
		51-81%	2009-2010	Anthro Mountain	Gruber 2012
		38%	2005-2006	Box Elder	Knerr 2007
		70%	2005	Sheeprock	Robinson 2007
		56%	2006	Sheeprock	Robinson 2007
		100%	2005	Deep Creek/Ibapah	Robinson 2007
		50%	2006	Deep Creek/Ibapah	Robinson 2007
*% of nests where >= 1 egg hatched successfully					
Brood Success					
		80%	2007-2008	Grouse Creek	Thacker 2010
		44%	2005-2006	Box Elder	Knerr 2007
		28.6%	2005	Sheeprock	Robinson 2007
		30%	2006	Sheeprock	Robinson 2007
		50%	2005	Deep Creek/Ibapah	Robinson 2007
		66.7%	2006	Deep Creek/Ibapah	Robinson 2007
*% of broods where >= 1 chick survived to 42 or 50 days					
Chick Survival					
	12-50%	47.5%	2005-2009	Parker Mountain	Guttery et al. 2013
		41 - 60%	2005-2006	Parker Mountain	Dahlgren 2009
		transmitter 0%	2003-2005	Currant Creek/Strawberry	Hennefer 2007
		transmitter 22.5%	2003-2005	Strawberry Valley	Hennefer 2007
		flushed 51.8%	2003-2005	Strawberry Valley	Hennefer 2007
		7.8-16%	2009-2010	Anthro Mountain	Gruber 2012
		60%	2005-2006	Parker Mountain	Dahlgren et al. 2010
*probability of chick surviving to 42 or 50 days					

Table M.1
Vital Rates for Greater Sage-Grouse from Utah Studies

Vital Rate	Range of Normal Variability	Utah Rates	Study Years	Location	Reference
Adult Hen Survival					
	37-78%	61%	2000-2002	Parker Mountain	Chi 2004
		59%	1998-2006	Parker Mountain	Dahlgren 2009
		41 to 61%	2008-2010	Parker Mountain	Caudill 2011
		18%[1]	2009	Anthro Mountain	Gruber 2012
		43%	2010	Anthro Mountain	Gruber 2012
		40%	2005	Sheeprock	Robinson 2007
		50%	2006	Sheeprock	Robinson 2007
		100%	2005	Deep Creek/Ibapah	Robinson 2007
		83%	2008	Horn Mountain	Perkins 2010
		78%	2009	Horn Mountain	Perkins 2010
		64%	2009	Wildcat Knolls	Perkins 2010
		60%	2003-2005	Strawberry Valley	Baxter 2007
		73%	2010-2011	Box Elder	Graham 2013
		84%	2011-2012	Box Elder	Graham 2013

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Appendix N

Greater Sage-Grouse Habitat Baseline and Habitat Update Protocol

APPENDIX N
GREATER SAGE-GROUSE HABITAT BASELINE AND HABITAT UPDATE PROTOCOL

BACKGROUND

Habitat for Greater Sage-Grouse (GRSG) is the most critical element in any efforts to manage and conserve the species in its range across the Western United States. Consequently, considerable time and expense has been dedicated to identifying current, historical, and potential expansion of GRSG habitat and how it functions to provide the life sustaining elements for the species. Conservation of habitat is the foundation for this land use plan amendment (LUPA). Any GRSG conservation effort in Utah, as stated in the Conservation Plan for Greater Sage-Grouse in Utah (State Conservation Plan) (UDWR 2013), must be "designed to protect high-quality habitat, enhance impaired habitat and restore converted habitat to support, in Utah, a portion of the range-wide population of GRSG necessary to eliminate threats to the species."

According to Manier et al. (2013), GRSG are currently estimated to occupy 165 million acres (668,000 square kilometers) across the western United States and Canada (Knick and Connelly, 2011), and this range encompasses tremendous variability in habitat conditions, anthropogenic activities, and GRSG populations. Development of comprehensive monitoring approaches lead to formal recognition that habitat selection assessments are needed to utilize approaches that address multiple spatial scales to represent selection processes of the animals (Connelly et al. 2003; Stiver et al. 2010). The first-order (1) is the geographic range and defines the GRSG population of interest, and within this geographic range (2) characterization of the second-order hinges on large, relatively intact regions of habitat identified using subpopulation distributions (for example, geographic connections among leks or regional population connectivity using genetics) to link habitats to GRSG use. The third-order (3) requires refinement from broad delineations of the species range in a given area to the seasonal habitats (for example, nesting and winter habitats), patch selection, and migration habitats. Finally, assessment can be made of fourth-order selection (for example, daily site selection and behavioral observations) by (4) quantifying food and cover attributes and foraging behavior at particular sites. In practice, selection of food items is nested within selection of feeding site because selection of a particular site determines the array of food items available to be selected; importantly, habitat value and

use will best be determined using a combination of these characteristics (not one alone). To accurately characterize GRSG habitat/range selection for a given population at the first- and second-orders, or landscape spatial scales, the migratory nature (seasonal movements) of the population must be well understood (see Connelly et al. 2000), and this may include very large areas on an annual basis. It has been suggested that migratory populations may range across hundreds of square miles (Connelly et al. 2003).

HABITAT IDENTIFICATION PROCESS

The UDWR is the primary entity responsible for management of GRSG populations in Utah and is also the lead entity in identifying and mapping GRSG distribution. Information on the distribution identification process followed in Utah was summarized and is included in the Utah Greater Sage-Grouse Management Plan (State Management Plan) (UDWR 2009). Although this plan has been superseded by the State Conservation Plan, the now dated Management Plan provides relevant information on the habitat identification process.

Following Doherty's work in Wyoming, Montana, and Colorado (Doherty 2008), core Utah GRSG breeding habitats were mapped. The mapping was accomplished utilizing occupied lek densities and associated male GRSG maximum lek attendance data for the period 1999 – 2008 (10 years), referred to as the breeding bird density mapping. The breeding bird density mapping identified four density levels or parameters. The first parameter identified areas where 25 percent of the state's total 10-year average spring breeding GRSG males (indicator for populations) are located. These areas symbolize the highest statewide density of breeding males on leks and can also be viewed as high priority leks or those leks and associated habitats that individually contribute the most to the state's GRSG total population. The second parameter identified areas where 50 percent of the state's total breeding GRSG males are found. This was repeated for the 75 percent and 100 percent of spring breeding GRSG males until all occupied leks were classified. Viewed from the converse, the total known spring GRSG statewide population was indicated by the combined area of all parameters.

The breeding bird density mapped habitat was further refined over time as additional population and habitat area inventory, studies and other information were available. This included information provided by other field specialists, other agencies, local and special interest groups, private landowners, and academia. Adjustments to habitat boundaries have been made based on verified information. The mapped occupied habitat boundaries in each population area include areas currently occupied by a population or populations of GRSG and are based upon the location of occupied leks, the identification of nesting and brood rearing habitat, and associated winter and other habitat.

For decades prior to the current review, the UDWR has been supporting research and community-based conservation efforts to learn more about the ecology of the species. Appendix 8 of the State's 2013 Conservation Plan contains a listing of research studies and reports on GRSG conducted in Utah. To facilitate this effort, the UDWR established ten Local Area Working Groups under the general direction of Utah State University, with the first established as far back as 1996. These Local Area Working Groups were composed of private interests and governmental entities, and were tasked to assess the local nature and scope of the threats to the species, and to recommend a course of action to address those threats. Because of this

early and ongoing assessment, the State of Utah is fortunate to have a high level of knowledge about many of the populations including seasonal range, migration routes, and other factors known to be essential to maintenance of the species, all in the context of Utah's unique conditions.

GRSG distribution in Utah is highly influenced by the geography of Utah, which is characterized by mountainous terrain, separated by broad valleys in the Great Basin, and by deeply incised canyons in the Colorado Plateau. GRSG habitat may be found in intact blocks in the Great Basin, or in disconnected "islands" of habitat in the Colorado Plateau.

The UDWR's broadly depicted occupied GRSG habitat maps are intended to encompass the range used throughout the year by known GRSG populations. Broad based maps that identify the GRSG range are necessary to include a variety of important seasonal habitats and movement corridors that are spread across Utah's geographically diverse and naturally fragmented landscape. GRSG, frequently described as "landscape-scale species", may use multiple areas to meet seasonal habitat needs throughout the year and the resulting patchwork of habitats (e.g. winter, breeding, nesting, early brood-rearing, late brood-rearing, transitional, and movement corridor habitats) can encompass large areas, sometimes ranging between 180,000 and 1.2 million acres. Broad range maps increase the likelihood that all seasonal habitats (including transition and movement corridors) are included, especially where there are information gaps on GRSG populations' habitats. Inevitably these GRSG range maps include a patchwork of GRSG habitats and non-habitats. Non-habitats, in and of themselves, may not provide direct habitat value for GRSG (e.g. deep canyons or water bodies), but may be crossed by GRSG when moving between seasonal habitats.

To assist in refining GRSG occupied habitat in Utah, telemetry and GPS data has been collected for a portion of the GRSG populations in the state. Telemetry and GPS data provides UDWR with site-specific data on how GRSG use the landscape. Telemetry information provides a snapshot of how GRSG used the landscape in specific years but does not necessarily represent how those same birds use the landscape every year. To ensure all potential areas used by GRSG are identified and adequately managed to maintain and enhance GRSG populations, non-sagebrush habitat types (i.e. alfalfa fields) adjacent to telemetry locations are likely included in UDWR occupied GRSG range maps. Similarly, for populations where there is no telemetry data, the UDWR occupied GRSG range maps are intentionally broad in an attempt to include all possible areas, adjacent or nearby, that may be used by GRSG as habitat or movement corridors. In general, maps are refined as additional information on habitat conditions, GRSG habitat use patterns, population susceptibility to stochastic events, and impacts of vegetation treatment are available.

In summary, broad maps are more likely to include all seasonal habitat areas important for each population and can be refined as management agencies gain more information. Occupied habitat maps used as a baseline for this LUPA currently include known use areas, areas of potential habitat, as well as areas of non-habitat.

PLANNING REQUIREMENTS

Though the BLM and Forest Service manage the habitat for wildlife species, the UDWR is the agency primarily responsible for managing GRSG in Utah. In the past, the UDWR has been the

primary repository for information regarding GRSG habitat in Utah. The range maps represent a broad combination of information sources, including intact sagebrush areas, field observations, radio-telemetry data, historic habitats, professional judgment, and sagebrush areas adjacent to the previously mentioned areas. Since telemetry data has not been collected for every GRSG population in the state, to refine the broader identified ranges, the aforementioned other sources of information are used in conjunction with telemetry and GPS data to create the GRSG range maps. For BLM's and the Forest Service's purposes of maintaining and enhancing GRSG persistence on the landscape, all GRSG occupied range identified and mapped by UDWR is included as the baseline for planning to ensure that all habitats that are or may be necessary for long-term GRSG persistence are including for assessment and evaluation in the planning process.

In general, the planning schedule and analysis process required a cutoff point for any further consideration of additional habitat information. For this reason the March 2012 version of the UDWR GRSG range map was used as the baseline for the planning amendment. Without the establishment of the a clear cut-off point, the BLM and Forest Service would constantly be in a process of revising baseline information, which would prohibit the agencies from ever being able to complete this LUPA process and begin implementing measures that are needed to reduce or eliminate identified threats to GRSG and prevent listing as threatened or endangered species. However, there is general recognition that the identification and mapping of GRSG habitat is an ongoing effort.

The mapped occupied range map used as a baseline for this planning process is not intended to represent a survey-grade boundary of GRSG habitat and is not expected to be exclusively used at the project-level. In this sub-regional LUPA the BLM and Forest Service are making broad-scale land use planning decisions that are connected with similarly broad-scale LUPAs being simultaneously completed across the range of GRSG (see **Section 1.1** of the Proposed Plan/Final EIS). Based on the scale of planning (landscape level), baseline habitat represented in this LUPA primarily represents first and second order habitat selections discussed in the Background section above.

Not only is the scale of mapping appropriate given the scale of planning, but it is also appropriate given the stated goals and objectives of this LUPA. Through this planning process the BLM and Forest Service aim to not only stop the decline of GRSG populations, but to increase populations, which may require protection and restoration of historic use areas, or stated another way, protection of potential habitat near existing GRSG populations that does not currently support GRSG populations but is ecologically capable of doing so with proper management.

HABITAT UPDATES

As expressed in the 2013 State Conservation Plan, the implementation of any plan should be accompanied by efforts to refine mapping of habitats, which includes this LUPA. These efforts should be coordinated among federal, state and local agencies, private landowners, GRSG working groups and academia that may choose to participate. On-the-ground projects should also contribute to this refined habitat mapping effort, at a level commensurate with the decisions to be made.

Habitat map updates will be made when agencies with special expertise and legal jurisdiction for GRSG and their habitat gain more information on the presence/absence of GRSG; obtain new or additional baseline population data, including information on the distribution and connectivity of GRSG populations with other populations; identify GRSG seasonal habitats and movements; and identify and quantify sagebrush habitats, the condition of those habitats, and connectivity within populations.

While refinements to habitat maps are necessary and appropriate, the Proposed Plan includes management that gives the agency's discretion to authorize actions in non-habitat areas under identified conditions. This eliminates the need to make constant site-specific adjustments to GRSG habitat management area boundaries through the land use planning processes, which is neither consistent with the landscape nature of management actions in BLM RMPs or Forest Plans, nor consistent with application of conservation measures at a scale and timing needed to protect GRSG.

Prior to considering proposed actions within Priority Habitat Management Areas (PHMA) or General Habitat Management Areas (GHMA), an evaluation should be conducted by a qualified biologist in collaboration with federal and state biologists, including a field investigation if needed. To this end, additional site-specific information associated with local surveys could result in a more precise delineation of habitat boundaries. If during implementation of the Proposed Plan or evaluation of a proposed action there are discrepancies between the LUP maps and the on-the-ground conditions, the on-the-ground information should be used to determine where the management included within this LUPA would apply. A similar site-specific review process has been effectively employed while GRSG occupied habits have been under interim management, allowing proposed projects in areas identified as non-habitat to proceed.

When considering new or local information for application of management actions, the goal is to provide a transparent and consistent scientific-based process for adjusting GRSG habitat that will promote conservation of GRSG in Utah. To that end, the following would be considered when updating the GRSG habitat delineations:

Occupied Habitat

- Determination of adjustments in the delineation of mapped occupied GRSG habitat would be coordinated among federal, state and local agencies, academia and technical specialists through a GRSG Working Group.
- Adjustments in mapped occupied GRSG habitat will be based on the best available information, including field observations and inventories, radio-telemetry data, habitat assessments, site visits, supporting research and science, restoration treatments, disturbance, technical expertise, and accepted modeling (including ground-truthing).
- Review of GRSG mapped occupied habitat and proposed adjustments could occur anytime there is a need to adjust the habitat baseline. At a minimum, the BLM would evaluate the mapped occupied habitat boundaries approximately every 5 years in conjunction with land use plan evaluations.

- In general, boundaries would not be adjusted to exclude non-habitat areas if those areas are wholly contained in the mapped occupied habitat boundaries, considering the level of habitat identification needed commensurate with the level of decision-making.
- Habitat altered by fire would not be removed as occupied habitat. If the BLM and Forest Service, in consultation with other agencies, determine that rehabilitation or restoration of mapped GRSG habitat is not feasible and that the area no longer contributes to any part of the GRSG lifecycle, adjustments may be made to exclude the area.
- Determinations on adjustments to mapped occupied GRSG habitat would be by consensus of the GRSG Working Group. If consensus cannot be reached, the BLM Utah State Director or the Forest Supervisor would determine whether habitat boundary adjustments should be made.

Priority and General Management Areas

- Because PHMA and GHMA boundaries are a land use plan action, adjustments are a BLM and Forest Service responsibility and will comply with the applicable BLM or Forest Service planning regulations and policies.
- Adjustments in delineation of PHMA and GHMA would be coordinated among federal, state and local agencies and interested parties.
- Adjustments in delineation of PHMA and GHMA would be based on the best available information, including field observations and inventories, radio-telemetry and GPS data, habitat assessments, site visits, supporting research and science, restoration treatments, disturbance, technical expertise, and accepted modeling (including ground-truthing).
- Review of PHMA and GHMA boundaries would generally be done approximately every 5 years (for the BLM, this would be in conjunction with land use plan evaluations), unless more frequent adjustments are needed.
- Consistent with landscape-level decision making, PHMA and GHMA would be identified at a first- and second-order level (Manier et. al. 2013), and as such, boundaries would generally not be adjusted to exclude non-habitat areas if those areas are wholly contained within the LUP-identified boundaries.
- Areas within PHMA and GHMA that are not currently used by GRSG, but are capable ecologically capable of supporting GRSG would not be removed from PHMA/GHMA boundaries.
- The GRSG Working Group would make adjustment recommendations to PHMA and GHMA to the BLM Utah State Director or Forest Supervisor, who will make the final determination on whether the boundary adjustment is appropriate.
- New areas of mapped GRSG occupied habitat could be identified as either PHMA or GHMA following the appropriate BLM and Forest Service planning rules and procedures. The administrative process through which boundary adjustments will be made would be determined on a case-by-case basis.

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Appendix O

Biological Assessment for the Utah Greater Sage-Grouse Land Use Plan Amendment and Final Environmental Impact Statement

Biological Assessment
for the

Utah Greater Sage-Grouse
Land Use Plan Amendment
and
Final Environmental Impact Statement

May 20, 2015

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Acronym List

APD	applications for permits to drill
BA	Biological Assessment
BLM	Bureau of Land Management
COAs	conditions of approval
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESR	emergency stabilization and rehabilitation
ExPA	experimental population area
FEIS	Final Environmental Impact Statement
GHMA	general habitat management areas
GRSG	Greater Sage-Grouse
LUP	Land Use Plan
MSO	Mexican Spotted Owl
MUs	management units
NEPA	National Environmental Policy Act
NRLMD	Northern Rockies Lynx Management Direction
OHV	off-highway vehicles
ORV	off-road vehicle
PCE	primary constituent elements
PHMA	priority habitat management areas
RMP	resource management plan
ROW	right-of-way
SFA	sagebrush focal areas
T&E	threatened and endangered
TEP	threatened, endangered, or proposed
TNC	The Nature Conservancy
UDWR	Utah Division of Wildlife Resources
UPD	Utah prairie dog
USFWS	US Fish and Wildlife Service

INTRODUCTION

Background

The Bureau of Land Management (BLM) and the Forest Service have prepared amendments to their respective Land Use Plans (LUPs)/Final Environmental Impact Statements (EISs). These documents provide direction for the conservation of greater sage-grouse (GRSG; *Centrocercus urophasianus*) in the following plans in Utah: Cedar City Field Office, Fillmore Field Office, Grand Staircase/Escalante National Monument, Kanab Field Office, Price Field Office, Richfield Field Office, Salt Lake Field Office, Vernal Field Office, Ashley National Forest, Dixie National Forest, Fishlake National Forest, Manti-La Sal National Forest, and Uinta-Wasatch-Cache National Forest. The LUPs/EISs analyze the environmental effects that could result from implementing the proposed action. A Draft LUP/EIS was published in August 2013. The Proposed LUP amendment, scheduled for publication in June 2015, is a refinement of the Preferred Alternative (Alternative D) from the Draft LUP, with consideration given to comments from the public and the State of Utah, corrections, and rewording for clarification.

The purpose of this biological assessment (BA) is to review the Proposed LUP amendments to determine the extent that implementing these amendments may affect proposed threatened and endangered species and proposed or designated critical habitat in the planning area. Because the LUP is a planning document, this BA focuses on the effect of management actions to be implemented.

Under provisions of the US Endangered Species Act (ESA) of 1973, as amended (16 USC, Section 1531 et seq.), federal agencies are directed to conserve threatened and endangered (T&E) species and their habitats. Section 7(a)(1) states that all federal agencies should use "their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species…." Thus, the conservation and recovery of threatened and endangered species is not simply the responsibility of the US Fish and Wildlife Service (USFWS), but of all federal agencies. In order to meet this requirement, the BLM and Forest Service, through the land use plan, would implement management actions, standards and guidelines, protective stipulations, conditions of approval (COAs), conservation measures, required design features, best management practices, mitigation, habitat restoration, and protections.

Section 7(c) of the ESA requires the BLM to complete a BA to determine the effects of implementing a resource management plan (RMP) on listed species, based on compliance with Section 102 of NEPA (National Environmental Policy Act). Federal agencies are required to consider, avoid, or prevent adverse impacts on fish and wildlife species. The agencies are also required to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of T&E species or their critical habitat. The ESA requires agencies, such as BLM and Forest Service, to not only consult or confer with the USFWS when there is discretionary federal involvement or control over the action, but also to ensure that resources are afforded adequate consideration and protection. Formal consultation becomes necessary when the action agency requests consultation after determining that the proposed action is likely to adversely affect listed species or critical habitat, or the aforementioned federal agencies do not concur with the action agency's finding (USFWS 1998).

This programmatic BA provides documentation and analysis for the proposed action to meet the federal requirements and agreements set forth among the federal agencies. It addresses proposed and federally listed threatened and endangered species and proposed or designated critical habitat. It has been prepared under the 1973 ESA Section 7 regulations, in accordance with the 1998 procedures set forth by USFWS and the National Marine Fisheries Service. The BLM and Forest Service, in coordination with the USFWS, conducted an analysis of the effects of the proposed LUP amendments on listed species.

Purpose and Need for GRSG LUP Amendment

The BLM and Forest Service have prepared LUP amendments with associated EISs for LUPs containing GRSG habitat. This is in response to the need to inform the USFWS's March 2010 "warranted, but precluded" ESA listing decision. The inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The need is to ensure that the BLM and Forest Service have adequate regulatory mechanisms in the LUPs for consideration by USFWS a year in advance of its anticipated 2015 listing. The USFWS identified the principal regulatory mechanisms for the BLM and the Forest Service as conservation measures embedded in LUPs. Changes in management of GRSG habitats are necessary to avoid the continued decline of populations that are anticipated across the species' range. These LUP amendments will focus on areas affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision.

The purpose for the LUP amendments is to identify and incorporate appropriate conservation measures in LUPs to conserve, enhance, or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. Changes in the BLM and Forest Service management of GRSG habitats are anticipated to have a considerable beneficial impact on present and future GRSG populations and could reduce the need to list the species as threatened or endangered under the ESA. This is because the BLM and the Forest Service administer a large portion of GRSG habitat in the affected states.

Description of Planning Area

The Utah sub-region includes BLM- and Forest Service-administered lands (Figure 1). The specific field offices and national forests in the planning area are Cedar City Field Office, Fillmore Field Office, Grand Staircase/Escalante National Monument, Kanab Field Office, Price Field Office, Richfield Field Office, Salt Lake Field Office, Vernal Field Office, Ashley National Forest, Dixie National Forest, Fishlake National Forest, Manti-La Sal National Forest, and Uinta-Wasatch-Cache National Forest. A portion of the Ashley National Forest considered in this analysis is in Wyoming (Figure 1).

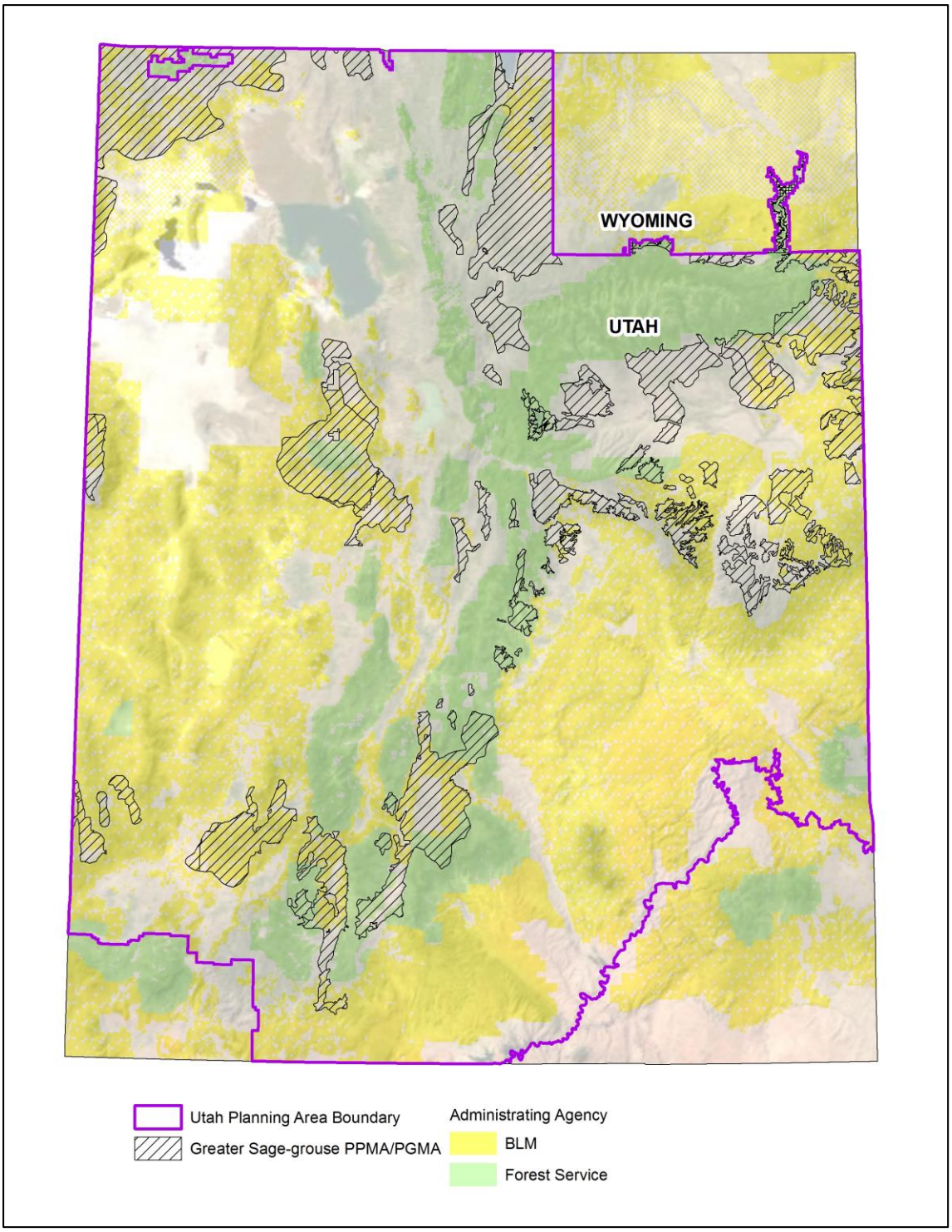

Figure 1. Utah GRSG EIS planning area boundaries

Priority habitat management areas (PHMAs), general habitat management areas (GHMAs), and sagebrush focal areas[1] (SFAs) have been delineated as defined by BLM IM No. 2012-043 for Utah. Although slightly different processes were used to delineate these areas, the habitat described is analogous and will be discussed in conjunction for the purposes of analysis.

The distribution of GRSG is closely aligned with the distribution of sagebrush-dominated landscapes (Schroeder et al. 2004). In the sub-region, large expanses of sagebrush still occur in portions of southwestern and south-central Idaho. This is in association with the Great Basin Core population shared with Nevada, Oregon, and Utah, as well as in portions of the Snake-Salmon-Beaverhead population north of the Snake River.

At a broad scale, PHMA and GHMA encompass areas of intact sagebrush, suitable for GRSG habitat needs. PHMA and GHMA may also have conifer encroachment and perennial grass-dominated areas, generally occupied by GRSG or potentially suitable for future restoration. At finer scales, PHMA and GHMA encompass areas of intact suitable sagebrush habitat that is generally occupied by GRSG, as well as areas of conifer expansion and perennial grassland potentially suitable for future restoration.

Ownership acres and GRSG habitat by ownership in the planning area boundary are shown in

Table 1. The planning area encompasses approximately 48 million acres, 12.7 million acres (26 percent) of which are under BLM administration and 13.9 million acres (28 percent) are under Forest Service administration. Mapped PHMA and GHMA GRSG habitats occur predominantly on BLM-administered lands (approximately 7 million acres), with lesser amounts on Forest Service lands (approximately 814,400 acres).

The decision area for this project includes lands in the planning area for which the BLM and Forest Service have authority to make management decisions. The BLM and Forest Service have jurisdiction over all BLM-administered and National Forest System lands, respectively. In addition the BLM has jurisdiction over federal minerals on National Forest System lands and in some areas where the surface is not owned by a federal entity.

The decision area also includes all GRSG mapped, occupied habitat administered by the BLM or Forest Service including non-federal lands where there are federal mineral interests. For this planning process, land with federal mineral interests refers to areas with state, private, or tribal surface estate with federal mineral estate. In total, there are 4,008,600 acres in the decision area. Tribal surface estate with tribal mineral estate is not considered part of the decision area, despite the fact that the BLM is responsible for reviewing applications for permits to drill (APDs) in these areas.

[1]SFAs consist of PHMAs and GHMAs in areas that represent recognized strongholds for GRSG and are considered most vital to the species persistence and, therefore, have the strongest levels of protection.

Table 1. Acres of GRSG Mapped Occupied Habitat by Landownership

Population Area Name	Total Mapped Occupied Habitat	BLM Surface	Forest Service Surface	Total Decision Area[2]
Bald Hills	347,900	267,500	0	274,050
Box Elder	1,020,900	413,100	0	514,800
Carbon	497,800	125,100	49,700	307,870
Emery	96,200	100	87,600	93,000
Hamlin Valley	143,200	101,000	0	107,530
Ibapah	85,200	57,100	0	57,770
Lucerne	37,600	0	2,300	11,500
Panguitch	343,900	163,000	58,600	252,900
Parker Mountain	792,500	226,200	305,600	613,300
Rich	1,226,000	166,200	15,200	323,250
Sheeprocks	836,300	423,500	92,400	556,100
Strawberry	181,300	0	40,200	40,680
Uintah	1,557,300	556,600	86,000	779,030
Wyoming-Blacks Fork	54,800	0	54,800	54,800
Wyoming-Uinta	22,000	0	22,000	22,000
Totals	**7,242,900**	**2,499,400**	**814,400**	**4,008,580**

2The decision area includes BLM- and Forest Service-administered surface and split-estate lands.

DESCRIPTION OF THE PROPOSED ACTION

There are two selected actions, which are very similar, one for BLM-administered lands (Attachment B) and one for Forest Service-administered lands (Attachment C). These selected actions are excerpts of Chapter 2 from the Final Environmental Impact Statement (FEIS); see this chapter for full details.

In general, the BLM and FS proposed plan amendments are intended to increase the regulatory mechanisms in place to adequately conserve and maintain Greater sage-grouse. As such, the nature of these actions will avoid and/or minimize impacts on GRSG and their habitats, and are generally anticipated to be beneficial to other species, in particular, species that are found within or rely on sagebrush habitats within GRSG occupied areas. Though vegetation management and fire-related actions already exist in current management plans, BLM and FS plan amendments specifically prioritize actions in GRSG habitats. Therefore, federally listed or federally proposed species in or reliant on GRSG habitats, may have a higher likelihood of exposure to these actions. One exception is Utah prairie dogs (federally listed as Threatened), since their site-specific habitat requirements differ from the site-specific descriptions of GRSG habitats. Therefore, where the Utah prairie dog and GRSG overlap, areas will be managed in coordination with DWR, BLM, USFWS biologists, to ensure that habitat treatments benefit both species. But, due to the increased emphasis of fire suppression actions in GRSG habitat, though conservation measures will be applied to avoid and minimize impacts to Utah prairie dogs, there could still be unintentional adverse impacts. In addition, in the Panguitch area, a proposed shift of a utility corridor in the Panguitch area could affect Utah prairie dogs.

SPECIES CONSIDERED IN THE ANALYSIS

This BA provides detailed analyses of all federally listed endangered or threatened species, proposed species, and designated or proposed critical habitat that may be affected by the actions proposed in the Utah Greater Sage-grouse LUP Amendments document. Development of this BA was guided by the regulations on Interagency Cooperation (Section 7 of the ESA) in 50 CFR, Part 402, and BLM Manual 6840.

The USFWS list of threatened, endangered, or proposed (TEP) species is composed of plants, birds, mammals, amphibians, fish, and invertebrates. Those species or critical habitat that may be in the decision area or be affected by the Preferred Alternative in the FEIS were reviewed.

Table 2 and Table 3 list USFWS TEP species that may be present or are known in the planning area and designated or proposed critical habitat for those species. The species and critical habitat in the tables were considered in this analysis and compared to the seven evaluation criteria listed below. The criteria were used to identify species or proposed or designated critical habitat that would have no effect from the action alternatives and could therefore be eliminated from detailed analysis. These numerical categories below are referred to in table 2.

1. Evaluation Criteria Decision area is outside species' range
2. Potential habitat for the species does not exist in GRSG habitat (sagebrush-steppe) or is outside the elevation range of the GRSG
3. The type or intensity of the activity in the proposed action is expected to have no impact on these species or their habitat
4. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic, or opportunistic visitors to the habitats impacted by the proposal, but no affiliation or dependence on these habitats has been shown
5. The associated conservation design or mitigations eliminate any potential for impact on the species
6. No overlap between critical habitat polygons and PHMA and GHMA
7. Critical habitat polygons may overlap with PHMA or GHMA, but primary constituent elements (PCEs) do not overlap; no essential features of critical habitat will be affected

Species with a no effect (NE) initial biological determination could be affected by site-specific projects in or near occupied or unoccupied suitable habitat. The potential effects on all species should be analyzed for any project that could affect any of the species listed in **Error! Reference source not found.**

Table 2. USFWS endangered and threatened species potentially occurring on BLM administered lands.

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Mammals											
Black-footed ferret (E-exp) *Mustela nigripes*	Black-footed ferret habitats are directly associated with the presence of prairie dog colonies. Grassland plains are the predominant habitats associated with both the ferret and the prairie dog. There is some overlap between the Coyote Basin Reintroduction Area and mapped GRSG habitat.	NP	NP	NP	NP	NP	NP	NP	D	3	No effect (see Attachment A)
Canada lynx (T) *Lynx Canadensis*	Core habitat is dense and continuous spruce/fir forests and lodgepole pine forests with snowshoe hare populations, and includes designated lynx analysis units. Secondary habitat is a mosaic of shrublands and mixed conifer forests next to core habitat. May include linkage corridors. Two linkage corridors overlap with PHMA in the Vernal Field Office and Salt Lake Field Office.	NP	NP	NP	NP	NP	NP	S	S	NA	See detailed analysis below

[3] E = Endangered; E-exp. = Endangered Experimental Population; T = Threatened; P-T = Proposed Threatened; P-E = Proposed Endangered
[4] Sources include: Agency Resource Specialist Review ;
NF = National Forest; S = Species is Suspected within planning unit; D = Presence of species within the planning unit has been Documented; X = Either Documented or Suspected; X1: These species do not occur in the planning area, but water depletions may affect the species and/or critical habitat in downstream reaches, GSENM = Grand Staircase/Escalante National Monument. NP = Not Present; Findings: LAA, NLAA, NE

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Canada lynx (T) *Lynx Canadensis* designated critical habitat		NP	NP	NP	NP	NP	NP	NP	NP	6	No effect
Utah prairie dog (T) *Cynomys parvidens*	Occur in semiarid shrub-steppe and grassland habitats. Currently limited to the central and southwestern quarter of Utah, in Beaver, Garfield, Iron, Kane, Piute, Sevier, and Wayne Counties, 6,200 feet to 9,180 feet. Overlaps with GRSG habitat in Cedar City, Kanab, and Richfield Field Offices. Historical habitat only in the Fillmore Field Office.	D	S	NP	D	NP	D	NP	NP	NA	See detailed analysis below
Birds											
California condor (E) *Gymnogyps californianus*	Nest in caves, on cliffs, or in a crevice among boulders on a steep slope. Regularly sighted in southern Utah, particularly in the vicinity of Zion National Park/Kolob Canyons. Possible foraging overlap with GRSG habitats.	D	NP	NP	NP	NP	S	NP	NP	NA	See detailed analysis below
California condor (E-exp) *Gymnogyps californianus*	Nest in caves, on cliffs, or in a crevice among boulders on a steep slope. Nesting documented in Bryce Canyon National Park. Possible foraging overlap with GRSG habitats.	D	NP	D	S	NP	NP	NP	NP	NA	See detailed analysis below

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Mexican spotted owl (T) *Strix occidentalis lucida*	A habitat specialist that roosts and nests in late seral forests or rocky canyons that include desert scrub and riparian vegetation. Occurs in Arizona, Colorado, New Mexico, and Texas and in the southern and eastern portions of Utah in Duchesne, Emery, Garfield, Grand, Iron, Kane, San Juan, Uintah, Washington, and Wayne Counties. No documented occurrences in GRSG mapped habitats on BLM or split-estate lands. However, there is some overlap of modeled potential habitat and GRSG mapped habitat.	D	S	D	D	D	D	NP	S	NA	See detailed analysis below
Mexican spotted owl (T) *Strix occidentalis lucida* designated critical habitat	Designated critical on lands administered by the Price, Cedar City, GSENM, Kanab, and Richfield Field Offices. Approximately 10,482 acres of overlap with PHMA on BLM-administered lands and 998 acres in Price Field Office only.	P	NP	P	P	P	P	NP	NP	NA	See detailed analysis below
Southwestern willow flycatcher (E) *Empidonax traillii extimus*	Summer breeder in Arizona, California, Colorado, Nevada, New Mexico, Texas, and southern Utah in Emery, Garfield, Grand, Iron, Kane, San Juan, Washington, and Wayne Counties. Requires dense riparian habitats (cottonwood/willow and tamarisk vegetation), saturated soils, standing water, or nearby streams, pools, or cienegas for nesting (below 8,500 feet). No overlap between documented breeding or other occurrences and GRSG mapped habitat on BLM or split-estate lands in all Field Offices.	D	NP	D	D	D	D	NP	D	3	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Southwestern willow flycatcher (E) *Empidonax traillii extimus* designated critical habitat	Designated critical habitat occurs only in the Grand Staircase-Escalante National Monument Field Office and is more than 20 miles from GRSG mapped habitat. No overlap between critical habitat and GRSG mapped habitat on BLM or split-estate lands.	NP	NP	D	NP	NP	NP	NP	NP	6	No effect
Yellow-billed cuckoo (T) *Coccyzus americanus*	Require large blocks of riparian woodlands (50 acres or more) in low to moderate elevation, arid to semiarid landscapes. Reported occurrences in Utah are primarily associated with larger rivers. No known recent occurrences in GRSG mapped habitats on BLM or split-estate lands within the past 19 years.	NP	NP	D	S	S	D	S	D	3	No effect (see Attachment A)
Yellow-billed cuckoo *Coccyzus americanus* proposed designated critical habitat	Proposed critical habitat is in the Vernal, Richfield, and Moab Field Offices. No overlap between known occurrences and GRSG mapped habitats on BLM or split-estate lands.	NP	NP	NP	NP	NP	NP	NP	NP	6	No effect
Invertebrates											
Kanab ambersnail (E) *Oxyloma haydeni kanabensis*	Occur in springs and seeps at bases of sandstone or limestone cliffs. In Utah, it is on private land near Kanab, around several spring-fed ponds named Three Lakes. No overlap between known occurrences and GRSG mapped habitats on BLM or split-estate lands.	NP	NP	D	D	NP	NP	NP	NP	2	No effect

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Fish											
Bonytail chub (E) *Gila elegans*	Adapted to main stem rivers of the Colorado River basin where it has been observed in pools and eddies. Based on available distribution data, flooded bottomland habitats are likely important growth and conditioning areas for bonytail, particularly as nursery habitats for young.	NP	NP	D	NP	D	NP	NP	D	1, 3	No effect (see Attachment A)
Bonytail chub (E) *Gila elegans* designated critical habitat	Critical habitat is the 100-year floodplain of the Colorado River. PCEs are water of sufficient quality and quantity, appropriate physical habitat (river channels, these areas also include bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain) supporting all life stages and biological environment (food supply for all life stages, competition, and predation). No overlap of critical habitat or GRSG mapped habitats on BLM or split-estate lands.	NP	NP	D	NP	D	NP	NP	D	6	No effect (see Attachment A)
Colorado pikeminnow (E) *Ptychocheilus lucius*	Inhabit a variety of habitats, by life stage, in warm-water reaches of the Colorado River main stem and larger tributaries, and require uninterrupted stream passage for spawning migrations and young dispersal.	NP	NP	D	NP	D	NP	NP	D	1, 3	No effect (see Attachment A)
Colorado pikeminnow (E) *Ptychocheilus Lucius* designated critical habitat	See critical habitat description above for bonytail chub (same for Colorado pikeminnow).	NP	NP	D	NP	D	NP	NP	D	6	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Greenback cutthroat trout (T) *Oncorhynchus clarki stomias*	Habitat is restricted to La Sal Mountains east of Moab. Does not occur in GRSG habitat on Forest Service lands in the planning area.	NP	NP	NP	NP	NP	NP	NP	NP	1, 3	No effect
Humpback chub (E) *Gila cypha*	Live and complete their entire life cycle in canyon-bound reaches of the Colorado River main stem and larger tributaries, characterized by deep water, swift currents, and rocky substrates.	NP	NP	D	NP	D	NP	NP	D	1, 3	No effect (see Attachment A)
Humpback chub (E) *Gila cypha* designated critical habitat	See critical habitat description above for bonytail chub (same for humpback chub).	NP	NP	D	NP	D	NP	NP	D	6	No effect (see Attachment A)
June sucker (E) *Chasmistes liorus*	Native range includes Utah Lake and the adjacent Provo River, Utah. Refuge populations have been established in protected locations throughout Utah. A refuge population (lake habitat) overlaps GRSG habitat on split-estate land in Box Elder County.	NP	NP	NP	NP	NP	NP	D	NP	3	No effect (see Attachment A)
June sucker (E) *Chasmistes liorus* designated critical habitat	Constituent elements are one to three feet of high-quality water flowing over a clean, unsilted gravel substrate in the Provo River. No overlap of critical habitat or GRSG mapped habitat on BLM or split-estate lands.	NP	NP	NP	NP	NP	NP	NP	NP	6	No effect

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Lahontan cutthroat trout (T) *Oncorhynchus clarkii* ssp. *henshawi*	Occur in California, Nevada, Oregon, and Utah. Inhabits both lakes and streams but is an obligatory stream spawner in habitat that is characterized by well-vegetated and stable streambanks, stream bottoms with relatively silt-free gravel/rubble substrate, cool water, and pools in proximity to cover and velocity breaks. Known occurrences overlap GRSG mapped habitat on BLM and split-estate lands in the Salt Lake Field Office.	NP	NP	NP	NP	NP	NP	D	NP	3	No effect (see Attachment A)
Razorback sucker(E) *Xyrauchen texanus*	Inhabit different habitats of the Colorado River Basin seasonally and by life stage.	NP	NP	D	NP	D	NP	NP	D	1, 3	No effect (see Attachment A)
Razorback sucker(E) *Xyrauchen texanus* designated critical funding	Critical habitat: Colorado River, Rifle west, Yampa River, Gunnison River. See critical habitat description above for bonytail chub (same for razorback sucker).	NP	NP	D	NP	D	NP	NP	D	6	No effect (see Attachment A)
Plants											
Autumn buttercup (E) *Ranunculus aestivalis*	Narrowly distributed to two populations in the upper Sevier River Valley, north of Panguitch. Found on islands of drier peaty hummocks in perennial wet meadows (6,358 to 6,446 feet). Blooms August-September. Populations are entirely on private lands, so occurrences do not overlap the decision area but are within 0.2 mile of PHMA on BLM lands. Unsurveyed habitat may exist on these nearby BLM lands.	NP	NP	NP	D[1]	NP	NP	NP	NP		See detailed analysis below. Autumn buttercup has been documented within the boundaries of the Kanab Field Office but not on BLM-administered lands.

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Barneby reed-mustard (E) *Schoenocrambe barnebyi*	Endemic to the canyonlands of south-central Utah and Emery and Wayne Counties, where it grows in mixed desert shrub communities on sparsely vegetated sites on steep, eroding north to northeast facing slopes at 4,800 to 6,500 feet. Blooms May-June. Occurs over 22 miles from the nearest PHMA/GHMA.	NP	NP	NP	NP	D	NP	NP	NP	2	No effect (see Attachment A)
Barneby ridge-cress (E) *Lepidium barnebyanum*	Found only in Indian Canyon in Duchesne County, on limestone outcrops in mixed desert shrub and pinyon/juniper woodlands. Very localized and occurs on poorly developed soils derived from marly shales in a zone of interbedding geologic strata from the Uinta and Green River Formations (6,200 to 6,500 feet). Occurs over 8 miles from the nearest PHMA/GHMA.	NP	NP	NP	NP	NP	NP	NP	D	2	No effect (see Attachment A)
Clay phacelia (E) *Phacelia argillacea*	Steep sparsely vegetated slopes among mountain brush and pinyon/juniper, on clayey substrates derived from shale of the Green River Formation. Grows at elevations ranging from 6,000-7,000 feet. Suitable (modeled) habitat for clay phacelia does not overlap PHMA/GHMA but does occur within about 1.5 miles of PHMA. Known sites also do not overlap GRSG habitats and are about 2 miles from PHMA.	NP	NP	NP	NP	NP	NP	D	NP		See detailed analysis below

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Clay reed-mustard (T) *Schoenocrambe argillacea*	Restricted distribution in Uintah County, in mixed desert shrub communities on steep slopes at 4,600- to 5,900-foot elevation. Blooms June-July. Occurrences overlap GHMA in the Willow Creek area.	NP	NP	NP	NP	NP	NP	NP	D		See detailed analysis below
Deseret milk-vetch (T) *Astragalus desereticus*	Occur in one location on steep, highly erosive, sandy slopes in a sagebrush-juniper community near Birdseye in Wasatch County at 5,320- to 5,780-foot elevation. Blooms May-June. The known population and its habitat occurs over 3 miles from PHMA/GHMA.	NP	NP	NP	NP	NP	D	NP	NP	2	No effect (see Attachment A)
Heliotrope milk-vetch (T) *Astragalus montii*	Alpine species found in openings in spruce-fir forests on plateaus in the Manti-LaSal National Forest (Sanpete and Sevier Counties), 11,000- 11,300-foot elevation. Restricted to subalpine mixed grass-forb cushion plant communities on level to gently sloping pavement surfaces of Flagstaff limestone shale barrens. Blooms July-August. Habitat does not occur on BLM-administered lands.	NP	NP	NP	NP	NP	NP	NP	NP	1	No effect (see Attachment A)
Heliotrope milk-vetch (T) *Astragalus montii* Critical habitat	Critical habitat occurs only on the Manti-LaSal National Forest, 3.9 miles from PHMA and 6.5 miles from GHMA.	NP	NP	NP	NP	NP	NP	NP	NP	6	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Jones cycladenia (T) *Cycladenia humilis* var. *jonesii*	Occur in desert shrub in the canyonlands section of the Colorado Plateau in southeastern Utah and in northern Arizona. Grows on barren gypsiferous clay hills that form the steep sides and lower slopes of mesas (USFWS 1986). Restricted to soils with a narrow range of morphological and physical properties, but not an obligate gypsophile. Documented between 4,600 and 6,600 feet. Known occurrences are over 25 miles from PHMA.	NP	NP	D	NP	D	D	NP	NP	2	No effect (see Attachment A)
Kodachrome bladderpod (E) *Lesquerella tumulosa*	Restricted to one population of scattered occurrences in the Kodachrome Flats area of the Paria River Drainage in Kane County, Utah. Grows on white, bare shale knolls derived from the Winsor member of the Carmel geologic formation. This plant is restricted to very xeric shale outcrops, at about 5,700 feet. Associated with scattered Utah juniper in a *Bouteloua* (grama grass) grassland. Known occurrences and habitats are about 13 miles from PHMA.	NP	NP	D	NP	NP	NP	NP	NP	2	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Last Chance townsendia (T) *Townsendia aprica*	Known from Emery, Sevier, and Wayne Counties, Utah, at 6,100 to 9,100 feet elevation. It generally occurs with galleta and salt desert shrubs in small barren openings of pinyon/juniper communities on barren soils of the Mancos Shale Formation. This plant's habitat is an inclusion in a larger matrix of GRSG habitat. Known occurrences overlap PHMA in the Lower Last Chance Creek area, on the Fishlake National Forest.	NP	NP	NP	NP	D	D	NP	NP		See detailed analysis below
Maguire primrose (T) *Primula maguirei*	A narrow endemic of Logan Canyon in Cache County, Utah, that is found on damp ledges, crevices, and over-hanging rocks along canyon walls. Almost always on north-facing, moss covered limestone cliffs at or near the canyon bottom in shallow dolomitic soils of the Laketown and Fish Haven geologic formations, 4,429 to 5,577 feet. This species does not occur on BLM administered lands. Occurrences on Forest Service lands are over 9 miles from PHMA.	NP	NP	NP	NP	NP	NP	NP	NP	1	No effect (see Attachment A)
Pariette cactus (T) *Sclerocactus brevispinus*	Restricted to fine soils in clay badlands derived from the Uinta Formation, Duchesne and Uintah Counties, Utah. Habitat is sparsely vegetated desert shrubland dominated by *Atriplex*, *Chrysothamnus*, and *Tetradymia* species (4,593 to 4,921 feet). This species is geographically restricted to Pariette Draw. PHMA occurs about 5 miles from Pariette Draw cactus habitats.	NP	NP	NP	NP	NP	NP	NP	D	2	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
San Rafael cactus (E) *Pediocactus despainii*	Known from only 2 populations in Emery County, with a total of about 6,000 individuals. Occurs on hills, benches, and flats of open semiarid grassland with scattered junipers and pinyon pines. No overlap is present between GRSG habitats and San Rafael cactus locations. The closest occurrences are about 1 mile from PHMA, near South Horn Mountain.	NP	NP	NP	NP	D	D	NP	NP	2	No effect (see Attachment A)
Shrubby reed-mustard (E) *Schoenocrambe suffrutescens*	Occur along semi-barren, white-shale layers of the Evacuation Creek member of the Green River Formation in the Uinta Basin of eastern Utah in Duchesne and Uintah Counties. Habitat includes disjunct knolls and benches resembling small extremely dry desert islands surrounded by mixed desert shrub and pinyon/juniper woodland (3,000 to 5,200 feet elevation). Occurrences overlap GHMA, in the Johnson Draw area.	NP	NP	NP	NP	NP	NP	NP	D		See detailed analysis below
Siler pincushion cactus (T) *Pediocactus sileri*	Distribution is limited to southwestern Utah and northwestern Arizona, where it is ecologically restricted to Moenkopi Formation gypsum and salt-rich soil in a variety of plant communities, from low elevation (approx. 2,789 feet) Mohave Desert scrub up to conifer woodlands and grasslands at 5,413 feet. Siler pincushion in the Kanab Field Office occurs over 22 miles from the nearest PHMA/GHMA.	NP	NP	NP	D	NP	NP	NP	NP	2	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Uinta Basin hookless cactus (T) *Sclerocactus wetlandicus*	Endemic to the Uinta Basin, Duchesne and Uintah Counties, in northeast Utah. Found on coarse soils derived from cobble and gravel river and stream terrace deposits, or rocky surfaces on mesa slopes at 4,400 to 6,200 feet in desert shrub communities and pinyon-juniper woodlands. One occurrence overlaps GHMA near Nine Mile Canyon, in the Vernal Field Office.	NP	NP	NP	NP	D	NP	NP	D		See detailed analysis below
Ute ladies'-tresses (T) *Spiranthes diluvialis*	Occur in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming. Found in moist meadows associated with perennial stream terraces, floodplains, and oxbows seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels, valleys, lakeshores, and human-modified wetlands (720 to 7,000 feet). No overlap, but a few occurrences are just over 0.1 mile from PHMA and others are close to GHMA. Some habitat likely is in PHMA/GHMA.	NP	NP	D	NP	NP	NP	S	D		See detailed analysis below
Welsh's milkweed (T) *Asclepias welshii*	Occur in Coral Pink Sand Dunes in sagebrush, juniper, and ponderosa pine communities at 5,577 to 6,234 feet. Known from only four locations in Kane County, Utah, and Navajo Nation lands in Arizona. Known occurrences and habitats are about 6 miles from PHMA.	NP	NP	NP	D	NP	NP	NP	NP	2	No effect (see Attachment A)

Species (Status[3])	Habitat Description and Range	Units where the species is known or suspected to be present in the decision area or that contain suitable or critical habitat in the decision area[4]								Evaluation Criteria	Initial Biological Determination
		Cedar City FO	Fillmore FO	GSENM	Kanab FO	Price FO	Richfield FO	Salt Lake FO	Vernal FO		
Welsh's milkweed (T) *Asclepias welshii* designated critical habitat	Do not overlap with GRSG habitat; closest critical habitat area is over 5.5 miles from PHMA.	NP	NP	NP	D	NP	NP	NP	NP	6	No effect (See Attachment A)
Winkler cactus (T) *Pediocactus winkleri*	Endemic to a small area of south-central Utah and restricted to a specific, alkaline soil type in salt desert shrub communities, characterized by drought-tolerant shrubs and grasses with ephemeral forbs (4,757 to 6,890 feet). Known occurrences and habitats are about 11 miles from PHMA.	NP	NP	NP	NP	D	D	NP	NP	2	No effect (see Attachment A)
Wright fishhook cactus (E) *Sclerocactus wrightiae*	Occur in barren alkaline soils with widely scattered shrubs, perennial herbs, bunch grasses, or scattered pinyon and juniper (4,790 to 6,119 feet). Endemic to east-central Utah in western Emery County, southeastern Sevier County, and central Wayne County. Although there is no overlap, the nearest occurrence is about 1 mile from PHMA. Due to the barren nature of Wright fishhook cactus habitat, it does not likely overlap with GRSG habitats.	NP	NP	NP	NP	D	D	NP	NP	2	No effect (see Attachment A)

Table 3. USFWS endangered and threatened species listed as potentially occurring on national Forest Service administered lands in the analysis area and that may be influenced by the preferred alternative and will be further analyzed in this document.

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Mammals								
Black-footed ferret (Exp.) *Mustela nigripes*	Historically found throughout the Great Plains, mountain basins, and semiarid grasslands of North America wherever black-tailed, Gunnison's, or white-tailed prairie dogs occur. Known current ferret populations were all reintroduced in Wyoming, South Dakota, Montana, Utah, Colorado, Arizona, Kansas, New Mexico, Canada, and Mexico. The only population in Utah is the Coyote Basin population established in 1999.	NP	NP	NP	NP	NP	1	No effect

[5]E = Endangered; E-exp. = Endangered Experimental Population; T = Threatened; P-T = Proposed Threatened; P-E = Proposed Endangered

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Canada lynx (T) *Lynx canadensis*	Montane and subalpine coniferous forests above 4,000 feet, with lodgepole pine, subalpine fir and Engelmann spruce. Core habitat is dense and continuous spruce/fir forests and lodgepole pine forests with snowshoe hare populations, and includes designated lynx analysis units. Secondary habitat is a mosaic of shrublands and mixed conifer forests next to core habitat. May include linkage corridors. Overlap between lynx secondary habitat and GRSG mapped habitat on about 42,400 acres.	D	NP	NP	NP	S	NA	See detailed analysis below
Canada lynx *Lynx canadensis* critical habitat	No designated critical habitat occurs in the planning area.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
Utah prairie dog (T) *Cynomys parvidens*	Occur in semiarid shrub-steppe and grassland habitats. Limited to the central and southwestern quarter of Utah in Beaver, Garfield, Iron, Kane, Piute, Sevier, and Wayne Counties at 6,200 to 9,180 feet. Overlap of Utah prairie dog Management Units and GRSG mapped habitat on the Dixie and Fishlake National Forests.	NP	D	D	NP	NP	NA	See detailed analysis below

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Birds								
California condor (E) *Gymnogyps californianus*	Nest in caves, on cliffs, or in crevices among boulders on a steep slope. Regularly sighted in southern Utah, particularly in the vicinity of Zion National Park/Kolob Canyons. Possible foraging overlap with GRSG habitats.	D	D	S	S	NP	NA	See detailed analysis below
California condor (Exp. 10J) *Gymnogyps californianus*	Nest in caves, cliffs or crevices among boulders on a steep slope. Nesting documented in Bryce Canyon National Park. Possible foraging overlap with GRSG habitats.	D (10J)	D (10J)	S (10J)	NA	NP	NA	See detailed analysis below
Mexican spotted owl (T) *Strix occidentalis lucida*	A habitat specialist that roosts and nests in late seral forests or rocky canyon habitats that include desert scrub and riparian vegetation. Occur in southern and eastern portions of Utah in Duchesne, Emery, Garfield, Grand, Iron, Kane, San Juan, Uintah, Washington, and Wayne Counties.	NP	D	D	D	NP	NA	See detailed analysis below
Mexican spotted owl (T) *Strix occidentalis lucida* designated critical habitat	No overlap of Mexican spotted owl designated critical habitat and GRSG mapped habitats on National Forest lands.	NP	D	D	NP	NP	6	See detailed analysis (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Southwestern willow flycatcher (E) *Empidonax traillii extimus*	Summer breeder in Arizona, California, Colorado, Nevada, New Mexico, Texas, and southern Utah in Emery, Garfield, Grand, Iron, Kane, San Juan, Washington, and Wayne Counties. Requires dense riparian habitats (cottonwood/willow and tamarisk vegetation), saturated soils, standing water, or nearby streams, pools, or cienegas for nesting (below 8,500 feet). No overlap between documented breeding or other occurrences and GRSG mapped habitat on Forest Service lands.	NP	NP	NP	D	NP	3	No effect (see Attachment A)
Southwestern willow flycatcher (E) *Empidonax traillii extimus* designated critical habitat	No designated critical habitat occurs on National Forest lands.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
Yellow-billed cuckoo (T) *Coccyzus americanus*	Require large blocks of riparian woodlands (50 acres or more) in low to moderate elevation, arid to semiarid landscapes. Reported occurrences in Utah are primarily associated with larger rivers. No known recent occurrences in GRSG mapped habitats on Forest Service lands within the past 15 years	D	S	S	D	D	3	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Yellow-billed cuckoo (P-T) *Coccyzus americanus* proposed critical habitat	No overlap of proposed critical habitat and National Forest lands.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
Invertebrates								
Kanab ambersnail (E) *Oxyloma haydeni kanabensis*	Occur in springs and seeps at base of sandstone or limestone cliffs. In Utah, it is on private land near Kanab, around several spring-fed ponds named Three Lakes. No overlap of species occurrence and National Forest lands.	NP	NP	NP	NP	NP	1	No effect
Fish								
Bonytail chub (E) *Gila elegans*	Critical habitat is the Colorado River, Yampa River, Dinosaur National Monument west, and Ruby Canyon west (not in planning area).	NP	NP	NP	NP	NP	1, 3	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Bonytail chub (E) *Gila elegans* designated critical habitat	Critical habitat is the 100-year floodplain of the Colorado River. PCEs are water of sufficient quality and quantity, appropriate physical habitat (river channels; these areas also include bottom lands, side channels, secondary channels, oxbows, and backwaters in the 100-year floodplain) supporting all life stages and biological environment (food supply for all life stages, competition, and predation). No overlap of critical habitat and GRSG mapped habitats on National Forest lands.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
Colorado pikeminnow (E) *Ptychocheilus lucius*	Occur in the upper Colorado River Basin. No known occurrences on National Forest lands since 1961.	NP	NP	NP	NP	NP	1, 3	No effect (see Attachment A)
Colorado pikeminnow (E) *Ptychocheilus lucius* designated critical habitat	See critical habitat description above for bonytail chub (same for Colorado pikeminnow). No overlap of designated critical habitat and National Forest lands in the planning area.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
Greenback cutthroat trout (T) *Oncorhynchus clarki stomias*	Habitat is restricted to La Sal Mountains east of Moab. Do not occur in GRSG habitat on Forest Service lands in the planning area.	NP	NP	NP	D	NP	3	No effect

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Humpback chub (E) *Gila cypha*	Live and complete their entire life cycle in canyon-bound reaches of the Colorado River main stem and larger tributaries, characterized by deep water, swift currents, and rocky substrates. No known occurrences on National Forest lands since 1961.	NP	NP	NP	NP	NP	1,3	No effect (see Attachment A)
Humpback chub (E) *Gila cypha* designated critical habitat	See critical habitat description above for bonytail chub (same for Colorado pikeminnow). No overlap of designated critical habitat and National Forest lands in the planning area.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
June sucker (E) *Chasmistes liorus*	Native range is Utah Lake and the adjacent Provo River, Utah. Refuge populations have been established in protected locations throughout Utah.	NP	NP	NP	NP	S	3	No effect (see Attachment A)
June sucker (E) *Chasmistes liorus* designated critical habitat	Constituent elements include one to three feet of high quality water flowing over a clean, unsilted gravel substrate in the Provo River. No overlap of critical habitat and GRSG mapped habitat on National Forest lands.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Lahontan cutthroat trout (T) *Oncorhynchus clarkii ssp. henshawi*	Occur in California, Nevada, Oregon, and Utah. Inhabit both lakes and streams but is an obligatory stream spawner in habitat that is characterized by well-vegetated and stable streambanks, stream bottoms with relatively silt-free gravel/rubble substrate, cool water, and pools in proximity to cover and velocity breaks.	NP	NP	NP	NP	NP	1,3	No effect
Razorback sucker(E) *Xyrauchen texanus*	Inhabits different habitats of the Colorado River Basin seasonally and by life stage.	NP	NP	NP	NP	NP	1,3	No effect (see Attachment A)
Razorback sucker(E) *Xyrauchen texanus* designated critical habitat	Critical habitat is the Colorado River, Rifle west, Yampa River, Gunnison River. See critical habitat description above for bonytail chub (same for razorback sucker).	NP	NP	NP	NP	NP	6	No effect (see Attachment A)
Plants								
Autumn Buttercup (E) *Ranunculus aestivalis*	Narrowly distributed to 2 populations in the upper Sevier River Valley, north of Panguitch. Found on islands of drier peaty hummocks in perennial wet meadows (6,358 to 6,446 feet). Blooms August-September. Because GRSG use wet meadows, there may be limited overlap with GRSG.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Barneby reed-mustard (E) *Schoenocrambe barnebyi*	Endemic to the canyonlands of south-central Utah, Emery and Wayne Counties, where it grows in mixed desert shrub communities on sparsely vegetated sites on steep, eroding north to northeast facing slopes at 4,800 to 6,500 feet. Blooms May-June. Occur over 22 miles from the nearest PHMA/GHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)
Barneby ridge-cress (E) *Lepidium barnebyanum*	Found only in Indian Canyon in Duchesne County on limestone outcrops in mixed desert shrub and pinyon/juniper woodlands. Very localized on poorly developed soils derived from marly shales in a zone of interbedding geologic strata from the Uinta and Green River Formations (6,200 to 6,500 feet). Barneby ridge cress occurs over 8 miles from the nearest PHMA/GHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Clay phacelia (E) *Phacelia argillacea*	Grow at elevations ranging from 6,000 to 7,000 feet. Found on steep hillsides of shaley clay colluvium on an extremely limited band of soil derived from an upper member of the Green River geologic formation called Green River Shale in Utah County, Utah. Suitable (modeled) habitat for clay phacelia does not overlap PHMA or GHMA but occurs within 0.85 mile of PHMA and within 0.4 mile of GHMA. Known sites also do not overlap GRSG habitats and are about 1.5 miles from PHMA.	NP	NP	NP	S	D	2	See detailed analysis below
Clay reed-mustard (T) Schoenocrambe argillacea	Restricted distribution in Uintah County in mixed desert shrub communities on steep slopes at 4,600 to 5,900 foot elevation. Blooms June-July. Occurrences overlap GHMA in the Willow Creek area (BLM).	NP	NP	NP	NP	NP	1	No effect in Forest Service units; see detailed analysis below for BLM units
Deseret milk-vetch (T) *Astragalus desereticus*	Occur on steep, highly erosive, sandy slopes in a sagebrush-juniper community near Birdseye in Wasatch County at 5,320 to 5,780 foot elevation. Blooms May-June. The known population and its habitat occurs over 3 miles from PHMA/GHMA.	NP	NP	NP	S	S	2	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Heliotrope milk-vetch (T) *Astragalus montii*	Alpine species found in openings in spruce-fir forests on plateaus in the Manti-LaSal National Forest (Sanpete and Sevier Counties), 11,000- to 11,300-foot elevation. Restricted to subalpine mixed grass-forb cushion plant communities on level to gently sloping pavement surfaces of limestone (Flagstaff limestone); shale barrens. Blooms July-August.	NP	NP	NP	D	NP	2	No effect (see Attachment A)
Heliotrope milk-vetch (T) (*Astragalus montii*) designated critical habitat	Designated critical habitat occurs on the Manti-LaSal National Forest but is 3.9 miles from PHMA and 6.5 miles from GHMA.	NP	NP	NP	D	NP	6	No effect (see Attachment A)
Jones cycladenia (T) *Cycladenia humilis* var. *jonesii*	Occur in desert shrub in the canyonlands section of the Colorado Plateau in southeastern Utah and in northern Arizona. Grow on barren gypsiferous clay hills that form the steep sides and lower slopes of mesas (USFWS 1986). Restricted to soils with a narrow range of morphological and physical properties but not an obligate gypsophile (Boettinger 1997). Documented between 4,600 and 6,600 feet. Known occurrences are over 25 miles from PHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Kodachrome bladderpod (E) *Lesquerella tumulosa*	Endemic only in Kane County, Utah. Restricted to one population of scattered occurrences in the Kodachrome Flats area of the Paria River Drainage. Kodachrome bladderpod is restricted to very xeric shale outcrops at about 5,700 feet. Occurs on extremely dry, sparsely vegetated, white shale knolls with thin soils derived from the Windsor Member of the Carmel Formation. Associated with scattered Utah juniper in a *Bouteloua* grassland. Known occurrences and habitats are about 13 miles from PHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)
Last Chance townsendia (T) *Townsendia aprica*	Known from Emery, Sevier, and Wayne Counties in Utah, at 6,100 to 9,100 feet in elevation. It generally occurs with galleta and salt desert shrubs in small barren openings of pinyon-juniper communities on barren soils of the Mancos Shale Formation. This plant's habitat is an inclusion in a larger matrix of GRSG habitat. Known occurrences overlap PHMA in the Lower Last Chance Creek area, in the Fishlake National Forest.	NP	D	D	NP	NP		See detailed analysis below

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Maguire primrose (T) *Primula maguirei*	A narrow endemic of Logan Canyon in Cache County, Utah. Found on damp ledges, crevices, and overhanging rocks along canyon walls. Almost always on north-facing, moss covered limestone cliffs at or near the canyon bottom in shallow dolomitic soils of the Laketown and Fish Haven geologic formations (4,429 to 5,577 feet). Occurrences are mapped in PHMA/GHMA, but the moist cliff habitat of this species is not a target for GRSG conservation actions.	NP	NP	NP	NP	D	2	No effect (see Attachment A)
Pariette cactus (T) *Sclerocactus brevispinus*	Restricted to fine soils in clay badlands derived from the Uinta Formation, Duchesne and Uintah Counties, Utah. Habitat is sparsely vegetated desert shrubland, dominated by *Atriplex*, *Chrysothamnus*, and *Tetradymia* species (4,593 to 4,921 feet). This species is geographically restricted to Pariette Draw, about 4 miles from PHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
San Rafael cactus (E) *Pediocactus despainii*	Known from only two populations in Emery County, with a total of about 6,000 individuals. Occur on hills, benches, and flats of open, semiarid grassland, with scattered junipers and pinyon pines. No overlap with GRSG habitats. The closest occurrences are about 1 mile from PHMA near South Horn Mountain.	NP	NP	D	NP	NP	1	No effect (see Attachment A)
Shrubby reed-mustard (E) *Schoenocrambe suffrutescens*	Occur along semi-barren, white-shale layers of the Evacuation Creek member of the Green River Formation in the Uinta Basin of eastern Utah in Duchesne and Uintah Counties. Habitat includes disjunct knolls and benches resembling small, extremely dry desert islands, surrounded by mixed desert shrub and pinyon-juniper woodland (3,000 to 5,200 feet in elevation). Occurrences do overlap GHMA in the Johnson Draw area on BLM-administered lands. The species is not suspected of occurring in National Forests.	NP	NP	NP	NP	NP	1	No effect in Forest Service units (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Siler pincushion cactus (T) *Pediocactus sileri*	Distribution is limited to southwestern Utah and northwestern Arizona, where it is ecologically restricted to Moenkopi Formation gypsum and salt-rich soil in a variety of plant communities, from low elevation (approx. 2,788 feet) Mohave Desert scrub up to conifer woodlands and grasslands at 5,413 feet. Occurs over 22 miles from the nearest PHMA/GHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)
Uinta Basin hookless cactus (T) *Sclerocactus wetlandicus*	Endemic to the Uinta Basin, Duchesne and Uintah Counties, in northeast Utah. Found on coarse soils derived from cobble and gravel river and stream terrace deposits or on rocky surfaces on mesa slopes at 4,400 to 6,200 feet in desert shrub communities and pinyon-juniper woodlands. One occurrence overlaps GHMA near Ninemile Canyon, BLM administered lands. It is not suspected of occurring on National Forest lands.	NP	NP	NP	NP	NP	1	No effect for Forest Service units; see detailed analysis below for BLM units

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Ute ladies'-tresses (T) *Spiranthes diluvialis*	Occurs in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming. Found in moist meadows associated with perennial stream terraces, floodplains, and oxbows; seasonally flooded river terraces; sub-irrigated or spring-fed abandoned stream channels and valleys; lakeshores; and human-modified wetlands (720 to 7,000 feet). No overlap but a few occurrences are just over 0.1 mile from PHMA, and others are close to GHMA. Some habitat likely is in PHMA/GHMA.	NP	NP	S	NP	D		See detailed analysis below
Welsh's milkweed (T) *Asclepias welshii*	Occurs in Coral Pink Sand Dunes in sagebrush, juniper, and ponderosa pine communities at (5,577 to 6,233 feet). Known from only four locations in Kane County, Utah, and Navajo Nation lands in Arizona. Known occurrences and habitats are about 6 miles from PHMA.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)
Welsh's milkweed (T) *Asclepias welshii* designated critical habitat	Does not overlap with GRSG habitat; closest critical habitat area is over 5.5 miles from PHMA.	NP	NP	NP	NP	NP	6	No effect (see Attachment A)

Species (Status[5])	Habitat Description and Range	Units in which the species is known or suspected to be present in the decision area, and/or containing suitable or critical habitat in the decision area					Evaluation Criteria	Initial Biological Determination
		Ashley NF	Dixie NF	Fishlake NF	Manti-LaSal NF	Uinta-Wasatch-Cache NF		
Winkler cactus (T) *Pediocactus winkleri*	Endemic to a small area of south-central Utah. The species is restricted to a specific alkaline soil type in salt desert shrub communities, characterized by drought-tolerant shrubs and grasses with ephemeral forbs (4,757 to 6,889 feet). Known occurrences and habitats are about 11 miles from PHMA.	NP	NP	NP	D	NP	1	No effect (see Attachment A)
Wright fishhook cactus (E) *Sclerocactus wrightiae*	Occurs in barren alkaline soils, with widely scattered shrubs, perennial herbs, bunch grasses, or scattered pinyon and juniper (4,790 to 6,1818 feet). Endemic to east-central Utah in western Emery County, southeastern Sevier County, central Wayne County, and a small strip in Garfield County. Although there is no overlap, the nearest occurrence is about 1 mile from PHMA. Due to the barren nature of Wright fishhook cactus habitat, it does not likely overlap with GRSG habitats.	NP	NP	NP	NP	NP	1	No effect (see Attachment A)

SPECIES INFORMATION AND CRITICAL HABITAT

A. Wildlife and Fish

Canada lynx (*Lynx canadensis*)—Threatened

Species/Habitat Description

The Canada lynx (*Lynx canadensis*) occurs across the boreal forests of Canada and Alaska into isolated spruce, fir, and lodgepole pine forests of the northern United States, including Washington, Montana, Wisconsin, Michigan, and Maine. Isolated or dispersing populations are thought to occur in northeastern Oregon, Wyoming, Utah, and Colorado (USFWS 2003). Lynx are generally found in the northern boreal forest in association with habitat for snowshoe hares and other suitable prey species. Early successional stands with high densities of shrubs and seedlings are optimal for hares and provide important habitats for lynx foraging activities. Mature forest stands are used for denning, cover for kittens, and linkage areas, which consist of habitat that provides landscape connectivity between blocks of lynx habitat (Ruggiero et al. 1999).

Life History

The lynx is a medium-sized cat with long legs, large well-furred paws, long tufts on the ears, and a short, black-tipped tail (McCord and Cardoza 1982). Adult males average 22 pounds and are 33.5 inches from head to tail; females average 19 pounds and are 32 inches from head to tail. The lynx's long legs and large feet make it highly adapted for hunting in deep snow.

Lynx use large woody debris, such as downed logs and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982; Koehler 1990; USFWS 1999). For den sites, the age of the forest stand does not seem as important as the amount of downed, woody debris available.

The size of lynx home ranges varies by the animal's gender, abundance of prey, season, and the density of lynx populations (Koehler 1990; Poole 1995). Documented home ranges vary from 3 to 300 square miles (Saunders 1963; Brand et al. 1976; Mech 1980; Koehler and Aubry 1994). Preliminary research supports the hypothesis that lynx home ranges at the southern extent of the its range are generally large compared to those in the northern portion of the range in Canada (Koehler and Aubry 1994).

Lynx are highly specialized predators whose primary prey is the snowshoe hare (*Lepus americanus*), which has evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Snowshoe hares use forests with dense understories that provide forage, cover to escape from predators, and protection during extreme weather (Wolfe et al. 1982; Hodges 1998, 1999). Generally, earlier successional forest stages have greater understory structure than do mature forests and therefore support higher hare densities (Hodges 1998, 1999). However, mature forests can also provide snowshoe hare habitat as openings develop in the canopy of mature forests when trees succumb to disease, fire, wind, ice, or insects and the understory grows. Lynx concentrate their hunting in areas where hare activity is relatively high (Koehler and Aubry 1994; Ward and Krebs 1985). Lynx also prey opportunistically on other small mammals and birds, particularly when hare populations decline (Nellis et al. 1972; Brand et al. 1976; McCord and Cardoza 1982).

Status and Distribution

The USFWS lists Canada lynx as threatened. In the contiguous United States, overall numbers and range are substantially reduced from historical levels. At present, numbers have not recovered from

overexploitation by both regulated and unregulated harvest in the 1970s and 1980s. Forest management practices that result in the loss of diverse age structure, fragmentation, road construction, urbanization, agriculture, recreational developments, and unnatural fire frequencies have altered suitable habitat in many areas. As a result, many states may have insufficient habitat quality or quantity to sustain lynx or their prey. Human access into habitat has increased dramatically over the last few decades contributing to direct and indirect mortality and displacement from suitable habitat. Although legal take is highly restricted, existing regulatory mechanisms may be inadequate to protect small remnant populations or to conserve habitat. Competition with bobcats and coyotes may be a concern in some areas.

In 1994, the USFWS (*Federal Register*, August 26, 1994) found that federal listing of the North American population of Canada Lynx may be warranted, and it initiated a formal status review. In 1997, the USFWS (*Federal Register*, May 27, 1997) determined that listing of the contiguous US population is warranted but is precluded by other higher priority actions. In 1998, the USFWS (*Federal Register*, July 8, 1998) proposed listing the lower 48-state population segment as threatened. In 1999, the USFWS (*Federal Register*, July 8, 1999) extended for not more than six months a decision to list the contiguous US population segment as a threatened species; this extension was made to allow time to resolve a dispute over the status of the lower 48-state lynx population. In 2000, the USFWS determined threatened status for the contiguous US distinct population segment of *L. canadensis*.

In 2006, the USFWS designated critical habitat for the contiguous US distinct population segment. In total, approximately 1,841 square miles fall within the boundaries of the critical habitat designation, in three units in Minnesota, Montana, and Washington (*Federal Register*, November 9, 2006). No designated critical habitat exists in the state of Utah.

In the summer of 2004, two radio-collared male lynx from the experimental-nonessential Colorado transplant population were detected in Utah. One lynx crossed through the Wasatch-Cache National Forest while traveling northward along the Wasatch Front. It continued to head north out of the Forest into Idaho or Wyoming. The other lynx, after crossing the Uinta Mountains, headed south toward Panguitch (Richard Williams, personal communication, September 28, 2004,). In addition, there is one report of a lynx trapped in Cache County in 1991 (Ruggiero et al. 1999). In December 2006 two lynx were trapped and tranquilized after being treed by dogs (Brian Maxfield, personal communication, 2007). The first, a female, was caught on the north end of the Book Cliffs near Argyle Canyon; the other, a male, was caught in the Mineral Mountains between Beaver and Milford, Utah. It is believed that both lynx migrated from the San Juan Mountains in Colorado where Colorado state wildlife officials started an experimental population in 1999, and both lynx were relocated back into the release area in Colorado in December 2006.

The Utah population is isolated and is considered to be comprised of dispersing rather than breeding individuals. Although there may be some individual lynx moving through the Vernal Field Office (VFO) area, no known resident populations of lynx have been documented in the VPA.

Ashley and Uinta-Wasach-Cache National Forests

There are 10 specimens of lynx that have been reliably traced to the Uinta Mountains, with collection dates ranging from 1916 to 1972. According to a completed biological assessment, lynx occur rarely if at all in the Uintas. Ashley National Forest staff began hair snare surveys in the fall of 1999 as part of the National Lynx Detection Protocol. In 1999, several hair samples were collected and results from the Rocky Mountain Research lab indicated no positive Canada lynx hair samples. Hair samples from the 2000 and 2001 field seasons also found no positive Canada lynx hair samples (USDA Forest Service 2006).

Between February of 1999 and March of 2007, 22 lynx (7 females and 15 males) from the experimental releasing in Colorado have been located at least once in Utah. Use-density of these locations indicates the primary area of use is in the Uinta Mountains, with most use in the Wasatch-Cache National Forest and a somewhat lesser degree of use on the Ashley National Forest. Although the potential for future residency of lynx in the Uinta Mountains is possible, these individual lynx were transient. Before the recent lynx occurrences, the last confirmed lynx in the Uinta Mountains was in 1972.

Photographic bait stations were placed on the Vernal District in 2005, in the Yellowstone drainage of the Roosevelt/Duchesne District in 2006 and in the Pole Creek (Roosevelt/Duchesne District) and Whiterocks (Vernal District) drainages in 2009. The photographic bait stations were to sample the Uintas for the presence of lynx and wolverine. To date, there have been no detections of lynx at these bait stations. Additionally, in the winter of 2010 161 miles of forest roads were surveyed for lynx and wolverine tracks in the National Forest (including the Rock Creek drainage), but no lynx tracks were detected (USDA Forest Service 2010).

In 2007, the FEIS for the Northern Rockies Lynx Management Direction (NRLMD) was released (USDA Forest Service 2007). The Ashley National Forest was included in the analysis and subsequently incorporated NRLMD direction as a Forest Plan amendment. The Ashley National Forest is considered unoccupied by lynx under the NRLMD.

While Canada lynx are not known to occur on BLM- or Forest Service-administered lands in the planning area, suitable habitat and lynx analysis units (LAUs) have been mapped in the Ashley and Uinta-Wasatch-Cache National Forests. Approximately 39,839 acres of lynx suitable habitat overlaps with PHMA/GHMA on the forests listed above. Lynx habitat overlap consists of both primary and secondary classifications.

Threats

In determining the threatened status for the contiguous US distinct population segment, the USFWS (2000) cited the inadequacy of existing regulatory mechanisms. “Current USFS and BLM LUPs include programs, practices, and activities within the authority and jurisdiction of federal land management agencies that may threaten lynx or lynx habitat. The lack of protection for lynx in these plans render[s] them inadequate to protect the species” (USFWS 2000). Past extensive logging that eliminated habitat for lynx and snowshoe hare was detrimental. Habitat has been lost due to suppression of forest fires and ecological succession to habitats that no longer support snowshoe hare and lynx. Fragmentation, due to forestry, agriculture, and roads, and the subsequent isolation of suitable habitat is a concern. Lack of immigration from Canadian lynx populations is an important factor in some regions. Past excessive trapping of lynx (as recently as the 1970s and 1980s) depressed populations and may have been detrimental to local lynx populations in Washington and elsewhere. Road construction causes habitat fragmentation and allows increased human access into lynx habitat; this may increase lynx mortality by facilitating access to hunters and trappers (although there is no legal harvest except for two lynx per year in Montana); incidental harvest of lynx in the course of legal trapping/hunting for other species may be a problem in some areas. Increased winter recreation (snowmobiles and ski area development) may be displacing or killing lynx. Habitat changes and increased access into lynx habitats has increased competition, and bobcat and coyote have displaced lynx in some areas.

Utah prairie dog (*Cynomys parvidens*)—Threatened

Species/Habitat Description

Utah prairie dogs (UPDs) occupy grasslands and open shrubland habitat with low shrubs on sites with well-drained soils, at elevations ranging from 6,200 to 9,180 feet above sea level (USFWS 2012a). Five

factors have been identified as influencing the suitability of prairie dog habitat: soils, vegetation height and density, vegetation moisture availability, and vegetation quantity and quality. Deep well-drained soils provide protection from predators and extreme temperatures and reduce the risk of drowning (Toombs 2007; 72 *Federal Register* 7843-7852). Suitable sites are flat or gentle slopes with soil that can support burrowing (Toombs 2007). Open grassy sites are preferred for foraging, as prairie dogs can communicate and detect predators better when vegetation is low or sparse enough to see through. Water is obtained from eating moisture-rich vegetation; sufficient succulent forage must be available to survive drought conditions (Toombs 2007; 72 *Federal Register* 7843-7852).

Life History

UPDs live in groups or families. They are social and maintain family unity through physical contact. The species forms colonies and spends much of its time in underground burrows, often hibernating in the winter. The life span of the UPD ranges from 5 to 8 years.

The species breeds in the spring, and young can be seen aboveground in early June. The UPD is sexually mature after its first winter and breeds in March. Gestation lasts 34 to 35 days, with litter sizes ranging from 1 to 6 pups. The pups remain underground for their first 6 weeks of life.

Predators are badgers, weasels, ferrets, coyotes, bobcats, foxes, hawks, humans, eagles, and some snakes. In an established prairie dog colony, predators do not make a significant impact; conversely they have a huge impact on translocation sites where an established social system or burrow system is not present.

Prairie dogs forage primarily on grasses and forbs and tend to select those with higher moisture content. They often select colony sites in swales where the vegetation can remain moist even in drought conditions (Collier 1975). Vegetation must be short to allow the prairie dogs to see approaching predators as well as other prairie dogs in the colony (Collier 1975; Crocker-Bedford and Spillet 1981). Soils need to be well drained for burrow sites. Burrows must be deep enough to protect the prairie dogs from predators and environmental and temperature extremes.

Status and Distribution

By the 1960s, distribution of the UPD was greatly reduced due to disease (sylvatic plague), poisoning, drought, shooting, and human-related habitat alteration from cultivation and poor grazing practices. The UPD was first federally listed as an endangered species (38 *Federal Register* 14678, June 4, 1973); it was later down-listed to its current federal listing status as a threatened species (49 *Federal Register* 22330, May 29 1984), due to the improved status and increased population numbers seen on private lands since 1976.

It was once widely distributed throughout southern Utah. The UPD, which now occurs in the southwestern part of the state (Beaver, Garfield, Iron, Kane, Millard, Piute, Sanpete, Sevier, and Wayne Counties), is one of three prairie dog species found in Utah. The species is not found anywhere else in the world, making it the only non-fish vertebrate endemic to Utah. The population declined from an estimated 95,000 animals in 1920, to less than 3,500 in 1976. No critical habitat has been designated for the UPD.

The Utah Prairie Dog Recovery Plan identified three areas in Utah for its recovery: West Desert (primarily in eastern Iron County, with a few isolated colonies in western Iron and southern Beaver Counties), Pansaugaunt Area (along the East Fork and main stem of the Sevier River, in western Garfield County), and Awapa Plateau (portions of north-central Garfield, western Wayne, eastern Piute, and southeastern Sevier Counties). The goal of the recovery plan was to establish three populations on public lands, one in each of the three identified recovery areas, with a minimum population of 813 animals in each population sustained for five consecutive years.

In 1997, the Utah Prairie Dog Recovery Implementation Team completed the Utah Prairie Dog Interim Conservation Strategy. The team determined that the Utah Prairie Dog Recovery Plan did not consider the latest scientific information for the species and that new recovery strategies needed to be considered. The team also recognized that existing conservation and recovery criteria for the UPD were not working and that the information necessary to define new and better criteria was not available. The resulting Interim Conservation Strategy identified an interim management strategy that focuses on habitat improvement, research, and public involvement. An instruction memorandum from the BLM State Director formalized implementation of the Utah Prairie Dog Interim Conservation Strategy on BLM-administered lands in Utah, and directed that all actions related to UPD management be guided by this strategy (IM No. UT 2002-040, March 13, 2002).

In 1972, the Utah Division of Wildlife Resources (UDWR) initiated a transplant program to move animals from private agricultural lands to areas of historical occupancy on public lands. For 31 years, from 1972 to 2002, over 19,561 UPD were translocated to public land sites (Bonzo 2003). Although initial survival has been limited, the number of UPD colonies on public lands has increased. Increases in the known number of active colonies on public land can be attributed to a combination of factors, including the translocation program, natural increases, flea dusting, distribution from existing sites, and discovery of previously unrecorded colonies. However, approximately 74 percent of UPD still occur on private and other non-federal lands.

UPD suitable habitat and distribution is public lands managed by the BLM and Forest Service in Utah in the planning area.

Threats

UPD populations are susceptible to sylvatic plague (*Yersinia pestis*), a bacterium introduced to North American in the late 1800s (Cully 1993). There is a limited understanding of the variables that determine when sylvatic plague will impact prairie dog populations. Fleas are the vectors that spread the disease and can be brought into the vicinity of a prairie dog colony by a suite of mammals. Plague outbreaks generally occur when populations increase to high densities causing increased stress among individuals and easier transmission of disease between individuals.

Threats to the species are intentional poisoning, urban development, shooting, diseases such as plague, habitat loss and degraded habitat quality, and environmental conditions, such as vegetation changes and drought. Factors leading to degraded habitat quality arise from landownership and management practices, including overgrazing and fire suppression, recreation, off-highway vehicles (OHVs), energy exploration, and development. Overgrazing has led to vegetation changes from grass to shrub, erosion of the swales that were historically occupied by UPD, and lowered water tables, which in turn reduces the amount of moisture available for palatable grasses and forbs that supply summer food for UPD. Habitat loss and poor habitat quality are immediate concerns for the remaining UPD. Most of the species' distribution is on private lands, which are now or will be largely developed for agricultural production or housing.

Mexican Spotted Owl (*Strix occidentalis lucida*)—Threatened

Species/Habitat description

The Mexican spotted owl is one of three subspecies of spotted owl recognized by the American Ornithologists' Union (AOU 1957:285). The other two subspecies are the northern spotted owl (*S. o. caurina*) and the California spotted owl (*S. o. occidentalis*). The Mexican subspecies is geographically isolated from both the California and northern subspecies.

Steep-walled rocky canyonlands provide typical owl habitat in the BLM Price and Richfield Field Offices and the Manti-La Sal National Forest within the planning area. Owls use Canyon habitat for nesting, roosting and foraging and includes landscapes dominated by vertical walled, rocky cliffs in complex watersheds, including many tributary side canyons. Rock walls must include caves, ledges, and fracture zones that provide protection for nesting and roosting sites. Although it is difficult to rely on vegetation alone to identify canyon habitat, these areas frequently contain small clumps or stringers of mixed-conifer, ponderosa pine, pine-oak, pinyon-juniper, and riparian vegetation (69 *Federal Register*53181). Willey and Van Riper (2007) documented owl use in Utah to include steep canyon areas below rims.

Life History

Mexican spotted owls breed sporadically and do not nest every year (Ganey 1988). In good years, most of the population will nest, whereas in other years only a small proportion of pairs will nest successfully. Breeding sites are below canyon rims; however, it is known that owls use areas outside of the canyons (i.e., rims and mesa tops). In the planning area, owls nest and roost primarily on cliff faces, using protected caves and ledges, and forage in canyon bottoms, on cliff faces and benches and along canyon rims and adjacent lands.

Courtship begins in March and eggs are laid in late March or early April. Incubation begins shortly after the first egg is laid, and is performed entirely by the female. During incubation, the female leaves the nest only to defecate, regurgitate pellets, or receive prey delivered by the male, who does most or all of the foraging. The eggs usually hatch in early May (Ganey 1988). Females brood their young almost constantly, leaving their nests for only brief periods during the night. Nestling owls, in most cases, fledge from early to mid-June in most cases (Ganey 1988). Owlets often leave the nest before they can fly, simply jumping from the nest onto surrounding tree branches or the ground. Within a week after leaving the nest, most owlets can make short clumsy flights. Three weeks after leaving the nest owlets can hold and tear up prey on their own, and by late July most have become proficient at pouncing on crawling insects. The young depend on their parents for food during the summer and will eventually disperse out of the natal area in the fall.

Mexican spotted owls appear to use a wider variety of cover types for foraging than for roosting or nesting. Owls forage in a variety of habitats: managed and unmanaged forests, pinyon-juniper woodlands, mixed-conifer and ponderosa pine forests, cliff faces and terraces between cliffs, and riparian zones (Ganey and Balda 1994; Willey 1998a, 1998b; Ganey et al. 2003; Willey and Van Riper 2007).

Status and Distribution

The Mexican spotted owl was listed as a threatened species on March 16, 1993 (58 *Federal Register* 14248). Mexican spotted owl is found in forested mountain and canyons habitat from southern Utah and Colorado to the mountains of Arizona, New Mexico, west Texas and into the mountains of northern and central Mexico.

On August 31, 2004, the USFWS designated approximately 8.6 million acres of critical habitat in Arizona, Colorado, New Mexico, and Utah on federal lands (69 *Federal Register* 53181). Approximately, 1,928,878 acres of designated critical habitat exists in the planning area under all landownerships. Critical habitat only slightly overlaps with PHMA/GHMA (0.5 percent of the MSO critical habitat; approximately 10,481 acres) on Forest Service and BLM-administered lands. MSO critical habitat occurs within the Price Field Office and Manti-La Sal National Forest, and an additional 998 acres overlap with PHMA/GHMA on split-estate lands in the Price Field Office boundary.

The primary constituent elements of the critical habitat designation are those physical and biological features that support nesting, roosting, and foraging. Primary constituent elements related to critical habitat in Utah are one or more of the following:

- Presence of water (often providing cooler temperatures and higher humidity than the surrounding areas)
- Clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, or riparian vegetation
- Canyon walls containing crevices, ledges, or caves
- High percent of ground litter and woody debris

The primary constituent elements provide a qualitative description of those physical and biological features necessary to ensure the conservation of the owl in Utah (69 *Federal Register* 53181). The mixed-conifer, pine-oak communities and canyon habitat appear to be the most frequently used throughout most portions of the subspecies' range, but owls primarily use canyon habitats in Utah (USFWS 2012b).

The Mexican Spotted Owl Recovery Plan was finalized in 1995 and was revised in 2012. Six recovery units in the United States were identified based on similarities, or obvious dividing lines, between the following: physiographic provinces, biotic regimes, perceived threats to habitat or individual birds, administrative boundaries, and owl distribution. Suitable habitat and designated critical habitat on public lands managed by the BLM and Forest Service in Utah occur in the planning area (USFWS 2012b).

Threats

Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: historical alteration of its habitat from timber-management and the threat of these practices continuing as evidenced in existing national forest plans. The danger of stand-replacing wildland fire was also cited as a threat at that time. The primary threats to its population in the United States have since transitioned from timber harvest to an increased risk of stand-replacing wildland fire. Recent forest management now emphasizes sustainable ecological function and a return to pre-settlement fire regimes, both of which are more compatible with maintaining spotted owl habitat conditions than the even-aged management regime practiced at the time of listing. Conversely, southwestern forests have experienced larger and more severe wildland fires from 1995 to the present. Climate variability combined with current forest conditions may also synergistically increase habitat loss from fire. The intensification of natural drought cycles and the ensuing stress placed on forested habitats could result in even larger and more severe wildland fires in owl habitat (USFWS 2012b).

In Utah, the threats to the species and its habitat are recreation, grazing, oil and gas exploration and development, road improvement and development in canyons, and increased predation associated with habitat fragmentation (USFWS 1995).

California condor (*Gymnogyps californianus*)—Endangered and Experimental/Nonessential Listings

Species/Habitat Description

California condors are primarily a cavity-nesting species and typically nest in cavities on steep rock formations or in the burned-out hollows of old-growth conifers. Less typical nest sites are cliff ledges, cupped broken tops of old-growth conifers, and, in several instances, nests of other species (USFWS 2013a). They are obligate scavengers that feed only on carrion. Typical foraging includes long-distance reconnaissance flights, lengthy circling over a carcass, and hours of waiting at a perch or on the ground near a carcass, possibly watching for predators. Condors maintain wide-ranging foraging patterns throughout the year, an important adaptation for a species with unpredictable food supplies. Condors at

interior locations in California feed on mule deer, Tule elk, pronghorn antelope, feral hogs, domestic ungulates, and smaller mammals.

Currently, California condors predominately forage in open terrain of foothill grassland and oak savanna habitats, and at coastal sites in central California, but they have also been observed feeding in more wooded areas, though this is less common. Condors repeatedly use roosting sites on ridgelines, rocky outcrops, and steep canyons and in tall trees or snags near foraging grounds. While at a roost, condors devote considerable time to preening, sunning, and other maintenance activities. Similar to other vulture species, condor roosts also may serve in social interaction and as assembly points for group activities; it is common for two or more California condors to roost together and leave the roost at the same time. Brooding pairs generally use cliffs and tall trees, including dead snags, as roosting sites in nesting areas (USFWS 2013a).

Life History

Condors reach sexual maturity by 5 to 6 years of age and breed between 6 and 8 years of age. Courtship and nest site selection occurs from December through spring (USFWS 1996). Nest sites are caves, cliffs, or a crevice among boulders on a steep slope. Breeding California condors normally lay a single egg between late January and early April, every other year (USFWS 1996). The condor provides an extensive amount of parental care and the average incubation period for a condor egg is about 56 days (USFWS 1996). Both parents share responsibilities for feeding the nestling, which fledges at six months; however, juvenile condors may depend on their parents for more than a year. The California condor life span is unknown but may extend up to 60 years (San Diego Zoo 2005).

Status and Distribution

The California condor was listed as endangered on March 11, 1967. The main reason for their decline is an unsustainable mortality rate of free-flying birds combined with a naturally low reproductive rate.

Despite intensive conservation efforts, the wild California condor population declined steadily until 1987, when the last free-flying individual was captured. During the 1980s, captive condor flocks were established at the San Diego Wild Animal Park and the Los Angeles Zoo, and the first successful captive breeding was accomplished at the former facility in 1988. Following several years of increasingly successful captive breeding, captive-produced condors were first released back to the wild in California in early 1992.

On October 6, 1996, the USFWS announced its intention to reintroduce California condors into northern Arizona and southern Utah and to designate the released birds as a nonessential, experimental population under Section 10(j) of the Endangered Species Act. On October 29, 1996, six California condors were released at the Vermilion Cliffs in Coconino County of northern Arizona. Since then, additional birds have been released. The designated experimental population area (ExPA) includes remote BLM-, Forest Service-, and National Park Service-administered lands, Native American reservation lands, and some private lands in northern Arizona, southern Utah, and southeastern Nevada. The primary release site and current nesting sites are in Grand Canyon National Park and Vermillion Cliffs, Arizona.

The California condor may occur throughout southern Utah in a variety of habitats in the planning area. Although most of the time the condors will occur in the designated ExPA, they have also been observed north of the ExPA boundary. In the Utah portion of the ExPA, nesting has recently been documented in Zion National Park. Condors have been documented in Utah as far north as Flaming Gorge Reservoir; regular sightings occur in southern Utah, particularly in the vicinity of Zion National Park/Kolob Canyons.

Because the planning area includes habitat that contains both the experimental population (areas south of I-70) and habitat that could be occupied by California condors in non-experimental areas (north of I-70), two determinations are made in the analysis portion of this report. One analysis includes the endangered California condor that may migrate north of I-70 and one analysis is made to determine effects on the experimental population south of I-70.

Threats

Since reintroduction in 1992, causes of California condor mortality have been closely documented. While not all have been identified, the great majority of deaths in the reintroduced population have been anthropogenic. Records from 1992 to 2012 show the cause of condor mortality in nearby Arizona was predominately lead exposure (USFWS 2013a). Other less prevalent mortality factors have included (in order of frequency) predation, starvation, shooting, and power line collision. Some of these factors may have contributed to the species' decline before extirpation, but it is difficult to determine to what extent the current limitations on the population were a factor in the decline. These recent causes of mortality provide a better understanding of current limitations on the reintroduced populations and species recovery. However some factors, such as predation and starvation, are likely the result of the challenges of reintroducing captive-bred individuals into the wild (which has been a necessary step toward reestablishing wild populations), rather than factors that will have a large effect on a self-sustaining population (USFWS 2013a).

B. Plants

Autumn Buttercup (*Ranunculus aestivalis, R. acriformis* var. *aestivalis*)—Endangered

Habitat Description

These plants inhabit the transition zone between wet, sedge-dominated, spring-fed meadows and dry, upland meadows. Within this transition zone, the plants occupy raised hummocks of soil that are presumed to be formed from livestock trampling (USFWS 2013). Juvenile plants are strongly associated with hummocks, which are drier than the surrounding soil in the area. It is not known if hummocks occurred before livestock grazing nor what the habitat conditions were before livestock grazing. Habitat consists of small peaty hummocks on a low knoll surrounded by freshwater marsh. The knoll may be the result of a raised peat bog uplifted by the upwelling waters of a spring that surrounds it. The overflow channel of a nearby spring-fed stock water pond also runs past the knoll (USFWS 1989). The most common species in the vicinity of autumn buttercup were blue-eyed grass (*Sisyrinchium demissum*), wiregrass (*Juncus arcticus*), scratchgrass (*Muhlenbergia asperifolia*), and other autumn buttercup plants.

Status and Distribution

There is uncertainty about the taxonomy of autumn buttercup, with some authorities considering it to be a separate species and some considering it a subspecies or variety of *Ranunculus acriformis*. Autumn buttercup was listed as endangered in 1988 after experiencing a 90 percent decline in population numbers in the five years before. In 1988 The Nature Conservancy (TNC) bought the property supporting the occurrence known at the time and removed grazing. Periodic monitoring has shown that numbers of plants on the TNC Preserve property increased to around 1,000 in 1992 and have since declined with no plants remaining on the property in 2010 (USFWS 2013). Two reintroductions were performed at the Preserve in 2007 and 2010 to avoid the possibility of extinction in the wild and to work toward meeting recovery plan criteria. The two reintroduction efforts were unsuccessful, with 100 percent mortality of reintroduced plants as of the fall of 2010, apparently due to small mammal herbivory. A second population occurs on the private Dale Ranch and contains several hundred plants. There is little data to assess the stability of the Dale Ranch population; ranch owners have not shown interest in formal

conservation efforts, but population numbers on the ranch appear to be fairly stable. No critical habitat has been designated.

The USFWS initiated a five-year review of autumn buttercup in 2011. At that time the plant was considered to have a high degree of threat and a low potential for survival.

The species is endemic to saline wet meadows in the upper Sevier River Valley at elevations between 6,374 and 7,000 feet in western Garfield County, Utah. To date, no plants have been found through cursory review of the areas near the two existing or recently existing known locations on any BLM administered lands in the Kanab Field Office.

Life History

Autumn buttercup appears to be a short-lived herbaceous perennial that reproduces only by seed (USFWS 2013b). Seeds require an exposure to cold temperatures before they germinate. At maturity, plants are between 1 and 2 feet tall. Most of the simple but deeply palmately divided leaves are clustered at the base. The stems and leaves are covered with fine hairs. The plant flowers from July to early October. There are typically six to ten flowers per plant and each flower is approximately 1/2 inch in diameter. The flowers have five yellow petals and produce twenty to forty small, dry, one seeded fruits clustered at the center of the flower.

Threats

Any disturbance is likely to increase the chances of extinction of the species. The species may depend on specific hydrologic conditions, but its hydrologic requirements have not been studied. Autumn buttercup is highly palatable to livestock and small mammals. Livestock grazing is generally considered a threat to the plant, but the population on private land continues to support several hundred plants, despite grazing, while the population fenced from grazing appears to be extirpated. Small mammals appear to be an important threat and were apparently responsible for the failure of reintroductions (USFWS 2013b). Other threats to the known occurrences have not been identified, but if the species or habitat is found on BLM-administered lands, other threats could be present. Potential threats are oil and gas development and off-road vehicle (ORV) use.

Clay Phacelia (*Phacelia argillacea*)—Endangered

Habitat Description

Clay phacelia has blue to violet flowers and stands 4 to 14 inches tall. It is found on steep hillsides of shaley clay colluvium on an extremely limited band of soil derived from an upper member of the Green River geologic formation called Green River shale. Occupied sites are xeric, with steep slopes and southeast- to west-facing aspects. Vegetation that grows with clay phacelia includes the yellow-flowered buckwheat (*Eriogonum brevicaule*), serviceberry (*Amelanchier alnifolia* Nutt.), Gambel oak (*Quercus gambelii* Nutt.), Indian ricegrass (*Stipa hymenoides*), and houndstongue (*Cynoglossum officinale*). Additional associated species are sparse stands of pinyon-juniper or mountain brush. Clay phacelia does not do well competing with other vegetation, and the habitat of actively eroding shale slopes likely discourages the growth of competitors.

Status and Distribution

Clay phacelia was listed as endangered in 1978. At the time, it was known from a single population containing nine individuals (USFWS 1978). In 1980 a second population was discovered, bringing the total number of individuals to approximately 200 (USFWS 1982). The range of clay phacelia extends along a 7.5-mile stretch of Highway 6 in Spanish Fork Canyon in Utah County, Utah. Today, three

population centers are known: Water Hollow-Garner Canyon, Tie Fork (an introduced population), and Tucker-Clear Creek. The species occurs on lands managed by the Forest Service (Uinta National Forest), BLM (SLFO), and The Nature Conservancy, as well as private lands. Accurate population estimates or trends are not available (USFWS 2013c).

Potentially suitable habitat has been modeled and represents the best estimate of the extent of suitable habitat. This potentially suitable, modeled habitat is not present in PHMA or GHMA, but it does occur within about 1.5 miles of PHMA near Starvation Creek. The nearest known occurrences are about 2 miles from PHMA.

Life History

Clay phacelia germinates in late summer and early autumn, and basal rosettes form in October. The first of the season's flowers begin opening by late May, full bloom is reached in late June or early July, and the last of the season's flowers are seen in October. Clay phacelia was formerly considered a winter annual but new data supports the idea that it is instead a true biennial. The life history of a biennial includes seedling emergence in the spring, growth of a rosette in the summer, vernalization during the following winter, and flowering, seed set, and death the second summer. Germination seems to be triggered by late summer or early autumn storms and two rains per summer seem to be critical for survival. The species harbors an extended seed bank, and one successful recruitment event every 10 to 15 years, coupled with high seed output, may be enough for the species survival through time. Seeds produced in one year germinate over the course of several years, thus ensuring a robust seedbank that can withstand stochastic events.

The following native bee species may be clay phacelia pollinators: *Dialictus perdifficilis*, *D. sedi*, *Evylaeus pulveris*, *Andrena walleye*, *A. pronorum*, and *Halictus rubicundus* (USFWS 2015). These species are small to medium-sized, mostly solitary bees and have been seen in the vicinity of clay phacelia.

Threats

The greatest current threats to this species are transportation and transmission line development and maintenance and herbivory. Invasive plants are considered a moderate threat (USFWS 2013c). US Highway 6 is a major transportation route that bisects the largest population and has affected the westernmost population. Threats may also come from increased railway traffic and dust and disturbance associated with transportation and transmission line development and maintenance. Herbivory has affected the species survival and abundance over many years. Herbivory, especially by deer, elk, and rabbits on clay phacelia occurs heavily in the winter and spring, preventing wintering rosettes from becoming flowering adults in summer. Livestock grazing and other herbivory has been reduced on some private land sites by fencing; it may still occur on other public and private lands, but the overall threat level is considered low (USFWS 2013c). Invasive, exotic species are a moderate threat and may become a larger threat in the future (USFWS 2013c). The species is particularly vulnerable because there are few small populations and the species is extremely restricted by climatic and edaphic factors (NatureServe 2014).

Clay Reed-Mustard (*Schoenocrambe argillacea*)—Threatened

Habitat Description

Clay reed-mustard occurs in desert shrub plant communities in association with shadscale, Indian ricegrass, pygmy sagebrush, western wheatgrass, Salina wildrye, and *Ephedra* species. It grows on gypsum-rich clay soils overlain with sandstone talus, resulting from a mixture from the zone of contact between the Uinta and Green River formations (USFWS 1992). Its elevation range is between 4,800 and 5,640 feet. Mapping suitable habitat for this species is problematic because it grows on steep inaccessible slopes, and the habitat is not well defined (USFWS 2011b).

Status and Distribution

Clay reed-mustard was listed as a threatened species in 1992. There are six known populations of clay reed-mustard, all in Uintah County, Utah (USFWS 2011b). The entire species range stretches approximately 13 miles from Green River to Willow Creek. There are approximately 6,000 plants total (USFWS 1994), and this remains the best estimate of the range-wide population size (USFWS 2011b). It occurs in the Vernal Field Office but no other BLM areas or National Forests. Known occurrences do not overlap PHMA, but they do overlap GHMA in the Willow Creek area, where 10 of 77 documented sites are.

Life History

Clay reed-mustard flowers from April to May, with fruit ripening in May to June. The plant reproduces by seed, and the pollinators are as yet unknown (USFWS 2011b). However, ground nesting, solitary bees pollinate the closely related *S. suffrutescens* (shrubby reed-mustard) that grows in nearby habitats (USFWS 1994), and it is likely that clay reed-mustard pollinators are similar.

Threats

Threats to clay reed-mustard are oil and gas exploration, oil-shale mining, stone quarrying, and ORV use. All known populations are found on federal lands leased for oil and gas energy reserves. Additionally, this species' range is underlain by oil shale, which may be mined when economic conditions for oil extraction become favorable (USFWS 1994). Oil and gas development remains the most significant threat to clay reed-mustard (USFWS 2011b).

Historical sheep and cattle grazing use may have impacted clay reed-mustard on BLM lands, but current grazing levels are not believed to pose a serious threat (USFWS 2011b). Although invasive species such as cheatgrass are present in clay reed-mustard habitat, they have not been identified in high numbers or densities, and they are not currently considered a threat to clay reed-mustard (USFWS 2011b).

Last Chance Townsendia (*Townsendia aprica*)—Threatened

Habitat Description

Last Chance townsendia is a low-growing perennial, herbaceous plant in the composite family (Asteraceae). The species is stemless, with its narrow leaves and orange-yellow (apricot-colored) flowers borne at ground level. Populations of Last Chance townsendia occur on a variety of geologic substrates, and most populations are found on soils in the Moenkopi Formation, Morrison Formation, Mancos Shale Group, and the San Rafael Group. The species is associated with pinyon-juniper grassland communities. However, the species appears to be restricted to fine-textured shale soils in each formation (USFWS 2013d).

Status and Distribution

Last Chance townsendia was listed as threatened in August 1985. Critical habitat has not been proposed. The range of the species extends across Capitol Reef, Fishlake National Forest (documented), Dixie National Forest (documented), and BLM-administered land managed by the Price and Richfield Field Offices (documented) (southeast portion of Sevier County, southwestern portion of Emery County, and northern central portion of Wayne County). BLM-administered land contains the most occupied habitat, with approximately 4,830 acres, followed by the Forest Service, with 2,620 acres, and Capitol Reef ,with 2,390 acres (USFWS 2013d). The latest range-wide estimate for the total population of Last Chance townsendia is 6,848 individuals.

In the Lower Last Chance Creek area, Fishlake National Forest, two of the 68 documented sites are in PHMA. No known occurrences overlap PHMA or GHMA on BLM-managed lands in the Lower Last Chance Creek area. In the Price Field Office, Last Chance townsendia habitat does not overlap GRSG habitat. But in the Richfield Field Office, there is some overlap of habitats between Last Chance townsendia and PHMA/GHMA.

Life History

Last Chance townsendia reproduces by seed. The plants flower from late April to early June, and seeds mature from May to June. The species only rarely self-pollinates, so cross-pollination is accomplished by several species of solitary bees: eight species of metallic blue and green inegachilid bees in the genus *Osinia*, and the anthophorid bee *Tetralonia fulvitarsis*. A few species of flies also visit the flowers. Seed set seems frequently to be pollinator-limited. Lack of pollination may result from various causes, including low pollinator numbers, inclement weather affecting pollinator flight activity, and possibly other unidentified factors.

Threats

Overall abundance of Last Chance townsendia has declined over the last thirteen years; drought is believed to be the primary cause of the decline (USFWS 2013d).

The USFWS (2013c) concluded that livestock grazing poses a threat to Last chance townsendia at the present time because of the range-wide scope of the threat and the apparent vulnerability of the species to low frequency trampling events. They also concluded that energy and mineral development (coal, oil and gas, and uranium) as well as wild horses and burros pose a moderate threat to the species and that OHV use and range improvements are low threats to the species.

Coal development and related activities may result in increased surface disturbance, increased foot and vehicle traffic, vegetation disturbance, removal of top soil and overburden, and localized ground subsidence. Coal development is considered a low threat, based on the present localized scope of underground coal mining, conservation measures protecting the species from direct impacts, and the potential future threat of strip mining within the range of Last Chance townsendia. This threat may increase to moderate if coal development expands in the range of the species (USFWS 2013d).

Oil and gas development is a moderate threat based on the imminent and future immediacy of development, the moderate scope, and moderate to high exposure of the activities within Last Chance townsendia's range. While conservation measures are in place to avoid directly impacting individual plants, oil and gas development is still considered a threat because of indirect impacts, such as habitat degradation and loss, and the loss of unoccupied suitable habitat that could limit potential expansion and recovery of the species.

The overall threat of uranium mining to the species is moderate at this time. The threat is not imminent, but alteration and destruction of the habitat from historic mining use needs to be assessed.

Cattle trampling and compaction of the soil and trampling of individual plants is a threat because Last Chance townsendia, like many small herbaceous plants, can be severely damaged in heavily travelled areas, such as around watering areas, fences, and along trails. The grazing of palatable forbs that flower at the same time as Last Chance townsendia, such as *Phlox austromontana*, may indirectly affect Last Chance townsendia pollinator abundance and the species' seed production. Livestock grazing is considered a moderate overall threat, based on the range-wide scope, the immediacy of the threat, and the small exposure of the threat. Range improvements are considered a low threat to the species (USFWS 2013d).

Wild horses and burros are considered a moderate threat to the species. While the exposure is small, the intensity of the threat is equivalent to that of livestock grazing and trampling (USFWS 2013d).

The overall threat of OHV use to the species is low. The current threat of direct impacts on the species is not imminent, now that vehicles are restricted to designated routes throughout a moderate portion of the species range.

Shrubby Reed-Mustard (*Schoenocrambe suffrutescens*)—Endangered

Habitat Description

Shrubby reed-mustard grows in an extremely limited band of soil derived from an upper member of the Green River geologic formation (USFWS 1994). This habitat is a disjunct white shale layer resembling small, dry desert islands, on level to moderate slopes (USFWS 1994).

Status and Distribution

Shrubby reed-mustard was listed as an endangered species in 1987, under the name of toad-flax cress (*Glaucocarpum suffrutescens*). In 1985, the genus was formally changed from *Glaucocarpum* to *Schoenocrambe* (Welsh and Chatterley 1985), and the species' common name was also changed from toad-flax cress to shrubby reed-mustard.

Shrubby reed-mustard occurs in three areas and seven populations in Uintah and Duchesne Counties: Gray Knolls, with two populations, Pack Mountain, with four populations, and Badlands Cliff, with one population. The total number of plants is estimated at about 3,000 individuals (USFWS 2010a). No overlap occurs with PHMA, but 7 of 63 documented sites are in GHMA. Except for one, the remaining 56 sites are all within 1 mile of GHMA on BLM-administered lands. This species is documented in the Vernal Field Office, but it is not suspected to occur on National Forest System lands or in any other BLM Field Offices.

Life History

Shrubby reed-mustard is a perennial plant that grows in clumps from a branched, slightly woody stem. It flowers in April to May and fruits May to June. It reproduces by seed and is capable of self-pollination; however, seed set is lower in individuals that self-pollinate, compared to individuals that are fertilized by pollen from another plant. The following native bee species may be shrubby reed-mustard pollinators: *Dialictus perdifficilis*, *D. sedi*, *Evylaeus pulveris*, *Andrena walleye*, *A. prunorum*, and *Halictus rubicundus* (USFWS 1994). These species are small to medium sized, mostly solitary bees.

Threats

The primary threat to shrubby reed-mustard is from energy development (USFWS 2010a), with associated direct damage to individuals and habitat, as well as effects from habitat fragmentation, increased dust, and pollinator disturbance. The entire range of this species is leased for oil and gas development and is underlain by oil shale deposits (USFWS 1987, 1994), which poses a significant threat. The underlying oil shale may also be mined when economically favorable (USFWS 1994).

In the listing and recovery plan for shrubby reed-mustard, building stone mining and localized grazing were associated with the decline in this species (USFWS 1987, 1994). Building stone mining can directly disturb individual plants and their habitat, with other effects similar to oil and gas development, including habitat fragmentation, increased dust, and pollinator disturbance. Today, building stone mining is a substantive issue only on private land (USFWS 2010a). At this time, effects from grazing and trampling are not considered meaningful factors impacting the viability of shrubby reed-mustard (USFWS 2010a). Although invasive species such as cheatgrass are present in shrubby reed-mustard habitat, they have not been identified in high numbers or densities, and they are not considered a threat to shrubby reed-mustard (USFWS 2010a).

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)—Threatened

Habitat Description

Uinta Basin hookless cactus is generally found on coarse soils derived from cobble and gravel river terrace deposits, or rocky surfaces on mesa slopes at 4,400 to 6,200 feet in elevation (USFWS 2012a). It is most abundant on south-facing exposures and on slopes to about 30 percent grade. It can be found growing with other common desert shrubland plants, including shadscale, black sagebrush, and galleta grass. It is usually a drier habitat than the sagebrush chaparral preferred by GRSG.

Status and Distribution

Uinta Basin hookless cactus was listed as a threatened species under the combined taxa name *Sclerocactus glaucus* in 1979. In 2009, the USFWS recognized and maintained threatened status for three distinct species that were formerly considered *Sclerocactus glaucus*, including *Sclerocactus wetlandicus*, Uinta Basin hookless cactus. Uinta Basin hookless cactus is known to occur in Uintah County, Utah, along the Green River and its tributaries, and in Carbon and Duchesne Counties, Utah. The species is known from the Vernal and Price Field Offices; it is not known or suspected on National Forest System lands. Of the thousands of specific locations documented, only one is in GHMA. Additional habitat for Uinta Basin hookless cactus likely occurs in GHMA in this area.

Life History

Uinta Basin hookless cactus is a perennial plant which presumably reproduces by seed. A broad assemblage of native bees and possibly other insects, including ants and beetles, pollinate Uinta Basin hookless cactus.

Threats

At the time of the original listing of the Uinta Basin hookless cactus complex, ongoing and foreseeable threats included mineral and energy development, illegal collection, recreational ORV use, and grazing. Energy development remains one of the largest threats to this species through direct loss of habitat (USFWS 2010b). Livestock grazing can result in mortality when livestock trample individual plants, and invasive species establishment may be enhanced by grazing activities. ORV use also threatens this species

with habitat damage and mortality from direct contact. New threats identified since original listing are climate change, parasitism by the cactus-borer beetle, and invasive weeds.

Ute Ladies'-Tresses (*Spiranthes diluvialis*)—Threatened

Habitat Description

When Ute ladies'-tresses was listed in 1992 it was known primarily from moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4,300 and 6,850 feet. Surveys since 1992 have expanded the number of vegetation and hydrology types occupied by Ute ladies'-tresses to include seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, and lakeshores. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands.

Status and Distribution

Ute ladies'-tresses was listed as threatened in 1992. In 2004, the USFWS issued a petition to delist the species and initiate a five-year review, which is ongoing. Occurrences are present on the Uinta-Wasatch-Cache National Forest, the Grand Staircase-Escalante National Monument, the Vernal Field Office and are suspected in the Salt Lake Field Office and the Fishlake National Forest. Although no Ute ladies'-tresses occurrences are mapped as overlapping PHMA or GHMA, several occurrences on BLM-administered lands occur just outside PHMA. Those occurrences are along drainages, and it is possible that GRSG would use the areas during breeding and nesting season.

Life History

Ute ladies'-tresses is a long-lived perennial forb that probably reproduces exclusively by seed (USFWS 2015). As with other orchid species, Ute ladies'-tresses seeds are microscopic and dust-like and are readily dispersed by wind or water. It is hypothesized that germinated seedlings must quickly establish a symbiotic relationship with mycorrhizal soil fungi in order to survive. The absence or rarity of appropriate fungal symbionts in the soil may be a major factor limiting the establishment of new Ute ladies'-tresses populations. New vegetative shoots are produced in October and persist through the winter as small rosettes. These resume growth in the spring and develop into short-stemmed, leafy, photosynthetic plants. Depending on site productivity and conditions, vegetative shoots may remain in this state all summer or may develop inflorescences. Individuals die back in the winter to subterranean roots or persist as winter rosettes. Across its range Ute ladies'-tresses blooms from early July to late October, typically earlier in sites that have an open canopy and later in well-shaded sites. Whole colonies of Ute ladies'-tresses can go dormant or not flower for many consecutive years, making the species very difficult to detect. Bees are the primary pollinators of Ute ladies'-tresses, particularly solitary bees in the genus *Anthophora*, bumblebees (genus *Bombus*), and occasionally nonnative honeybees (*Apis mellifera*; Sipes and Tepedino 1995). Of these species, *Anthophora terminalis* is apparently the most effective pollinator.

Threats

Threats are competition from invasive species, vegetation succession, construction, hydrologic changes, grazing, recreation, urbanization, flooding, haying/mowing, natural herbivory, loss of pollinators, and drought (Fertig et al. 2005).

GENERAL DISCUSSION OF POTENTIAL IMPACTS BY PROGRAM AREAS

Actions Evaluated and General Effects

Because the proposed land use plan amendment is an umbrella planning document, it does not propose any specific ground-disturbing actions, there would be no direct effects on any threatened, endangered, or proposed species (listed species). Although, indirect effects will occur later in time and those actions that are reasonably certain to occur within PHMA/GHMA are mentioned in the following discussion. Only in one case do we consider indirect impacts outside PHMA/GHMA, with clay phacelia and the reasonably foreseeable TransWest Express (TWE) and Energy Gateway South (EGS) transmission line projects. Aside from the likely impacts to Utah prairie dog, the determination for proposed actions under this Land Use Plan Amendment are either be "no effect" or "may affect, but not likely to adversely affect" listed species and/or their habitats (and designated critical habitat, where applicable). Proposed actions from this Land Use Plan Amendment that could affect species will be evaluated at the project level, and adverse impacts will be avoided.

The environmental baseline is set by the existing conditions, including the current authorized activities and programs already analyzed and for which there has been consultation in the jurisdiction of each land use plan. Various activities, such as grazing, mining, recreation, travel management, and invasive species control, are already analyzed at the land use plan level. Each activity may also have been assessed for environmental impacts through their project-level, site-specific NEPA analysis and ESA compliance. Examples of these are allotment management plans, noxious weed control plans, and travel management plans. All of their associated conservation measures concerning listed species would still be valid.

Programmatic plans are considered permissive in that they allow but do not authorize or approve any site-specific projects or actions. They are much like zoning ordinances under which future decisions are made. Decision at the land use plan level establish goals and objectives, identify the types of activities that are allowed or prohibited in specific areas, may specify management standards and minimum habitat condition goals, either unit wide or for specific areas, and may establish a monitoring and evaluation program.

This biological assessment does not analyze site-specific actions (e.g., ongoing and new roads or other disturbances or ongoing, new, or renewed permits). Though, effects determinations made in this document should provide the umbrella effects determinations for site-specific projects. In the future, during project-level environmental planning and analysis, site-specific actions will continue to be analyzed to identify possible effects on listed species. As part of any future project-level environmental analysis, additional specific conservation measures and strategies to alleviate any potential adverse effects may be developed as the details of the future proposed actions become available.

The proposed actions were evaluated for possible indirect (later in time) effects on listed plants within PHMA/GHMA. Many of the amendment actions are restrictive of anthropogenic disturbances for the benefit of GRSGs, reducing the potential impacts from various activities on GRSGs and their habitats. Some examples of restrictive actions are as follows:

- Avoid construction of new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) in PHMA and sagebrush focal areas, unless the development would have a net conservation gain for GRSG habitat or unless required for visitor safety (BLM MA-REC-2 and FS GRSG-R-GL-065)
- Collocate new road right-of-ways (ROWs) (BLM MA-LAR-3) and new infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers; FS GRSG-LR-SUA-ST-020-Standard) in or as close as possible to existing sites in PHMA

- Establish PHMAs as avoidance areas for new linear and site type ROWs, except in designated ROW corridors (BLM MA-LAR-2)
- Not exceed a 3 percent disturbance cap in PHMA at the scales of biologically significant units and the proposed project analysis area (BLM MA-GRSG-3 and FS GRSG-GEN-ST-004)

All of the energy and minerals conservation measures are also considered restrictive actions. Therefore, no adverse effects on listed plants are expected from these types of actions because the measures would reduce potential impacts on GRSG habitats (mostly in PHMA), and these same measures could also benefit listed plants by reducing potential impacts in those areas.

Many other proposed management actions for GRSGs establish guidance for resource management planning and establish priority and emphasis for sound GRSG habitat management. One example is stated in BLM MA-FIRE-8: *Fire fighter and public safety are the highest priority. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction. PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well.*

This is an action that prioritizes the implementation of an existing program in GRSG habitat. Occupied habitat and critical habitat for threatened and endangered species already has a priority for protection in wildfire suppression, below firefighter and public safety and property protection. This measure says to include GRSGs (a candidate species) at the same priority level as critical habitat for threatened and endangered species.

Some proposed management actions for GRSGs are more directive, presenting somewhat specific actions to benefit GRSG in the future, if they occur. Such actions would only have potential to impact plant species that exist within PHMA/GHMA. The plant species that exist within PHMA/GHMA are Autumn buttercup, clay reed-mustard, Last Chance townsendia, shrubby reed-mustard, Uinta Basin hookless cactus, and Ute ladies'-tresses. One such action, to *work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation* (BLM MA-LAR-5), has potential to impact listed plants from personnel and vehicles accessing the towers, if the plants are present in the ROW corridors where retrofit activities are needed. Though, if listed plants are present in any proposed areas, any proposed actions that may adversely affect these species and/or their habitats will be evaluated at the project level, and adverse impacts would be avoided.

Restrictions for ORV use may benefit listed plant species by reducing impacts from this activity. BLM MA-TTM-2 states: *PHMA and GHMA that do not have designated routes in a Travel Management Plan would be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use)*. Where travel management planning has not been completed and listed plant habitats are present, there may be a reduction of impacts from ORV use. Restricting motorized travel as described above would occur immediately following the decision to amend land use plans.

Because many activities would be restricted or not allowed in GRSG habitats, there is potential for an increase of the restricted activities in other plant communities outside of PHMA/GHMA. Of the most concern is energy exploration and development and other infrastructure, but other activities, such as ORV use, may also increase in areas remaining open to their particular uses. The nature and location of these potential shifts in activities are not known. Although potential impacts are too speculative at this time to analyze, the activities would still be required to comply with existing restrictions of authorized use. Furthermore, any future proposals for specific activities would still be required to undergo site-specific

analysis through NEPA and ESA consultation to determine effects of the actions on listed plant species and other resources.

Adaptive Management

The proposed plans establish soft and hard adaptive management triggers for both GRSG populations and habitat. The specific triggers and additional detail on the management responses are identified in Attachment B and Attachment C (the BLM and Forest Service proposed plans, respectively), as well as Appendix B in the GRSG FEIS.

If a soft trigger is met, the BLM and Forest Service will determine the specific cause or causes that are contributing to the decline. If they determine that the decline is related to a natural variation in the population, no specific management actions would be required. However, if agency management actions are determined to be the cause or contribution to the decline, the agency would apply measures in its implementation-level discretion to mitigate the decline of populations and habitat. These measures would apply more conservative or restrictive implementation-level conservation conditions, terms, or decisions in the agency's discretion to mitigate the decline or, for example, increase proactive habitat improvement efforts in the population area where the soft trigger was tripped.

If monitoring indicates that a hard trigger is met, definitive action is necessary to stop further population declines and/or address loss of habitat. On reaching a hard trigger, a more restrictive alternative, or an appropriate component of a more restrictive alternative analyzed in the environmental impact statement would be implemented without further action by the agency involved. The final strategy could also include the need to further amend land use plans to address the situation and modify management accordingly.

Adaptive management soft triggers can result in a suite of prioritized proactive management actions aimed at protecting existing habitat, expanding sagebrush areas used by GRSG, prioritizing management, and increasing coordination to address determined threats. Adaptive management hard triggers may further restrict power lines larger than 138kV and pipelines larger than 24 inches from PHMA. Other than that, hard trigger responses are aimed at prioritizing management actions already identified in the GRSG LUP Amendment (e.g., habitat assessments, the fire program, activities). More restrictive or conservative management of GRSG habitat is the expected result from implementing adaptive management, and these changes would potentially further benefit listed species from activities already analyzed and consulted on in preceding Resource Management Plans (e.g., closing OHV routes). In the event that adaptive management response requires an additional Land Use Plan amendment, that amendment would be analyzed for effects to listed species during the additional Land Use Plan amendment process.

Regulatory Mechanisms

In general, ground-disturbing activities could modify habitat and cause individuals to be lost, depending on the extent of area disturbed, the nature of the disturbance, the species affected, and the location of the disturbance. The proposed land use plan amendments would not take the place of site-specific environmental analysis required for any new ground-disturbing actions that may arise from implementing the proposal. Furthermore, if listed species are present in any of the areas where proposed actions may adversely affect them and/or their habitats, the project will be evaluated at the project level, and adverse impacts would be avoided. Current regulatory mechanisms in place are a thorough analysis at the appropriate scale of the presence and possible effects on TEP species, as required by NEPA, and in consultation with the USFWS, as required by the ESA. In addition, conservation measures for TEP species are required by each management unit. Documents used by the management units (MUs) are listed below with summaries of their included conservation measures.

The BLM is mandated to ensure that special status species are protected, by virtue of the ESA; by agency policy, as described in the Special Status Species Management Manual (Manual 6840) (BLM 2008a); by the BLM Land Use Planning Handbook (H-1601-1) (BLM 2005); and management direction in RMPs produced by BLM field offices.

The Forest Service is also subject to requirements of the ESA. Its handbook, the Forest Service Manual, and the land and resource management plans for National Forests provide direction to be used in all ground-disturbing projects to protect threatened and endangered species.

All BLM and Forest Service units have resource management plans in place: All units are subject to national and local guidance related to invasive species management. In general, newer and proposed plans provide more specific management direction for federally listed, proposed, and candidate plant species.

Federal legislation and agency regulations direct agencies to avoid jeopardizing the continued existence of any federally listed species or species proposed for listing; to actively promote species recovery; and to improve the status of candidate species. If a federally listed species may be affected by a proposed land use allocation or management action, consultation with the USFWS, pursuant to Section 7 of the ESA, would occur.

Existing Conservation Measures

Management direction for TEP species on the eight BLM and five Forest Service units considered in this analysis is listed in Attachment D. Direction specific to a certain species is listed in the analysis of effects for that species.

ANALYSIS OF EFFECTS OF THE PROPOSED ACTION BY SPECIES

A. Wildlife and Fish

Canada lynx (*Lynx canadensis*)

Canada lynx is not known to occur on BLM- or Forest Service-administered lands in the planning area. However, suitable habitat and LAUs have been mapped in the Ashley and Uinta-Wasatch-Cache National Forests. Approximately 39,839 acres of lynx suitable habitat overlaps with PHMA/GHMA on the forests listed above. Lynx habitat overlap consists of both primary and secondary classifications (Table 4). Closer inspection shows that vegetation cover types where overlap with primary lynx habitat occurs are not habitat for GRSG and consist predominately of spruce-fir, mixed conifer, and conifer-aspen forests. Vegetation in areas of overlap with lynx secondary habitat consists primarily of aspen, aspen-conifer, Douglas-fir, and lodgepole pine habitats. Forested lynx-suitable habitat in mapped PHMA and GHMA often occurs where forest patches and stringers are interspersed with grass/forb/shrub openings. Locations of lynx-suitable habitat and GRSG mapped habitat overlap are shown in Figure 2.

Utah GRSG habitat mapping was conducted at a broad scale in order to include all seasonal habitat and potential movement areas important for each population and include known use areas, historic use areas, as well as areas of non-habitat (GRSG FEIS, Appendix N). It is expected that the maps will be refined as more information is gained and much of this refinement is likely to be completed by individual Field Offices and National Forests at a unit-wide scale, or during project-level analysis. Further mapping refinement is also expected to identify forested lynx suitable habitats as unsuitable for GRSG unless they provide a benefit to GRSG such as facilitating movement between areas of suitable habitat. On rare occasion when suitable lynx habitat also functions as beneficial sage-grouse habitat, actions that would

adversely affect lynx would not be conducted. Site-specific analysis will be conducted at the project level to ensure adverse impacts to lynx do not occur.

Table 4. Overlap Between Lynx Suitable and Mapped GRSG Habitats

National Forest	Lynx Habitat	
	Primary (Acres)	Secondary (Acres)
Ashley	1,281	4,411
Uinta-Wasatch-Cache	8,686	25,460
Total	**9,967**	**29,871**

There is also overlap between areas linking suitable lynx habitat and mapped GRSG habitats (Figure 2) in the Salt Lake, Vernal, and Price Field Offices and split-estate lands, as well as in the Ashley and Uinta-Wasatch-Cache National Forests.

No direct effects on Canada lynx from the proposed land use plan amendments would occur. Negative indirect impacts from the proposed action are highly unlikely, due to the project focus on protection and enhancement of GRSG habitats, the lack of known occurrences in the project area, and the fact that additional site-specific analysis and, if necessary, avoidance would occur at the project level in the future. Where PHMA and GHMA overlap with lynx linkage areas, elements provided in the proposed action that would maintain or enhance GRSG habitats are compatible with maintaining lynx linkage characteristics in shrub-steppe habitats.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified, and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands are in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area; only federal actions are expected to occur, so no cumulative effects are expected.

Summary Determination of Effects on Canada Lynx

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect Canada lynx because negative impacts on suitable habitat will not occur in the Ashley and Uinta-Wasatch-Cache National Forests. Where PHMA and GHMA overlap lynx linkage areas on the Salt Lake, Vernal, and Price Field Offices and Split-estate lands, and the Ashley and Uinta-Wasatch-Cache National Forests may be beneficial because they retain intact shrub communities. Further, there are no potential direct or indirect adverse effects to this species from this action.

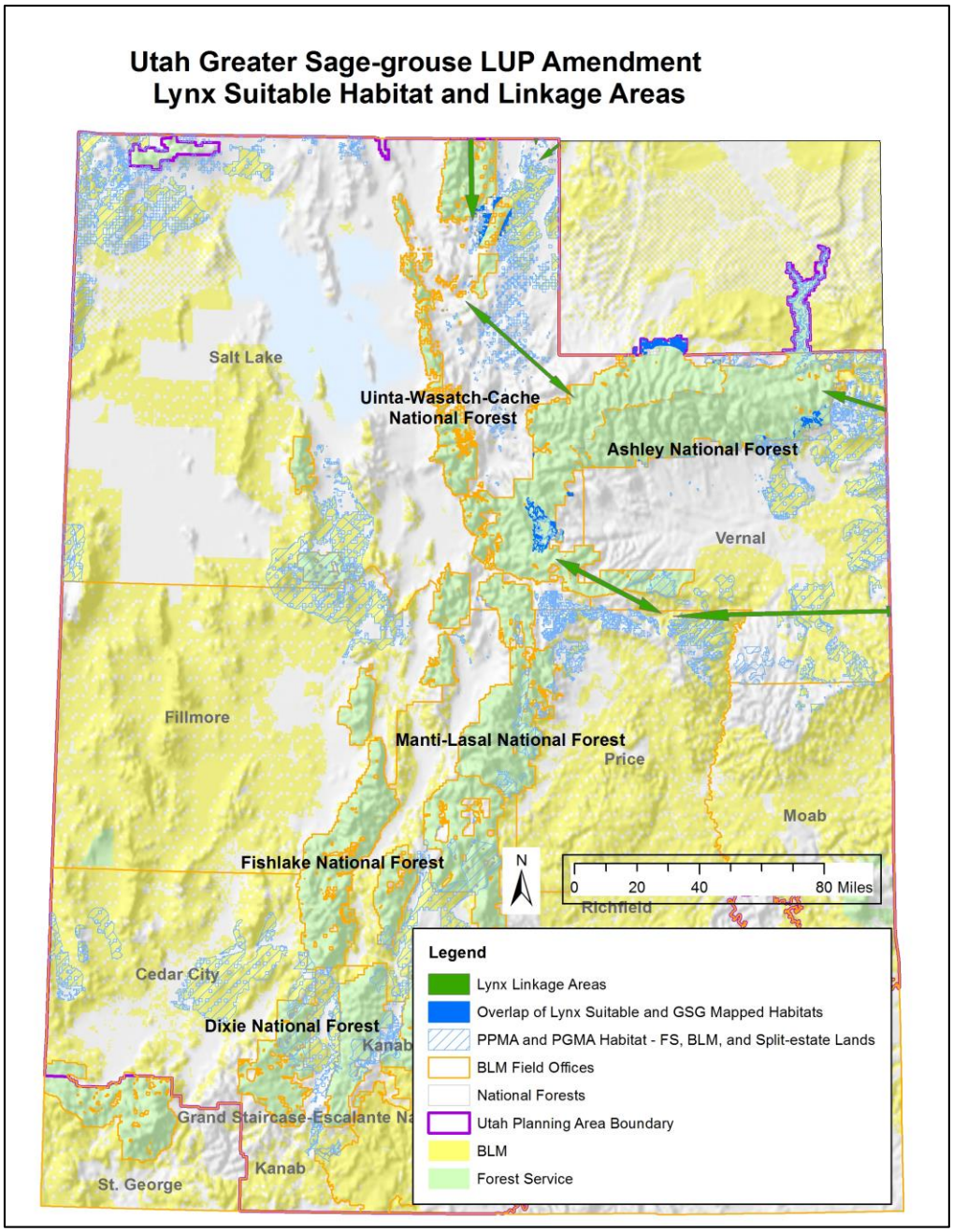

Figure 2. Locations of lynx suitable habitat and GRSG mapped habitat overlap

Utah Prairie Dog (*Cynomys parvidens*)—Threatened

Utah prairie dog (UPD) species is endemic to Utah and exists in southwestern Utah in Beaver, Garfield, Iron, Kane, Millard, Piute, Sanpete, Sevier, and Wayne Counties. The Utah Prairie Dog Recovery Implementation Plan identifies three recovery areas with 40 management units within the recovery areas (UPDRIP 2013, 2014; Figure 3). The 40 UPD management units (MUs) encompass approximately 342,258 acres located in only 3 counties within Utah. The species represents the only vertebrate non-fish endemic to the State. UPD MUs occur within portions of the Cedar City, Kanab, and Richfield BLM Field Offices and in parts of the Dixie and Fishlake National Forests.

UPD MUs overlap with GRSG mapped habitats to a substantial degree (Figure 3). On all landownerships, UPD MUs coincide with priority and general GRSG habitats on 87.6 percent of all MU acreage. In contrast, UPD MUs encompass a relatively small portion of GRSG mapped habitats in Utah: about 4.1 percent of all priority and general habitat. On BLM, Forest Service, and split-estate lands, UPD MU overlap with GRSG mapped habitats totals 267,853 acres. UPD MU overlap with GRSG mapped habitats on BLM, Forest Service, and split-estate lands is 81 percent (Table 5).

Table 5. UPD MU and GRSG Mapped Habitat Overlap

Administrating Agency or Land Status	UPD MU Overlap with Agency or Split-Estate Lands (Acres)	UPD MU Overlap with GRSG Mapped Habitat Acres (Percent)
BLM	132,360	121,482 (92)
Forest Service	92,085	84,005 (91)
Split-estate	43,408	11,153 (26)
Totals	**267,853**	**216,640 (81)**

Relative to management for UPD, the recovery plan (USFWS 2012a) identifies the following recovery actions relative to effects generated by this and other projects conducted at the unit-level planning scale:

Conserve sufficient acreages and distribution of occupied UPD habitat on federal, state, tribal, and private lands.

2.1. Prioritize UPD habitat for protection and management.

2.3. Manage and improve UPD habitat on federal lands.

Continuing to maintain and improve habitat for UPD on federal lands is a critical priority for the species. Habitat improvement projects may consist of increasing plant diversity with warm and cool season grasses, forbs, and shrubs and altering ground cover and canopy cover to ensure optimum foraging and visual surveillance conditions. These activities also coincide with the goals of the translocation program.

2.3.1. Plan and implement vegetation treatments in strategic locations (including translocation sites) that benefit UPD and their habitat.

Currently occupied as well as historic UPD habitat can be improved with vegetation treatments, such as thinning dense sagebrush via mechanical or other methods and reseeding with mixes beneficial to UPD. Both the Forest Service and BLM have completed several projects of this kind that focus on benefiting UPD.

2.3.2. Develop and implement guidelines to minimize adverse impacts on UPD and their habitat from various activities on federal lands.

Multiple uses on public lands need to be balanced with minimizing adverse effects on UPD and their habitat. This goal can be accomplished via established guidelines for project proposals that can be incorporated into project descriptions and Section 7 consultations.

2.3.3. Amend or update federal land use plans to include these guidelines when appropriate.

Incorporating guidelines that minimize adverse impacts on UPD into federal land use plans is key to demonstrating that regulatory mechanisms are in place to conserve the species after delisting.

Effects of the Action

Management direction under both the BLM proposed plan and the Forest Service proposed action contain elements that pertain to vegetation management (e.g., pinyon-juniper removal), wildland fire suppression, and fuels management that may generate effects on UPD; however, the BLM proposed plan contains a management action statement that will accommodate UPD habitat management in GRSG habitats. In addition, in the Panguitch PHMA BLM will be adjusting a utility corridor to align with where there currently is a power line in the area. The following proposed action/proposed plan elements are pertinent to potential UPD direct or indirect effects:

Forest Service Proposed Action Elements

Habitat Management

GRSG-GRSGH-ST-028 – Design habitat restoration projects to move towards desired conditions (Table 6) and incorporate the concepts outlined in ***GRSG FEIS Appendix K****.*

GRSG-GRSGH-GL-029 – Sagebrush removal in GRSG breeding and nesting and wintering habitats should be avoided unless necessary to support attainment of desired habitat conditions (Table 6).

Table 6. Seasonal Habitat Desired Conditions for Greater Sage-Grouse

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING[1,2,3] (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks.[4]		
Lek Security	Proximity of trees [5]	Trees or other tall structures are none to uncommon within 1.86 miles of leks[6, 7]
	Proximity of sagebrush to leks [6]	Adjacent protective sagebrush cover within 328 feet of lek [6]
Cover	Seasonal habitat extent [7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [6, 7, 8]	15 to 25%
	Sagebrush height [7] Arid sites [6,7,9] Mesic sites[6,7,10]	 12 to 32 inches 16 to 32 inches
	Predominant sagebrush shape [6]	>50% in spreading [11]
	Perennial grass canopy cover [6,7] Arid sites [7,9] Mesic sites [7,10]	 ≥10% ≥15%
	Perennial grass height[6,7,8]	Provide overhead and lateral concealment from predators[7, 15]
	Perennial forb canopy cover [6,7,8] Arid sites [9] Mesic sites [10]	 ≥5%[6,7] ≥10%[6,7]
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)		
Cover	Seasonal habitat extent [7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height [7,8]	16 to 32 inches
	Perennial grass canopy cover and forbs [7,8]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability [6,7]	Preferred forbs are common with several preferred species present[13]
WINTER[1] (Seasonal Use Period November 1-February 28)		
Cover and Food	Seasonal habitat extent [6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow [6,7,8]	>10%
	Sagebrush height above snow [6,7,8]	>10 inches [14]

ATTRIBUTE	INDICATORS	DESIRED CONDTION

[1]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.
[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.
[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.
[4] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[5] Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.
[6] Stiver et al. 2015 *In Press*.
[7] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.
[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.
[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (Stiver et al. 2015 *In Press*).
[12] 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.
[13] Preferred forbs are listed in Table III-2 of the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015 *In Press*). 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 of the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015 *In Press*).
[14] 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.
[15] Projects will be designed to provide overhead and lateral concealment of nests on a site specific basis.

GRSG-GRSGH-GL-032 - To facilitate safe and effective fire management actions, in PHMA, SFA, GHMA, and Anthro Mountain, fuels treatments in high-risk areas (i.e., areas likely to experience wildfire at an intensity level that might result in movement away from the GRSG desired conditions in GRSG-GEN-DC-003) should be designed to reduce the spread and/or intensity of wildfire or the susceptibility of GRSG values to move away from desired conditions (Table 6).

GRSG-GRSGH-GL-033 - In PHMA, SFA, GHMA, and Anthro Mountain, native plant species should be used, when possible, to restore, enhance, or maintain desired habitat condition (table 6).

GRSG-GRSGH-GL-034 – In PHMA, SFA, and Anthro Mountain, vegetation treatment projects should only be conducted if they restore, enhance, or maintain desired conditions (table 6).

Lands and Realty

GRSG-LR-SUA-ST-013 – In PHMA, SFA, and Anthro Mountain, restrict issuance of new lands special use authorizations (SUAs) that authorize infrastructure, such as high-voltage transmission lines, major pipelines, hydropower, distribution lines, and cellular towers. Exceptions must be limited and based on rationale (e.g., monitoring, modeling, or best available science) that explicitly demonstrates that adverse impacts to GRSG will be avoided by the exception.

GRSG-LR-SUA-ST-015 – In PHMA, SFA, GHMA, and Anthro Mountain, do not authorize temporary lands special uses (i.e., facilities or activities) that result in loss of habitat or would have long-term (i.e., greater than 5 years) negative impact on GRSG or their habitats.

Fire and Fuels Management

GRSG-FM-ST-045 – In PHMA, SFA, GHMA, and Anthro Mountain, if it is necessary to use prescribed fire to facilitate site preparation for restoration of GRSG habitat consistent with desired conditions (Table 6), the associated NEPA analysis must identify how the project would move

towards GRSG desired conditions, why alternative techniques were not selected, and how potential threats to GRSG habitat would be minimized.

GRSG-FM-GL-046 – In wintering or breeding and nesting habitat, sagebrush removal or manipulation, including prescribed fire, should be restricted unless the removal strategically reduces the potential impacts from wildfire.

GRSG-FM-GL-047 – In PHMA, SFA, GHMA, and Anthro Mountain, when reseeding in fuel breaks, fire resistant native plant species should be used if available, or consider using fire resistance non-native species to meet resource objectives, if analysis demonstrates that nonnative plants will not damage GRSG habitat in the long-term.

GRSG-FM-GL-048– In PHMA, SFA, GHMA, and Anthro Mountain, fuel treatments should be designed to restore, enhance, or maintain GRSG habitat.

GRSG-FM-GL-049– Locating temporary wildfire suppression facilities (e.g., incident command posts, spike camps, helibases, and mobile retardant plants) in PHMA, SFA, GHMA, and Anthro Mountain should be avoided.

GRSG-FM-GL-006-Guideline – In priority and general habitat management areas and sagebrush focal areas, burnout operation areas should be avoided by constructing direct fire lines, whenever safe and practical to do so, to improve suppression effectiveness and minimize loss of existing sagebrush habitat as determined by fireline leadership, incident commanders, etc.

GRSG-FM-GL-058– On critical fire weather days, protection of GRSG habitat should receive high consideration, along with other high values, when positioning resources.

GRSG-FM-GL-059- Line officers should be involved in setting pre-season wildfire response priorities and, during periods of multiple fires, prioritizing protection of PHMA, SFA, and GHMA.

GRSG-FM-GL-060 – In PHMA, SFA, GHMA, and Anthro Mountain, consider using fire retardant and mechanized equipment only if it is likely to result in minimizing burned acreage.

GRSG-FM-GL-061 – In PHMA, SFA, GHMA, and Anthro Mountain, to minimize sagebrush loss, mop-up should be conducted where the burned areas adjoin unburned islands, doglegs, or other habitat features, as safety and available resources allows.

BLM Proposed Plan Elements

Habitat Management

MA-GRSG-4 – In PHMA and in adjacent opportunity areas, maintain, improve and restore GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Vegetation treatments would be applied to meet GRSG habitat objectives and provide additional GRSG habitat (Table 7).

Table 7. Seasonal Habitat Desired Conditions for Greater Sage-grouse.

ATTRIBUTE	INDICATORS	DESIRED CONDITION
Breeding and Nesting (February 15-June 15)[1, 2, 3, 4, 5, 6]		
Lek Security	Proximity of trees	Trees absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 km) of occupied leks.[6, 7, 8]
	Proximity of sagebrush to leks	Has adjacent sagebrush cover.[6]
Cover	% of seasonal habitat meeting desired conditions	>80% of the mapped nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).[8]
	Sagebrush canopy cover	≥15%[6, 8, 9]
	Total shrub cover[6, 8, 9]	15-30%: Box Elder, Parker Mountain, Bald Hills, Hamlin Valley, Panguitch, Uintah south of Hwy 40 15-35%: Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40
	Sagebrush height[6, 8, 9]	>12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah >10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40
	Predominant sagebrush shape[10]	>50% in spreading (applicable to the specific sagebrush types prone to columnar vs. spreading shape e.g., Wyoming, not black sage)[6]
	Perennial grass cover[6, 8, 9]	>10%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >5%:Parker Mountain, Panguitch, Uintah south of Highway 40
	Perennial grass and forb height[6, 8, 9]	Provide overhead and lateral concealment from predators.[11]
	Perennial forb canopy cover[6, 8, 9]	>5%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >3%: Parker Mountain, Panguitch, Uintah south of Highway 40
Brood-Rearing/Summer (April 15-August 15)[1]		
Cover	% of Seasonal habitat meeting desired condition	>40% of the mapped brood-rearing/summer habitat meets recommended habitat characteristics where appropriate (relative to ecological site potential, etc.)[8]
	Sagebrush canopy cover[6, 8, 9]	>10%
	Total shrub cover[6, 8, 9]	10-25%: Box Elder, Bald Hills, Hamlin Valley, Panguitch, Rich, Sheeprocks, Ibapah, Parker Mountain, Uintah 10-30%: Carbon, Emery,
	Sagebrush height[6, 8, 9]	>12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah >10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40
	Perennial grass canopy cover and forbs[6, 8, 9]	>15% (Grass: >10%; Forb: >5%): Box Elder, Rich, Sheeprocks, Ibapah, Parker Mountain, Panguitch, Uintah, Carbon, Emery >15% (Grass: >8%; Forb: >7%): Bald Hills, Hamlin Valley,
	Riparian areas/mesic meadows	Proper Functioning Condition[6]
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present[6, 12]
Winter (November 15-March 15)[1]		
Cover and Food	% of seasonal habitat meeting desired conditions	>80% of the mapped wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). [8]
	Sagebrush canopy cover above snow[6, 8,]	>10%
	Sagebrush height above snow[6, 8, 9, 13]	>10 inches (25 cm): Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40

Notes:
1 Specific dates would be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter), in coordination with the State of Utah.
2 Utah Greater Sage-Grouse Working Group 2013
3 Doherty 2008
4 Doherty et al. 2010
5 Holloran and Anderson 2005
6 Stiver et al. 2015 *In Press*

ATTRIBUTE	INDICATORS	DESIRED CONDITION

[7] Baruch-Mordo et al. 2013
[8] Connelly et al. 2000
[9] Unpublished data, Utah Community-Based Conservation Program Greater Sage-grouse Statewide Database, Utah State University, Logan, Utah and Brigham Young University, Provo, Utah. Summarization and analysis of nesting and brood-rearing habitat characteristics from data collected through Utah State University and Brigham Young University research efforts. Researchers located the nest and brood sites using radio-marked telemetry methods. Shortly after the site was used by the marked bird (after hatch or use by a brood), vegetation characteristics on the site were measured using the line intercept method for shrub canopy cover and Daubenmire frames for herbaceous cover. Researchers across the various study areas used methods that followed the guidelines identified in Connelly et al. (2003).
[10] Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 *In Press*). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[11] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[12] Preferred forbs are listed in Stiver et al. 2015 *In Press*. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[13] 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.

MA-GRSG-6 – Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that would create a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas.

MA-VEG-1 – In PHMA, where necessary to meet GRSG habitat objectives, treat areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas, annual grasslands).

In PHMA, prioritize implementation of restoration/treatment projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (e.g., proximity to existing GRSG populations, ecological site potential, resistance and resilience), documented in ***Appendix K****.*

In PHMA, prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance.

In PHMA, avoid sagebrush reduction treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population. Coordinate with the State of Utah and USFWS prior to conducting sagebrush treatment projects within nesting and winter habitat.

MA-VEG-2 – Remove conifers encroaching into sagebrush habitats. When conducting conifer treatments:

- *Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or phase II.*
- *Treat areas in late Phase II or Phase III condition to create movement corridors, connect habitats, or to break up hazardous fuels and reduce the potential for catastrophic fire.*
- *Prioritize methods to reduce conifer canopy cover to those that maintain the understory vegetation as the preferred treatment methods (e.g., mechanical, lop and scatter).*
- *Require that vegetation treatments conducted within 0.6 miles of a lek include an objective of reducing conifer, where technically feasible, to less than 5 percent canopy cover, with preference for complete removal.*
- *Include stipulations to avoid removing old-growth pinyon/juniper stands (e.g., Tausch et al. 2009; Miller et al. 1999).*
- *Use of site-specific analysis and tools like VDDT and the FIAT report (Chambers et al. 2014) will help refine the location for specific areas to be treated.*

MA-VEG-4 – In PHMA, include GRSG habitat objectives in restoration/treatment projects. Treatment objectives should include short-term and long-term habitat conditions, and they should include specific objectives for the establishment of sagebrush cover and height, as well as cover and heights for understory perennial grasses and forbs necessary for GRSG seasonal habitats (Table 7). Make meeting the GRSG objectives for the restoration/treatment project one of the primary priorities for the project and subsequent land uses, recognizing that managing for other special status species may result in treatment objectives that may not meet GRSG seasonal habitat objectives (e.g., winter habitat cover requirements vs. creation of Utah prairie dog habitat). Where GRSG habitat overlaps with that of federally listed threatened or endangered species (e.g., Utah prairie dogs), coordinate with species-specific experts to develop conservation and recovery objectives and allow habitat treatments that will benefit both species.

MA-VEG-5 – In PHMA, prioritize the use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, desirable non-native seeds may be used as long as they support GRSG habitat objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the principle objective for rehabilitation efforts.

Wildland Fire Management (General)

MA-FIRE-1 – In collaboration with the USFWS and relevant state agencies, complete and maintain GRSG Landscape Wildland Fire and Invasive Species Habitat Assessments to prioritize at risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting GRSG populations. These assessments and subsequent assessment updates would also be a collaborative effort to take into account other GRSG priorities identified in this plan. ***Appendix K*** *describes a minimal framework example and suggested approach for this assessment.*

Wildland Fire Management (Fuels Management)

MA-FIRE-3 – In PHMA, fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat.

- *In collaboration with USFWS and relevant state agencies, BLM planning units with large blocks of GRSG habitat will develop, using the assessment process described in* ***Appendix K****, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.*
- *Use green strips and/or fuel breaks to protect GRSG habitat from fire events.*
- *When possible, locate fuel breaks along existing roads, ROWs, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops).*
- *Avoid constructing fuel breaks through large areas of intact GRSG habitat, unless the associated NEPA document demonstrates a biological need for the fuel break to maintain or protect habitat for the GRSG population. Coordinate with the State of Utah and USFWS prior to constructing fuel breaks within nesting and winter habitat.*

- *Using an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as conifer reduction, grazing, prescribed fire, chemical, biological, and mechanical treatments may be acceptable, given site-specific variables.*
- *Remove encroaching conifer stands as a fuels management tool, where environmental review documents it would protect or improve GRSG habitat.*
- *Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success for native seed availability is low, desirable non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and desirable non-native species, as appropriate, to provide for fire breaks.*
- *Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance actions. Control invasive vegetation post-treatment.*
- *Apply seasonal restrictions, as needed, for implementing fuels management treatments according to the type of seasonal habitats present (see MA-GRSG-3G).*

In PHMA, avoid sagebrush reduction fuels treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population. Treatments in winter habitat should be designed to maintain sagebrush, especially tall sagebrush (sagebrush capable of standing above heavier than normal snowfall), which would be available to GRSG above snow during a severe winter. Prior to conducting fuels treatments in winter habitat, coordinate with the State of Utah and USFWS to design the treatment to strategically reduce wildfire risk around or in the winter habitat.

MA-FIRE-4 – In prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:

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

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

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

Wildland Fire Management (Suppression)

MA-FIRE-8 – Fire fighter and public safety are the highest priority. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the

goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction.

PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the GRSG Landscape Wildland Fire Invasive Species Habitat Assessments described in ***Appendix K****.*

In GHMA or areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent PHMA.

MA-FIRE-9 – Within acceptable risk levels use a full range of fire management strategies and tactics, including the management of wildfires to achieve resource objectives, across the range of GRSG habitat consistent with LUP direction.

In PHMA, burnout operations areas should be avoided by constructing direct fire lines, whenever safe and practical to do so.

Lands and Realty (Transmission Lines)

MA-LAR-2 – PHMA are designated as avoidance areas for high voltage transmission line ROWs (100kV or greater). All authorizations in these areas, other than the excepted projects, must comply with the conservation measures outlined in this plan, including the RDFs and avoidance criteria presented in MA-GRSG-03 (see GRSG FEIS ***Appendix G****).*

In PHMA, high voltage transmission lines (100 kV or greater) would be avoided if possible. If avoidance is not possible, they would be placed in designated corridors where technically feasible. Where not technically feasible, lines should be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG. New ROWs constructed adjacent to existing infrastructure will be constructed as close as technically feasible to existing infrastructure to limit disturbance to the smallest footprint.

Utah Prairie Dog—Project Design Features/Conservation Measures

Common to All Proposed Actions

Habitat Management

1.1 In order to sustain Utah prairie dog recovery in perpetuity, the Service recommends creating and maintaining a minimum of 50 percent of the suitable[6] and potentially suitable habitat[7] within the Utah

[6] Suitable Habitat: Habitat capable of supporting Utah prairie dogs including grassland or low-density sagebrush sites, agricultural fields, vacant lots, and other areas as identified by the Authorizing Federal Agency. Habitat previously mapped by the Utah Division of Wildlife Resources must be treated as suitable, regardless of current vegetative status.

[7] Potentially Suitable Habitat: Utah prairie dog habitat including areas that are mapped, occupied, or currently unoccupied or unmapped that can benefit from habitat treatments. Specifically, these are areas that are sagebrush-steppe grasslands with deep and well-drained soils and a good existing understory (USFWS 2009) that could support prairie dogs with management actions such as reducing sagebrush canopy cover to <10%.

prairie dog Management Units (MU) (UPDRIP 2013, 2014)[8,9] by meeting current Utah prairie dog habitat guidelines (USFWS 2009)[10]. Where sage-grouse priority and general habitat overlap the Utah prairie dog MUs or other important areas identified as necessary for UPD conservation in coordination with the Service, vegetation treatments will be developed and implemented consistent with the above Utah prairie dog recovery recommendations. These areas would be managed to consist of perennial grassland with a minimum contiguous patch size of 250 acres. Treatments may include sagebrush density reduction or removal to achieve desired UPD habitat conditions. Indicators and desired vegetation conditions for perennial grassland patch areas are provided in Table 8.

The Utah prairie dog MUs overlap with a small percentage (4.6%) of the greater sage-grouse priority and general habitat in Utah, and the two species are sympatric and easily co-managed throughout most of the Utah prairie dog range in Southern Utah. Once the Utah prairie dog requirements are met as described above, then the remaining acreage within the Utah prairie dog MU's and Greater sage-grouse priority and general overlap areas may be managed to meet Greater sage-grouse needs as described in the Proposed Action/Proposed Plan of this Biological Assessment.

Table 8. UPD Desired Future Conditions and Maintenance

Vegetation Indicator	Desired Condition
Shrub Canopy Cover[11]	0-3%
Pinyon Pine and Juniper Composition	0%
Perennial cool & warm season grass canopy cover	15-40%
Perennial cool season grass species richness	> 3 native species
Perennial warm season grass species richness	> 1 native species
Perennial forb canopy cover	1-10%
Perennial forb species richness	4-8 native species
Total grass and forb species diversity (native/non-natives, annuals/perennials)	>10 species

1.2 Only hand tools will be used within 1100 feet of occupied Utah prairie dog habitat[12] when removing conifers that are encroaching into greater sage-grouse habitat.

[8] Utah Prairie Dog Recovery Implementation Program. 2013. Population structure for Utah prairie dog recovery. White paper. Utah Prairie Dog Recovery Implementation Program, Southern Utah University, Cedar City, UT. 10 pp.

[9] Utah Prairie Dog Recovery Implementation Program. 2014. Utah prairie dog 5-year management unit plans: The Path to Recovery 2014-2018. Utah Prairie Dog Recovery Implementation Program, Southern Utah University, Cedar City, UT. 70 pp.

[10] U.S. Fish and Wildlife Service Utah Prairie Dog Recovery Team. 2009. Recommended translocation procedures for Utah prairie dog. U.S. Fish and Wildlife Service, West Valley City, UT. 19 pp.

[11] Sub-shrubs or low stature shrubs may be present on site if height is less than 12 inches.

[12] Occupied Utah prairie dog habitat-: During the Active Season: Any area where Utah prairie dogs are seen or heard, or any Functional Utah prairie dog burrows (see definition of Functional Burrow) are found and show evidence of recent prairie dog activity (fresh digging, scat, fresh tracks). During the Dormant Season: Any Utah prairie dog burrows (functional or not functional), or any Utah prairie dog mound system (see definition of mound system) is found, even if no other signs of Utah prairie dogs are present.

Wildfire Suppression and Emergency Stabilization and Rehabilitation

2.1 Wildfires will be suppressed before they reach a prairie dog colony[13] or after they exit a colony to avoid direct adverse impacts to UPD, unless the burn is consistent with UPD recovery goals. Active suppression efforts may not occur within a colony unless human health and safety or structures are at risk.

2.2 Only hand lines will be authorized within colonies.

2.3 Normally, only water shall be used on fires that occur within prairie dog colonies. If the fire Incident Commander decides that the situation requires use of chemical retardants in order to protect life and property, they may be used. The chemical composition will be supplied to the U.S. Fish and Wildlife Service during emergency consultation.

2.4 All vehicles shall stay on existing roads within colonies, except as stated in (2.5). Storage of equipment and materials shall not occur within ¼ mile of colonies. Vehicle maintenance shall not occur within these areas.

2.5 The Resource Advisor, biologist, or biological monitor (someone who is either qualified with a biological background or has been trained by the Resource Advisor) ensures that prairie dogs and their burrows are protected or avoided by walking in front of engines, tracked vehicles, or other firefighting related vehicles within occupied prairie dog colonies.

2.6 Vehicles shall not exceed a speed of 10 miles per hour (cross country) in occupied Utah prairie dog colonies unless a higher speed is determined to be prudent for safety reasons.

2.7 Within colonies, precautions shall be taken to ensure that contamination of the site by fuels, motor oils, grease, etc. does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based or other toxic materials shall be cleaned up and removed immediately, unless during an emergency event (wildfire suppression). In which case the spill shall be cleaned up as soon as practical after the emergency situation is controlled.

2.8 Camps associated with fire suppression activities shall be situated outside occupied habitat.

2.9 During fire ESR activities, sagebrush seed WILL NOT be included in the seed mix when rehabilitation activities are occurring within Utah prairie dog MU's and the Utah prairie dog habitat requirements as described in Conservation Measure (1.1) have not been met. Sagebrush seed will not be included in the seed mix when rehabilitation activities are occurring within occupied Utah prairie dog habitat.

Fuels Treatments

3.1 Surveys according to approved protocols and procedures will be required prior to surface disturbance unless species occupancy and distribution information is complete, current, and available. Surveys would be conducted by USFWS-approved biologists. In the event species occurrence is verified, the project proponent may be required to modify operational plans, at the discretion of the authorized officer, to include additional, appropriate protection measures or practices for the minimization of impacts to the Utah prairie dog and its habitat.

[13] "Prairie dog colony" refers to any occupied Utah prairie dog colony

3.2 Prescribed burns may be allowed in priority and general habitat management areas, if deemed necessary to meet Utah prairie dog requirements described above (1.1).

3.3 Proposed treatments within suitable Utah prairie dog habitat would be surveyed in accordance with USFWS protocols or in coordination with USFWS prior to implementation.

3.4 All project personnel would be required to attend an environmental training prior to initiating Project construction. The training would address environmental concerns, applicable environmental laws, and requirements for compliance with the project.

3.5 All staging areas (e.g. vehicles, trailers, and materials) would be located outside of a 350 foot buffer of areas that were identified as mapped Utah prairie dog habitat.

3.6 Project related vehicles would not exceed a speed of 15 miles per hour within mapped Utah prairie dog habitat.

3.7 A qualified Utah prairie dog biologist or certified Utah prairie dog surveyor[14], approved by the action agency, would be required to be on-site during all work within mapped Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities which may be in violation of these stipulations.

3.8 All vehicle maintenance activities shall be conducted in maintenance facilities or in the event of emergency vehicle maintenance at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions shall be taken to ensure that contamination of maintenance sites by fuels, motor oils, grease, etc. does not occur and that such material are contained and properly disposed of off-site. Inadvertent spills of petroleum based or other toxic materials shall be cleaned up and removed immediately or upon completion of the project.

3.9 Habitat treatments within occupied Utah prairie dog habitat would occur during the extended active season (April 1st – September 30th) unless otherwise determined in coordination with USFWS and UDWR.

3.10 Use spot applications or low-boom broadcast applications for herbicides within Utah prairie dog habitat, where possible, to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area.

3.11 All project personnel would be required to attend an environmental training prior to initiating Project construction. The training would address environmental concerns, applicable environmental laws, and requirements for compliance with the project.

3.12 If a dead or injured Utah prairie dog is located, initial notification must be made to the Service's Division of Law Enforcement, Salt Lake City, Utah, at telephone (801) 975-3330, to the UDWR at telephone number (435) 865-6100, and to the Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.

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[14] Certified Utah prairie dog surveyor is an individual who has completed the U.S. Fish and Wildlife Service approved Utah Prairie Dog Surveyor Course within the last 4 years.

3.13 BLM and/or FS would re-initiate consultation with the USFWS if it is determined through site-specific coordination, USFWS protocol level surveys, etc. that impacts vary from what has been consulted on.

Habitat Management Effects

Management direction elements under the Forest Service proposed action and BLM proposed plan that may impact UPD are those that prescribe habitat management objectives for GRSG habitat win UPD suitable[15] habitats (i.e. grass-dominated areas). Management actions resulting from direction aimed at retaining or restoring shrub components at levels described in Tables 6 and 7 above may result reduce opportunity for UPD habitat restoration but will be coordinated with UPD recovery team to ensure that UPD recovery goals are not impeded. Management direction for removing encroaching conifers may cause short-term disturbances, such as human presence, vehicle traffic, and mechanized equipment. However, project design features (see below) incorporated into the proposed action/proposed plan would reduce or minimize potential disturbance. In addition, conifer removal is expected to benefit UPD in the long-term when conducted in suitable UPD habitat.

Consideration and allowances for managing UPD habitats in GRSG mapped habitats is provided in one BLM management action (listed below). These are species that have coexisted and coevolved in these landscapes (see management action below), so management actions will not be precluded as a result of the GRSG LUP Amendment.

Habitat Management (BLM)

Make meeting the GRSG objectives for the restoration/treatment project one of the primary priorities for the project and subsequent land uses, recognizing that managing for other special status species may result in treatment objectives that may not meet GRSG seasonal habitat objectives (e.g., winter habitat cover requirements vs. creation of Utah prairie dog habitat). Where GRSG habitat overlaps with that of federally listed threatened or endangered species (e.g., Utah prairie dogs), coordinate with species-specific experts to develop conservation and recovery objectives and allow habitat treatments that will benefit both species.

No UPD-specific habitat considerations are provided in the Forest Service proposed action. Given the distribution overlap of UPD and GRSG and threat factors associated with UPD, project design features (applicable to both BLM and Forest Service proposed alternatives) are included to avoid or minimize impacts from prescribed vegetation management conducted to benefit GRSG. With these design features, the proposed alternatives are consistent with elements prescribed in the UPD Recovery Plan (see below).

Incorporating UPD design features would ensure UPD recovery by managing to maintain a minimum of 50 percent of the suitable and potentially suitable habitat in the UPD MU (UPDRIP 2013, 2014). However, managing for GRSG habitat considerations in MUs, where at least 50 percent of suitable and potentially suitable UPD habitat has been achieved, may adversely impact local UPD individuals and habitats where portions of MUs are managed for suitable GRSG shrub densities.

UPD design features are not expected to limit opportunities for GRSG habitat management at the planning area scale. As stated above, UPD MUs occur in only about 4 percent of GRSG mapped habitats in Utah. In addition, the design features allow for retention of shrub cover in MUs of up to 50 percent of

[15]Suitable habitat is that capable of supporting UPD and includes grassland or low-density sagebrush sites, agricultural fields, vacant lots, and other areas identified by the authorizing federal agency. Habitat previously mapped by the UDWR must be treated as suitable, regardless of current vegetation status.

the usable area, thereby reducing the area of potential impacts on GRSG to about 2 percent of Utah mapped GRSG habitat. Areas managed for UPD would function similar to brood-rearing habitat where some level of shrubs is retained. Where pure grassland patches are managed, the edges of these areas would remain functional during the brood-rearing period.

Wildfire Suppression Effects

Management direction in both the Forest Service proposed action and BLM proposed plan emphasize wildfire suppression in mapped GRSG habitats and fuels treatments designed to reduce wildfire potential and lessen the risk of impacts on sagebrush availability. Fire suppression methods may involve fireline construction, suppression agents and retardants, and water withdrawals. Fuels treatments aimed at reducing wildfire risk may involve conifer reduction, grazing, prescribed fire, chemical, and biological; mechanical treatments may be acceptable, given site-specific variables.

UPD and suitable habitat occur in grassland and sagebrush habitats. All components of fire management could be used in potentially suitable or occupied UPD habitat. Wildfire suppression methods and associated activities may have direct short-term negative effects on UPD as well as negative impacts on occupied or suitable habitat (see list below). Suppression may harass, displace, injure, or kill prairie dogs from smoke or fire during backfires, surface disturbance, or human-caused disturbance. Wildland fire suppression operations may adversely affect prairie dogs or colonies if unintentionally exposed to fire retardant. Following a fire, short-term adverse impacts may occur from a reduction in food supplies, loss of surface cover, an increased potential for colonization by invasive plant species, and increased predation. Long-term indirect effects are a mix of potentially positive and negative impacts associated with suppression, emergency rehabilitation, and fire severity.

The following short-term and long-term effects could occur on the UPD or its habitat from wildland fire suppression:

Short-term direct effects

- Visual or auditory disturbance or displacement of individuals from low-flying aircraft, vehicles, heavy equipment, and humans during operations or treatments, affecting foraging, roosting, or reproduction
- Mortality and displacement or injury of adults or young from smoke inhalation or from vehicles or equipment
- Removal of key habitat components for burrowing, foraging, or cover due to equipment or operational tactics, including
  - tree and shrub removal and soil disturbance during fire line construction
  - vegetation removal and soil disturbance during helipad or base camp construction
  - vegetation removal and soil disturbance during temporary or permanent road construction for project access
- Injury or mortality due to inadvertent strikes during aerial drops, including fire retardant
- Illness or mortality due to inadvertent chemical contamination of terrestrial species or aquatic habitats and species (special status species or prey species) during aerial applications, including fire retardant

Long-term effects

- UPD habitat could benefit from letting fire burn sagebrush and other habitat types; therefore; interdependent effects of wildland fire suppression that prevents the loss of suitable GRSG habitat from catastrophic wildland fires could limit the benefits of fire for UPD

- Wildfire suppression could negatively impact UPD habitat where the effects of wildfire would otherwise maintain suitable grass/forb habitat characteristics
- UPD and their habitat could experience positive interrelated effects from post-fire emergency stabilization and rehabilitation (ESR) efforts in or near occupied sites, which would avoid or minimize further negative indirect effects on populations or key habitat components from either the wildland fire or fire suppression operations
- Long-term changes in quality or quantity of habitat when key habitat components are slow to recover, affecting the ability of a federally protected species to continue occupying a site, including extensive or severe damage to seedbanks, substrates, vegetative composition, or structure of habitats for plant species

Because alteration, damage, removal, or fragmentation of key habitat components from fire suppression would generally be mitigated as part of either fire suppression (implementation of resource protection measures) or ESR, negative long-term effects on habitat quality or quantity would typically be avoided or limited in scope and intensity.

Fuels Treatments Effects

Fuels treatments using prescribed fire or other means in grassland and sagebrush habitats could negatively affect UPD from smoke, fire, noise, or other human-caused disturbance, resulting in harassment, displacement, injury, or possibly mortality; or immediate post-project alteration of key habitat components (e.g., forage or vegetative cover) or prairie dog colonies from surface-disturbing activities. Any effects would be short term and of low intensity due to the implementation of resource protection measures, including pre-project surveys and avoiding critical periods for the UPD (e.g., hibernation and when pups are in the burrows). The immediate initial loss of forage and cover after a prescribed fire would be followed by vigorous regrowth of forb species in the growing seasons that follow (less than five years).

The following short-term and long-term effects could occur on the UPD or its habitat from prescribed fire and non-fire fuels treatments:

Short-term direct effects

- Burrow abandonment or mortality of young, resulting in the loss of one year's recruitment
- High levels of fuel loading at some sites would cause some adaptively managed wildland fires or prescribed fires to burn at higher than natural intensities, even when fire prescriptions were designed to maintain lower intensities
- Consumption of large woody debris and removal of shrub cover would be greater than typically found in the natural range of variation for an area, while creation of habitat mosaics would be less than typical
- Soil or ground disturbance from vehicles or heavy equipment during treatments, resulting in disturbance or destruction of vegetation (federally protected plant species and habitats for wildlife or fish) and subsurface dens or burrows
- When using domestic ungulates as the tool to implement biological vegetation treatments, trampling of plants or small animals could occur

Long-term effects

- Long-term changes in quality or quantity of habitat when key habitat components are slow to recover, affecting the ability of a federally protected species to continue occupying a site,

including extensive or severe damage to seedbanks, substrates, vegetative composition, or structure of habitats for plant species

- Long-term beneficial effects on species from the following:
  - Decreased risk for large, catastrophic fires through fuels reduction and the gradual transition to a more natural fire regime
  - Restoration of habitats that have been altered due to invasion of nonnative species, or long-term exclusion of fire (in fire-adapted vegetation communities)
  - Long-term positive effects could benefit a species' reproduction, numbers, or distribution and, in some cases, facilitate the return of a species to its historic range

There is the potential for indirect effects (effects caused by the action but at a later time) from future site-specific ground-disturbing actions associated with fuels treatments. However, at this programmatic planning level, these future actions are currently unknown, and any possible effects are too speculative to evaluate at this time and are not reasonably certain to occur. All future site-specific projects will include an environmental analysis through the NEPA process and ESA Section 7 consultation. Potential adverse effects on UPD would be avoided, minimized, or mitigated through site-specific analysis of the details of such actions.

Lands and Realty Effects (Transmission Lines)

Under the existing plans, an existing designated utility corridor is aligned to intersect two major leks in the Panguitch area. This corridor does not have any power lines in a portion of it. Under the proposed plan, the portion vacant of power lines is being re-aligned to where there are currently existing power lines and closer to Highway 89. As a result of this realignment, if a new transmission line (100kV or greater) cannot avoid PHMA, which is the principle management approach, the next option would be to locate it in a designated corridor. By placing a potential new line next to an existing power line, there would be less overall new disturbance and impacts would be concentrated where there is already some disturbance. While this is avoiding impacts to GRSG leks and nesting habitat, it increases the possibility of localized impacts to UPD because the adjusted alignment and existing power lines go over an existing UPD colony. However, the existing Kanab RMP management decisions that pertain to UPD (and are not being amended in this process) state that no surface disturbance or surface occupancy can occur within 0.5 miles of active UPD habitats, and that renewed or amended ROWs on public lands that have the potential to disturb active and inactive Utah prairie dog colonies should be rerouted. Though a designated utility corridor does not guarantee a power line will be built in the area, it increases the likelihood, relative to other areas outside the designated corridor. In addition to complying with the GRSG lands actions directing avoidance of this area, any potential power line would have to also comply with the UPD actions in the Kanab RMP, including in the realigned corridor. Further, the Kanab RMP does not restrict power lines to designated corridors; neither does the proposed Plan. As such, any new potential power lines, while more likely to be located within the realigned corridor, would still need to comply with other GRSG and UPD management RMP actions (see Kanab RMP language below).

Kanab RMP Language for Utah Prairie Dog

- Implement conservation measures (Kanab RMP - Appendix 9) on actions affecting Utah prairie dogs or their habitat.
- Permit no surface disturbing activities or surface occupancy within ½ mile of active, suitable (currently inactive), or potential reintroduction (BLM 2002b) Utah prairie dog habitats/sites.
- Seismic activities would avoid these areas, particularly during the active season (April 1 to September 30).
- Allow introduction, augmentation, restocking, translocations, transplantation, and/or reestablishments of special status species in cooperation and collaboration with USFWS,

UDWR, and other agencies as necessary, subject to guidance provided by BLM's 6840 policy and by existing or future memoranda of understanding (MOU).

- Require deterrent devices designed to prevent raptors from perching on powerline structures on all new construction (including upgrades and reconstruction) to discourage predation on Utah prairie dogs.
- Reroute renewed or amended ROWs on public land that have the potential to disturb active and inactive Utah prairie dog colonies.
- Preclude cross-country OHV use in occupied or inactive Utah prairie dog colonies.
- Allow for the treatment of plague and other diseases that may impact Utah prairie dogs.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. While the decision area for the current proposal encompasses mapped GRSG habitats on BLM- and Forest Service-administered lands as well as split-estate lands under other ownerships, the elements considered here as potentially affecting UPD (i.e., habitat management, wildfire management, and fuels management) are to BLM- and Forest Service-administered lands only. Because only federal actions are expected to occur in the focus area, no cumulative effects are expected as a result of actions on state, tribal, local, or private lands in the decision area.

Summary Determination of Effects on Utah Prairie Dog

The Forest Service proposed action and BLM proposed plan both contain elements associated with wildfire management, fuels management, and vegetation management that may affect UPD. The BLM proposed plan specifically acknowledges that where GRSG and UPD overlap, site-specific consideration of projects will be necessary, in collaboration with local biologists, to ensure that projects benefit both species. In addition, the shifting of the utility corridor may have adverse impacts to UPD. For all projects in UPD habitat, BLM and Forest Service will incorporate Service-recommended UPD design features, to the extent possible, to avoid and minimize impacts; however, it is possible that not all UPD design features will be possible to incorporate. Therefore, **the Utah GRSG LUP Amendment and EIS may affect, and is likely to adversely affect, UPD.**

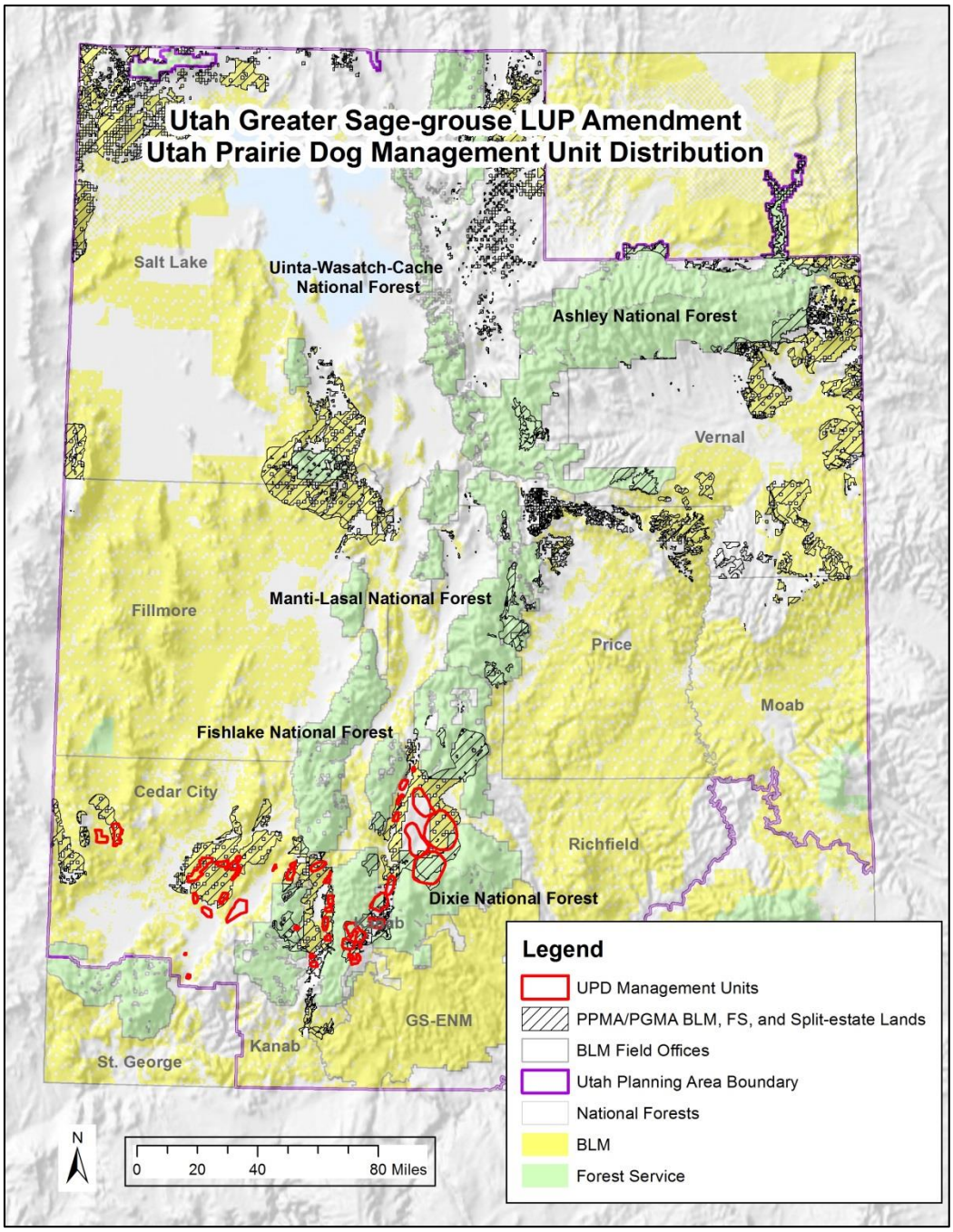

Figure 3. Utah Prairie Dog and GRSG Mapped Habitat Distribution

Mexican Spotted Owl (*Strix occidentalis lucida*)—Threatened

Designated critical habitat for Mexican Spotted Owl (MSO) exists on lands administered by the BLM Price, Cedar City, GSENM, Kanab, and Richfield Field Offices but overlap with GRSG PHMA/GHMA primarily exists within the Price FO. Of the approximately 10,482 acres of MSO critical habitat that overlaps with PHMA on BLM lands, 998 acres are within the Price FO. MSO modeled habitat on BLM-administered lands overlaps PHMA/GHMA on approximately 23,530 acres in the Price and Vernal Field Offices. An additional 13,426 acres of PHMA/GHMA on split-estate lands overlaps with modeled MSO habitat in the same field office boundaries (Table 9). Modeled habitats overlapping GRSG mapped habitats on the Manti-La Sal and Dixie National Forests total 5,291 acres.

Table 9. MSO Modeled Habitat and GRSG Mapped Habitat Overlap

Administrating Unit	Modeled Habitat (BLM- and Forest Service-Administered Lands in Acres)	Modeled Habitat (Split-Estate Lands in Acres)	Designated Critical Habitat (BLM- and Forest Service-Administered Lands in Acres)	Designated Critical Habitat (Split-Estate Lands in Acres)
Cedar City Field Office	0	0		
GSENM				
Price Field Office[1]	23,423	11,930		998
Vernal Field Office[1]	107	1,496		0
Dixie NF[2]	302	0		0
Manti-La Sal NF*	4,989	0		0
Totals	**28,821**	**13,426**		**998**

[1]Acres based on 2000 Statewide habitat model
[2]Acres based on MSO habitat modeled specifically by the Dixie National Forest

Mexican Spotted Owl—Project Design Features

- Where management activities designed to maintain or enhance GRSG habitat occur in MSO-designated critical habitat, avoid negative impacts on MSO critical habitat primary constituent elements.

- For management activities designed to maintain or enhance GRSG habitat that occur within 0.5 mile of suitable MSO breeding habitat, survey for MSO presence before implementation. Apply appropriate management buffers around known MSO active sites during potential disturbance to breeding MSOs. If no surveys occur, apply appropriate management buffers around unsurveyed suitable breeding habitat during potential disturbance to breeding MSOs, or conduct proposed activities between September 1 and February 28 (outside of the breeding season).

Habitat Management Effects

No direct impacts to nesting areas will occur from proposed actions. Though, the habitat management and wildfire management actions could impact foraging habitats. Due to the generalized nature of MSO foraging, it is deemed that the scope of the actions proposed in this plan amendment will not have adverse direct or indirect impacts to MSO.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on Mexican Spotted Owl and Critical Habitat

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, MSOs or MSO critical habitat because any proposed actions that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

California condor (*Gymnogyps californianus*)—Endangered and Experimental/Nonessential Population

California condors are primarily a cavity-nesting species, typically in cavities on steep rock formations or in the burned-out hollows of old-growth conifers. Roosting sites are ridgelines, rocky outcrops, steep canyons, and tall trees or snags near foraging grounds. In search of carrion, typical foraging behavior is long-distance reconnaissance flights usually over more open terrain. Records from 1992 to 2012 show the cause of condor mortality in nearby Arizona was predominately lead exposure (USFWS 2013a). Other less prevalent mortality factors are (in order of frequency) predation, starvation, shooting, and power line collision.

Condors are not known to nest in the decision area. Suitable nest sites (cliffs and hollowed portions of old-growth conifer) are unlikely to coincide with suitable GRSG habitat. However, the decision area may serve as condor foraging habitat.

There would be no direct effect on California condors as a result of the proposed action. The single most significant threat to this species is lead ingestion (USFWS 2013a). Elements in the proposed action would have no indirect effect on condor exposure to lead.

There is a potential for indirect effects on foraging habitat from management direction under both the BLM and Forest Service proposed alternatives. Management actions and standards and guidelines designed to maintain or enhance GRSG habitat would also maintain healthy open ecosystems favorable to California condor foraging. In addition, management direction listed below pertaining to installation of anti-perching devices on towers and tall structures would apply to power lines. California condors have been known to use transmission towers and other tall structures for perching (USFWS 2013a), and there is a risk of collision and electrocution associated with these structures. Retrofitting such structures to prevent perching would likely reduce risk to condors, thereby providing a beneficial effect on the species.

BLM MA-LAR-5 – *Work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation.*

USFS GRSG-LR-SUA-ST-016 – *In PHMA, SFA, GHMA, and Anthro Mountain, require protective stipulations (e.g., noise, tall structure, guy wire removal, perch deterrent installation) when issuing new authorizations or during renewal, amendment, or reissuance of existing authorizations that authorize infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers).*

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on California Condor

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, California condor where it is federally listed as endangered and is not likely to jeopardize California condor in the Experimental Population Area. This is because the anticipated effects to the species and suitable habitat existing in the decision area would be beneficial due to the reduced risk associated with use of transmission lines as perch sites and overall management for open vegetation in GRSG habitats. Any proposed actions that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

B. Plants

Autumn Buttercup (*Ranunculus aestivalis*)

Autumn buttercup is a rare endemic species that occurs on a piece of private land within PHMA in the Panguitch Valley, approximately one-fourth mile from the BLM lands managed under the Kanab Field Office. No plants are known to occur on either BLM- or Forest Service-administered lands. There is approximately 20 acres of this habitat type onBLM lands in the area, near the TNC property (identified known location currently vacant), but the BLM habitats are drier. In the event that any actions under this GRSG LUP Amendment are proposed that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

Due to the rarity of this species, there are only two known occurrences in the project area. Potential effects would result from GRSG conservation measures, which are largely restrictive, and would likely be beneficial to autumn buttercup habitat.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA on BLM- and Forest Service-administered lands. No State, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on Autumn Buttercup

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, autumn buttercup. This is because any proposed actions that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided

Because no suitable habitats for autumn buttercup are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Richfield, Price, or Vernal, or Salt Lake Field Offices or

the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on autumn buttercup in these areas.

Clay phacelia (*Phacelia argillacea*)

Clay phacelia, their occupied habitats, and modeled habitats do not overlap PHMA or GHMA. This narrow endemic species currently exists in three populations on 74 acres (70 acres The Nature Conservancy property and 4 acres on Uinta-Wasatch-Cache Forest Service lands). The nearest known clay phacelia occurrences are approximately 4.1 miles from PHMA federal lands (3.5 miles from PHMA on non-federal lands). Through modeling efforts, Forest Service has identified 1,352 acres of potential clay phacelia where some of the area has been ground-truthed but has not yet documented new occupied clay phacelia habitats. The modeled habitat occurs approximately 1.5 miles of PHMA on BLM lands under the jurisdiction of the Salt Lake City Field Office (near Starvation Creek off of Highway 6 through Spanish Fork).

Through,the greatest existing and potential threats to this species are transportation and transmission line development and maintenance and herbivory (USFWS 2013c). Ground disturbance in association with these threats has the potential to damage individuals and degrade habitat. While clay phacelia, their occupied habitat, and their modeled habitat do not overlap with PHMA or GHMA, other concurrent 500 kV transmission projects have been developing their alignments in anticipation of Utah GRSG LUP amendments. Therefore, the planning of these two transmission lines has identified preferred alignments that may cross modeled clay phacelia habitat. Future site-specific analysis of impacts for these two projects will occur in compliance with NEPA and ESA.

Summary Determination of Effects on Clay Phacelia

Clay phacelia known occurrences and modeled habitat do not overlap GRSG habitat.

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, clay phacelia. This is because there will be no adverse direct or indirect impacts from the plan amendment because there is no overlap of currently occupied or modeled habitat but the proposed TWE and EGS transmission lines avoided impacting GRSG and by doing so, will cross modeled clay phacelia habitat.

Because no suitable habitats for clay phacelia are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Richfield, Price, or Vernal Field Offices or the Ashley, Dixie, Fishlake, or Manti-LaSal National Forests, there would be no effects on clay phacelia in these areas.

Clay Reed-Mustard (*Schoenocrambe argillacea*)

Clay reed-mustard is a rare endemic species that is known to exist in six populations along 13 miels of the Green River to Willow Creek in the BLM Vernal Field Office. The only known occurrence of Clay reed-mustard within a GRSG habitat area the eastern portion of its distribution near Willow Creek and is in GHMA on BLM-administered lands. The GHMA habitat overlaps near Willow Creek, but the clay reed-mustard populations and suitable habitat areas are steep sparsely-vegetated slopes and would not be targeted for future GRSG conservation actions.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands exist in the decision area,

and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on Clay Reed-Mustard

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, clay reed-mustard. This is because clay reed-mustard is found within GHMA area in the Vernal Field Office but does not exist in GRSG habitats. However, in the event that any actions under this GRSG LUP Amendment are proposed that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. Because no suitable habitats for clay reed-mustard are expected in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on clay reed-mustard in these areas.

Last Chance Townsendia (*Townsendia aprica*)

Last Chance townsendia occurs in two locations in PHMA in the Lower Last Chance Creek area on Forest Service lands within the jurisdiction of Fishlake National Forest in the Parker population area. In addition, Last Chance townsendia overlaps with PHMA/GHMA in the BLM Richfield Field Office. Species occurrences are known in the Price Field Office and the Dixie National Forest but are outside PHMA and GHMA. Management decisions are not anticipated to have direct or indirect adverse impacts to Last Chance townsendia, but in the event that any actions under this GRSG LUP Amendment are proposed that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

The current primary threats to Last Chance townsendia are trampling from livestock and wild horses and burros, energy and mineral-related development, range improvements, and ORV use (USFWS 2013d). Ground disturbance in association with these threats has the potential to damage individuals and degrade habitat. In the event that any actions under this GRSG LUP Amendment are proposed that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

ORV use is a threat to Last Chance townsendia because individuals can be damaged resulting in reduced seed production or individual mortality. Indirectly, soil disturbance as a result of ORV use can increase soil erosion and promote invasive species. The following action may, under BLM MA-TTM-2 states that *PHMA and GHMA that do not have designated routes in a Travel Management Plan would be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use)*. Thus, if any areas of occupied or suitable habitat for Last Chance townsendia in PHMA or GHMA are currently open to ORV use, concurrent restrictions would be placed on the vehicle operators to use only existing routes.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA occurring on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on Last Chance Townsendia

A potential beneficial effect on Last Chance townsendia may result in PHMA/GHMA from the action of restricting vehicle use to existing roads and trails (where travel planning has not previously been completed – BLM MA-TTM-2).

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely, affect Last Chance townsendii. This is because the anticipated effects to species occurrences and suitable habitat that exist in PHMA and GHMA in the Richfield Field Office and the Fishlake National Forest would be beneficial due to the reduced threat from ORVs. Any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

Because no suitable habitats for Last Chance townsendia are suspected to occur in PHMA or GHMA in the Price Field Office or the Dixie National Forest, and suitable habitats are not suspected at all on the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Salt Lake, or Vernal Field Offices or the Ashley, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on Last Chance townsendia in these areas.

Shrubby Reed-Mustard (*Schoenocrambe suffrutescens*)

Shrubby reed-mustard is a rare endemic that occurs in seven populations in Uintah and Duchesne counties with known occurrences in GHMA (none on PHMA) on BLM lands within the jurisdiction of the Vernal Field Office. Known sites are about 5 miles from PHMA. Seven of 63 documented sites overlap GHMA on BLM-administered lands in the Johnson Draw area, Vernal Field Office. Other shrubby reed-mustard suitable habitat areas exist nearby and are in the decision area of the proposed land use plan amendments. The small dry desert-like habitats of shrubby reed-mustard would not likely be targeted for GRSG conservation actions. In the event that any actions under this GRSG LUP Amendment are proposed that may adversely affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA occurring on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on Shrubby Reed-Mustard

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, shrubby reed-mustard. This is because the species exists within GHMA but there are no anticipated effects on occurrences and suitable habitat. In addition, any impacts from this proposed plan that may affect this species would be evaluated at the project level and all adverse effects avoided.

Because no suitable habitats for shrubby reed-mustard are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on shrubby reed-mustard in these areas.

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)

Uinta Basin hookless cactus is known to occur in the Price and Vernal Field Offices; no occurrences or habitat are suspected to occur in PHMA. Only one documented site is in GHMA, near Nine Mile Canyon in the Vernal Field Office.

At the time of the original listing of the Uinta Basin hookless cactus complex, ongoing and foreseeable threats included mineral and energy development, illegal collection, recreational ORV use, and grazing. New threats identified since original listing are climate change, parasitism by the cactus-borer beetle, and invasive weeds. This GRSG LUP Amendment is not anticipated to substantially change these threats in GHMA in the Vernal Field Office.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA occurring on BLM and Forest Service administered lands. No state, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Determination of Effects on Uinta Basin Hookless Cactus

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, Uinta Basin hookless cactus. This is because there are no anticipated effects to the species or suitable habitat that exist in PHMA and GHMA in the Vernal Field Office. Any impacts from this proposed plan would be evaluated at the project level and all adverse effects avoided. Because no suitable habitats for Uinta Basin hookless cactus are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on Uinta Basin hookless cactus in these areas.

Ute Ladies'-Tresses (*Spiranthes diluvialis*)

Ute ladies'-tresses is known to occur in the Uinta-Wasatch-Cache National Forest, the Grand Staircase-Escalante National Monument, the Vernal Field Office and is suspected in the Salt Lake Field Office and the Fishlake National Forest. Occurrences on the Uinta-Wasatch-Cache National Forest do not overlap GRSG habitat.

Current Conservation/Protection Measures for Ute Ladies'-Tresses

Grand Staircase/Escalante National Monument Plan

SSP-4: The allotment evaluation process will address the protection of endangered species, including the incorporation of the latest research and information in the protection of these species, consistent with the BLM-wide grazing permit review process. Section 7 consultation will be conducted for all allotments that may affect listed species.

SSP-9: Communication sites, utility and road ROWs will not be permitted in known special status species populations. As permits are granted for these sites and ROWs, surveys will be completed to determine the presence of special status species in the area. If they are found, these activities will be moved to another location.

Measures Specifically for Ute Ladies'-tresses (Spiranthes diluvialis)

SSP-18: The information in the water section describes a strategy for ensuring water availability. Under that strategy, priority will be to maintain natural flows and floods. In addition, the maintenance of instream flows will provide adequate water for natural structure and function of riparian vegetation. Ute ladies'-tresses relies on these natural floods to colonize new areas and maintain healthy and viable populations.

SSP-19: Surveys for this species began in the 1999 growing season, and the results will be used to determine any further actions.

SSP-20: Appropriate actions will be taken to prevent trampling of the plants by visitors in high-use areas. These actions may include replanting native vegetation or constructing barriers.

SSP-21: Areas may be closed if necessary to protect these plants. Barriers will be constructed and restoration work initiated to stabilize the soil and banks and provide the best possible habitat for this plant.

SSP-22: No expansion of current or new facilities will be permitted where this plant grows.

SSP-23: Trails in areas where this plant grows will be relocated away from the plants and potential habitat when possible. These protection measures apply to current as well as future potential habitat areas for this species.

SSP-24: Interpretive materials will be developed to educate the public about Ute ladies'-tresses and the actions being implemented to protect it.

SSP-25: Restoration of the social trails in known populations will be initiated, including obliterating the trail by planting native species and moving soil to return the area to its natural grade. Group size restrictions, allocations, or other measures will be initiated if continued monitoring indicates that visitor use in the area is causing impacts.

Uinta National Forest

Sub-goal-2-15 (G-2-15): Ute ladies'-tresses colonies are managed so as to contribute to the protection and recovery of the species in the Diamond Fork watershed. If necessary, these colonies will serve as propagation stock for new habitats in this watershed. Bee (pollinator) habitat will be identified and protected in association with these plant colonies.

WL&F-16 Guideline: Where feasible, pollinator habitat will be provided next to Ute ladies'-tresses colonies by avoiding the removal of down woody material in the course of any management activities in the lower 7.5 miles of the Diamond Fork River corridor. Where removal cannot be avoided, a portion of down woody material greater than 3 inches in diameter will be salvaged and relocated to sunny openings next to Ute ladies'-tresses colonies.

Riparian habitat along Diamond Fork Creek is managed to achieve and maintain healthy, dynamic, sustainable communities in which the Ute ladies'-tresses orchid is an integral, if not dominant, component.

Threats to Ute ladies'-tresses are ORV use, competition with aggressive nonnative plants, alteration of hydrologic regimes through stream management, urbanization (conversion of potential habitat and increasing demands for water), drought, trampling from livestock, wild horses, and burros, and

recreational use. (USFWS 1995). Any projects proposed as a result of this plan amendment that could potentially adversely affect Ute ladies'-tresses would be avoided.

Beneficial effects, such as reduced impacts from grazing and invasive species, are possible from proposed actions, but the extent of benefit and likelihood of occurrence are too speculative to quantify.

In addition, the specific conservation measure BLM MA-TTM-2 states *that PHMA and GHMA that do not have designated routes in a Travel Management Plan would be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use).* Thus, if any areas of occupied or suitable habitat for Ute ladies'-tresses in PHMA or GHMA are currently open to ORV use, restrictions would be placed on the vehicle operators to use only existing routes. This would provide a small but contemporaneous beneficial effect on Ute ladies'-tresses by reducing the likelihood of damage from ORVs.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the decision area are identified, and their effects are added to the anticipated effects of the current proposal. The decision area for the current proposal is limited to PHMA and GHMA occurring on BLM- and Forest Service-administered lands. No state, tribal, local, or private lands exist in the decision area, and no state, tribal, local, or private actions are planned or expected to occur in the decision area. Only federal actions are expected to occur in the decision area; therefore, no cumulative effects are expected.

Summary Determination of Effects on Ute ladies'-tresses

A potential beneficial effect on Ute ladies'-tresses may result in PHMA/GHMA from restricting vehicle use to existing roads and trails (where travel planning has not previously been completed – BLM MA-TTM-2). Any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, Ute ladies;-tresses. This is because the estimated effects on occurrences and suitable habitat that exist in PHMA and GHMA in the project area would be beneficial due to the reduced impacts from ORVs. Any proposed actions as a result of this plan amendment that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided

Because no suitable habitats for Ute ladies'-tresses are suspected to occur in the Cedar City, Fillmore, Price, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, or Manti-LaSal National Forests, there would be no effects on Ute ladies'-tresses in these areas.

DETERMINATIONS OF EFFECTS SUMMARY BY SPECIES

Table 10. Summary of determinations

Species	Status[16]	Determination[17]	Rationale
Black-footed ferret *Mustela nigripes*	Exp.	NLJ	The Utah GRSG LUP Amendment and FEIS decision is not likely to jeopardize the black-footed ferret in the Vernal Field Office. Activities implemented at the project-level may occur in proximity to black-footed ferrets and any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. The Utah GRSG LUP Amendment and EIS will not affect black-footed ferret because there are no occurrences or identified reintroduction areas in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-Lasal, or Uinta-Wasatch-Cache National Forests.
Canada lynx *Lynx canadensis*	T	NLAA	The Utah GRSG LUP Amendment and FEIS decision may affect, but is not likely to adversely affect Canada lynx in the Vernal Field Office or the Uinta-Wasatch-Cache or Ashley National Forests. Primary habitats for Canada lynx and GRSG are generally separate. Overlapping habitat is relegated to secondary status. Any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. There would be no effect on Canada lynx in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-Lasal, or Uinta-Wasatch-Cache National Forests due to lack of species occurrence, lack of suitable habitat, and lack of potential impact on the species and its habitat.
Canada lynx critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect Canada lynx critical habitat because there is no Canada lynx critical habitat designated in the Planning Area.
Utah prairie dog *Cynomys parvidens*	T	LAA	The Utah GRSG LUP Amendment and FEIS decision may affect, and is likely to adversely affect, UPD in the Cedar City, Fillmore, Kanab, and Richfield Field Offices and the Dixie and Fishlake National Forests. Overlapping habitat does occur, with a potential for effects. There are mitigation measures for UPD, but adverse effects on UPD may still result from activities associated with wildfire suppression and from management actions associated with transmission line ROWs.

[16]E = Endangered; T = Threatened; P-T = Proposed Threatened

[17]NE = No effect (will not affect the species); NLJ = Not likely to jeopardize the continued existence of the species; NLAA = May affect, but is not likely to adversely affect; LAA = May affect, likely to adversely affect

Species	Status[16]	Determination[17]	Rationale
			The project would not affect UPD in the Grand Staircase-Escalante National Monument, Price, Salt Lake, and Vernal Field Offices, and the Ashley, Manti-Lasal, and Uinta-Wasatch-Cache National Forests due to a lack of overlap between UPD occurrence and UPD management areas and the decision area.
California condor *Gymnogyps californianus*	E	NLAA	The Utah GRSG LUP Amendment and FEIS decision may affect, but is not likely to adversely affect, California condor in the Cedar City, Kanab, and Richfield Field Offices and the Dixie and Fishlake National Forests. There is no overlap of known or potential nest sites with GRSG mapped habitats that constitute the decision area. Overlapping of potential foraging habitat with GRSG mapped habitat does occur, but any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. The project would not affect California condor in the Fillmore, Grand Staircase-Escalante National Monument, Price, Salt Lake, and Vernal Field Offices, and the Ashley, Manti-Lasal, and Uinta-Wasatch-Cache National Forests due to a lack of overlap between known occurrence and the decision area.
California condor *Gymnogyps californianus* 10(j) area	Exp.	NLJ	The Utah GRSG LUP Amendment and FEIS decision may affect, but is not likely jeopardize, California condor in the Cedar City, Kanab, and Richfield Field Offices and the Dixie and Fishlake National Forests. There is no overlap of known or potential nest sites with GRSG mapped habitats that constitute the decision area. Overlapping of potential foraging habitat with GRSG mapped habitat does occur, but any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. The project would not affect California condor in the Fillmore, Grand Staircase-Escalante National Monument, Price, Salt Lake, and Vernal Field Offices, and the Ashley, Manti-Lasal, and Uinta-Wasatch-Cache National Forests due to a lack of overlap between breeding occurrence and the decision area or lack of overlap lands and the 10(j) area. There is no overlap of known or potential sites with GRSG mapped habitats that constitute the decision area. Overlapping of potential foraging habitat with GRSG mapped habitat does occur, but any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided.
Mexican spotted owl *Strix occidentalis lucida*	T	NLAA	The Utah GRSG LUP Amendment and FEIS decision may affect, but is not likely to adversely affect, MSO in the Price and Vernal Field Offices and the Manti-Lasal National Forest due to occurrence of MSO modeled suitable habitat within

Species	Status[16]	Determination[17]	Rationale
			0.5 mile of GRSG mapped habitat in the decision area. Cedar City, Kanab, and Richfield Field Offices and the Dixie and Fishlake National Forests. Any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. The project would not affect MSO in the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Price, Richfield and Salt Lake Field Offices, and the Ashley, Dixie, Fishlake, and Uinta-Wasatch-Cache National Forests due to a lack of MSO modeled suitable habitat within 0.5 mile of GRSG mapped habitats in the decision area.
Mexican spotted owl critical habitat	Designated	NLAA	The Utah GRSG LUP Amendment and FEIS decision may affect, but is not likely to adversely affect, Mexican spotted owl critical habitat. To ensure there would be no adverse impacts, design features would be incorporated when in areas with overlapping MSO critical habitat and GRSG mapped habitats on BLM and split-estate lands on 11,480 acres. The project will not affect MSO critical habitat on the Cedar City, Grand Staircase-Escalante National Monument, Kanab, and Richfield Field Offices, and Dixie and Fishlake National Forests due to overlap of critical habitat and GRSG mapped habitat in the decision area.
Southwestern willow flycatcher *Empidonax traillii extimus*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the southwestern willow flycatcher on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, and Vernal Field Offices, and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap of known southwestern willow flycatcher occurrence with GRSG mapped habitat in the decision area. There are no actions in this LUP amendment decision that would impact suitable riparian habitats.
Southwestern willow flycatcher critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect southwestern willow flycatcher critical habitat because there is no overlap of designated critical habitat with GRSG mapped habitats in the decision area.
Western yellow-billed cuckoo *Coccyzus americanus*	T	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the western yellow-billed cuckoo on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, and Vernal Field Offices, and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap of known species occurrence with GRSG mapped habitat in the decision area during the last 19 years. There are no actions in this LUP amendment decision that would impact suitable riparian habitats.

Species	Status[16]	Determination[17]	Rationale
Western yellow-billed cuckoo critical habitat	Proposed	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect western yellow-billed cuckoo proposed critical habitat on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap between proposed critical habitat and GRSG mapped habitats in the decision area.
Kanab ambersnail *Oxyloma haydeni kanabensis*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the Kanab ambersnail on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There are no occurrences in GRSG mapped habitats in the decision area.
Bonytail chub *Gila elegans*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the bonytail chub on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no known occurrence on lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Bonytail chub critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect bonytail chub critical habitat on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap between critical habitat polygons and lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Colorado pikeminnow *Ptychocheilus lucius*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the Colorado pikeminnow on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no known occurrence on lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Colorado pikeminnow critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect Colorado pikeminnow critical habitat on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field

Species	Status[16]	Determination[17]	Rationale
			Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap between critical habitat polygons and lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Greenback cutthroat trout *Oncorhynchus clarki stomias*	T	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the greenback cutthroat trout on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no known occurrence on lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat.
Humpback chub *Gila cypha*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the humpback chub on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no known occurrence on lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Humpback chub critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect humpback chub critical habitat on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap between critical habitat polygons and lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
June sucker *Chasmistes liorus*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the June sucker on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There are no actions in this LUP amendment decision that would impact aquatic habitat.
June sucker critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect razorback sucker critical habitat on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap between critical habitat

Species	Status[16]	Determination[17]	Rationale
			polygons and lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water.
Lahontan cutthroat trout *Oncorhynchus clarkii* ssp. *henshawi*	T	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the Lahontan cutthroat trout on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There are no actions in this land use plan amendment decision that would impact aquatic habitat.
Razorback sucker *Xyrauchen texanus*	E	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect the razorback sucker on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no known occurrence on lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Razorback sucker critical habitat	Designated	NE	The Utah GRSG LUP Amendment and FEIS decision will not affect razorback sucker critical habitat on the Cedar City, Fillmore, Grand Staircase-Escalante National Monument, Kanab, Price, Richfield, Salt Lake, and Vernal Field Offices and the Ashley, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache National Forests. There is no overlap between critical habitat polygons and lands that constitute the decision area. There are no actions in this LUP amendment decision that would impact aquatic habitat or deplete water in main stem rivers of the Colorado River Basin.
Autumn Buttercup *Ranunculus aestivalis*	E	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but would not likely adversely affect, autumn buttercup. This is because it exists within PHMA in the Kanab Field Office. Any proposed actions that may affect this species and/or its habitats will be further evaluated at the project level, and adverse impacts would be avoided. The Utah GRSG LUP Amendment and EIS would not be likely to affect autumn buttercup in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Price, Richfield, Salt Lake, or Vernal field offices, or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache national forests because the species is not known or suspected to occur in those areas.
Barneby reed-mustard *Schoenocrambe barnebyi*	E	NE	The Utah GRSG LUP Amendment and EIS will not affect Barneby reed-mustard. This is because there are no occurrences or suitable habitat for Barneby reed-mustard in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, and there

Species	Status[16]	Determination[17]	Rationale
			is no overlap between Barneby reed-mustard occurrences or suitable habitat and PHMA/GHMA in the Price Field Office.
Barneby ridge-cress *Lepidium barnebyanum*	E	NE	The Utah GRSG LUP Amendment and EIS will not affect Barneby reed-mustard. This is because there are no occurrences or suitable habitat for Barneby reed-mustard in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, and there is no overlap between Barneby reed-mustard occurrences or suitable habitat and PHMA/GHMA in the Vernal Field Office.
Clay phacelia *Phacelia argillacea*	E	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, clay phacelia. This is because it exists within 2 miles of PHMA in the Salt Lake Field Office and on the Uinta National Forest and an acknowledgement that the proposed action may be increasing the likelihood of the alignment of two reasonably foreseeable projects (TWE and EGS transmission lines) in or near clay phacelia habitat. Any proposed actions under proposed management decisions that may impact this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided. The Utah GRSG LUP Amendment and EIS would not affect clay phacelia or suitable habitat for the species in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, or Vernal Field Offices, or the Ashley, Dixie, Fishlake, or Manti LaSal National Forests. This is because there are no known or suspected occurrences of clay phacelia in those areas.
Clay reed-mustard *Schoenocrambe argillacea*	T	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, clay reed-mustard. This is because it exists in PHMA and GHMA in the Vernal Field Office. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided. Because no suitable habitats for clay reed-mustard are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on clay reed-mustard in these areas.
Deseret milk-vetch *Astragalus desereticus*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Deseret milk-vetch because there are no occurrences or suitable habitat for Deseret milk-vetch in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, or Fishlake National Forests. There is no overlap between Deseret milk-vetch occurrences or suitable habitat and PHMA/GHMA

Species	Status[16]	Determination[17]	Rationale
			in the Richfield Field Office or the Manti-LaSal or Uinta-Wasatch-Cache National Forests.
Heliotrope milk-vetch *Astragalus montii*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Heliotrope milk-vetch. This is because there are no occurrences or suitable habitats for Heliotrope milk-vetch in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, or Uinta-Wasatch-Cache National Forests. There is no overlap between Heliotrope milk-vetch occurrences and suitable habitat and PHMA/GHMA in the Manti-LaSal National Forest.
Heliotrope milk-vetch *Astragalus montii* critical habitat	Designated	NE	The Utah GRSG LUP Amendment and EIS will not affect heliotrope milk-vetch designated critical habitat. This is because there is no designated critical habitat for heliotrope milk-vetch in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, or Uinta-Wasatch-Cache National Forests. There is no overlap between heliotrope milk-vetch designated critical habitat and PHMA/GHMA in the Manti-LaSal National Forest.
Jones cycladenia *Cycladenia humilis* var. *jonesii*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Jones cycladenia because there are no occurrences or suitable habitat for it in the Cedar City, Fillmore, Kanab, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Jones cycladenia occurrences or suitable habitat and PHMA/GHMA in the Grand Staircase/Escalante National Monument, Price or Richfield Field Offices.
Kodachrome bladderpod *Lesquerella tumulosa*	E	NE	The Utah GRSG LUP Amendment and EIS will not affect Kodachrome bladderpod. This is because there are no occurrences or suitable habitat for Kodachrome bladderpod in the Cedar City, Fillmore, Kanab, Price, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Kodachrome bladderpod occurrences or suitable habitat and PHMA or GHMA in the Grand Staircase/Escalante National Monument.
Last Chance townsendia *Townsendia aprica*	T	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect Last Chance townsendia. This is because it exists in PHMA and GHMA in the Richfield Field Office and the Fishlake National Forest. Effects would likely be beneficial due to the reduced threats related to ORVs. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided. Because no suitable habitats for Last Chance townsendia are suspected to occur in PHMA or GHMA in the Price Field Office or the Dixie National Forest, and suitable habitats are not suspected at all on the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab,

Species	Status[16]	Determination[17]	Rationale
			Salt Lake, or Vernal Field Offices or the Ashley, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on Last Chance townsendia in these areas.
Maguire primrose *Primula maguirei*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Maguire primrose. Even though, it is in the Uinta-Wasatch-Cache National Forest, Maguire primrose does not occur within 9 miles of PHMA.
Pariette cactus *Sclerocactus brevispinus*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Pariette cactus. This is because there are no occurrences or suitable habitat for Pariette cactus in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Pariette cactus occurrences or suitable habitat and PHMA/GHMA in the Vernal Field Office.
San Rafael cactus *Pediocactus despainii*	E	NE	The Utah GRSG LUP Amendment and EIS will not affect San Rafael cactus. This is because there are no occurrences or suitable habitat for San Rafael cactus in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between San Rafael cactus occurrences or suitable habitat and PHMA/GHMA in the Price or Richfield Field Offices.
Shrubby reed-mustard *Schoenocrambe suffrutescens*	E	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, shrubby reed-mustard. This is because there are no anticipated adverse effects on occurrences and suitable habitat that exist in PHMA and GHMA in the Vernal Field Office. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided. Because no suitable habitats for shrubby reed-mustard are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Price, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on shrubby reed-mustard in these areas.
Siler pincushion *Pediocactus sileri*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Siler pincushion. This is because there are no occurrences or suitable habitat for Siler pincushion in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Price, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Siler pincushion occurrences or suitable habitat and PHMA/GHMA in the Kanab Field Office.

Species	Status[16]	Determination[17]	Rationale
Uinta Basin hookless cactus *Sclerocactus wetlandicus*	T	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, Uinta Basin hookless cactus. This is because the species exists in PHMA and GHMA in the Vernal Field Office. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided. Because no suitable habitats for Uinta Basin hookless cactus are suspected to occur in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Richfield, or Salt Lake Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests, there would be no effects on Uinta Basin hookless cactus in these areas.
Ute ladies'-tresses *Spiranthes diluvialis*	T	NLAA	The Utah GRSG LUP Amendment and EIS may affect, but will not likely adversely affect, Ute ladies'-tresses. Suitable habitat exists in PHMA and GHMA in the Grand Staircase-Escalante National Monument, Salt Lake, and Vernal Field Offices and the Fishlake and Uinta-Wasatch-Cache National Forests but proposed action may be beneficial due to reducing impacts from ORVs. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided. No suitable habitats for Ute ladies'-tresses are suspected to occur in the Cedar City, Fillmore, Kanab, Price, or Richfield Field Offices or the Ashley, Dixie, or Manti-LaSal National Forests, therefore, there would be no effects on Ute ladies'-tresses in these areas.
Welsh's milkweed *Asclepias welshii*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Welsh's milkweed. This is because there are no occurrences or suitable habitat for Welsh's milkweed in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Price, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Welsh's milkweed occurrences or suitable habitat and PHMA or GHMA in the Kanab Field Office.
Welsh's milkweed *Asclepias welshii* critical habitat	Designated	NE	The Utah GRSG LUP Amendment and EIS will not affect Welsh's milkweed designated critical habitat. This is because there is no designated critical habitat for Welsh's milkweed in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Price, Richfield, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Welsh's milkweed designated critical habitat and PHMA or GHMA in the Kanab Field Office.
Winkler cactus *Pediocactus winkleri*	T	NE	The Utah GRSG LUP Amendment and EIS will not affect Winkler cactus. This is because there are no occurrences or suitable habitat for Winkler cactus in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-

Species	Status[16]	Determination[17]	Rationale
			Cache National Forests. There is no overlap between Winkler cactus occurrences or suitable habitat and PHMA or GHMA in the Price or Richfield Field Offices.
Wright fishhook cactus *Sclerocactus wrightiae*	E	NE	The Utah GRSG LUP Amendment and EIS will not affect Wright fishhook cactus. This is because there are no occurrences or suitable habitat for Wright fishhook cactus in the Cedar City, Fillmore, Grand Staircase/Escalante National Monument, Kanab, Salt Lake, or Vernal Field Offices or the Ashley, Dixie, Fishlake, Manti-LaSal, or Uinta-Wasatch-Cache National Forests. There is no overlap between Wright fishhook cactus occurrences or suitable habitat and PHMA or GHMA in the Price or Richfield Field Offices.

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Attachment A: ADDITIONAL RATIONALE BEHIND NO EFFECT DETERMINATIONS FOR SELECT SPECIES OR GROUPS OF SPECIES IN TABLES 1 AND 2

Black-footed Ferret

The black-footed ferret is listed as an experimental, non-essential population within the decision area. Black-footed ferrets have been documented only on the Vernal Field Office within the last 15 years as a result of reintroduction efforts in the Coyote Basin Reintroduction Area. As of 2012, the black-footed ferret population in Coyote Basin was estimated to consist of one breeding adult, down from a total of 25 breeding adults in 2008. Average estimate of breeding adults from 2008 to 2012 was seven individuals (USFWS 2013e).

The Utah GRSG LUP Amendment decisions are not likely to jeopardize the black-footed ferret. The primary threats to this species, loss of its prairie dog prey due to eradication as well as lack of regulatory mechanisms (USFWS 2013e), are not directly influenced by elements contained in this land use plan amendment. Secondary threats, such as oil and gas development, will not be authorized as part of this decision. Conservation measures specific to leased and unleased fluid minerals generally include stipulations either preventing new leasing or surface occupancy near leks or within PHMAs or GHMAs, timing restrictions, and disturbance caps. Although these measures may have the potential to increase the likelihood offluid minerals development into adjacent areas, this potential effect is currently too speculative to analyze because there are no site-specific project projects currently proposed. Furthermore, site-specific effects analysis for NEPA and ESA compliance, including the potential for oil and gas development in adjacent areas, will be conducted at the project level, and an effects determination for the black-footed ferret will be made at that time.

Southwestern willow flycatcher

Southwestern willow flycatcher suitable habitat consists of patchy to dense riparian habitats along streams and wetlands near or adjacent to surface water or saturated soils.

The primary cause of the flycatcher's decline is loss and modification of habitat. Riparian ecosystems have declined from reductions in water flow, interruptions in natural hydrological events and cycles, physical modifications to streams, modification of native plant communities by invasion of exotic species, and direct removal of riparian vegetation (USFWS 2002a).

There is currently no known use of sage-grouse PHMA and/or GHMA within the planning area by southwestern willow flycatchers. While the decision area may overlap with riparian habitat, there are no actions within this LUP Amendment decision that would alter risk factors or habitat conditions for the species. There is no overlap between designated critical habitat and the decision area. Therefore, the Utah GRSG LUP Amendment and EIS will not affect southwestern willow flycatcher or its habitat.

Yellow-billed cuckoo

Yellow-billed cuckoos require large blocks of riparian woodlands (50 acres/20 hectares or more) within low to moderate elevation arid to semiarid landscapes.

Primary threat to the species is loss of suitable habitats. Principal causes of riparian habitat losses are conversion to agricultural and other uses, dams and river flow management, stream channelization and stabilization, and livestock grazing. Available breeding habitats for cuckoos have also been substantially

reduced in area and quality by groundwater pumping and the replacement of native riparian habitats by invasive non-native plants, particularly tamarisk. Much of the remaining habitat is in poor condition and heavily affected by human use. Fragmentation effects include the loss of patches large enough to sustain local populations, leading to local extinctions, and the potential loss of migratory corridors, affecting the ability to recolonize habitat patches. The threats facing the western US population of the yellow-billed cuckoo continue as a result of habitat loss from clearing and removal, or alteration and fragmentation of riparian forest for agriculture, urban development, flood control, and as a result of invasion of habitat by exotic species. The majority of the habitat for the cuckoo is on private lands and continues to be affected through land use conversion and grazing (USFWS 2011c).

There is currently no known use of sage-grouse PHMA and/or GHMA within the planning area by yellow-billed cuckoos. While the decision area may overlap with riparian habitat, there are no actions within this Land Use Plan Amendment decision that would alter risk factors or habitat conditions for the species. In addition, there is no critical habitat proposed within the planning area. Therefore, the Utah GRSG LUP Amendment and EIS will not affect yellow-billed cuckoo or its habitat

Colorado River Fishes (Bonytail chub, Humpback chub, Colorado pikeminnow, Razorback sucker)

Streamflow regulation, water depletion, and associated habitat modification are identified as primary threats to Colorado River listed fish populations (USFWS 1990, 2002b, 2002c, 2002d). There are no actions within this LUP Amendment decision that would impact aquatic habitat or cause streamflow alterations, modifications, or water depletions in these drainages. There is no overlap between designated critical habitats and the decision area. In addition, site-specific analysis will be conducted at the project level and a determination of effects for each of the Colorado River fish species will be made at that time. Therefore, the Utah GRSG LUP Amendment and FEIS decision will not affect the bonytail chub, humpback chub, Colorado pikeminnow, razorback sucker, or their habitat.

June sucker

June sucker habitat is low gradient streams and lakes with good water quality. Three populations have been introduced to locations off-forest to attempt to ensure species survival: one population each in Camp Creek Reservoir in Box Elder County, Red Butte Reservoir on the Wasatch-Cache National Forest; and at the Ogden Nature Center in Weber County. The refuge population in Box Elder County (lake habitat) overlaps GRSG mapped habitat on Split-estate land.

Threats to the species include habitat alteration and the introduction of nonnative fishes. Habitat alterations include the following: (1) water development has altered natural flow events, reduced annual lake-level stability, and blocked migration corridors; (2) changes in water quality have resulted in higher monthly river and lake temperatures, reduced dissolved oxygen levels, increased sedimentation rates and levels of dissolved solids, and increased turbidity; and (3) urbanization has resulted in development of the Provo River flood plain, channelization of the river and a reduction in available nursery habitat. The introduction of nonnative fishes has resulted in competition and predation as well as water quality changes such as increased turbidity. Loss of recruitment has resulted from a combination of the above factors (USFWS 1999).

There are no actions within this LUP Amendment decision that would impact aquatic habitat or cause water depletions, flow reductions or diversions, water quality, or presence of introduced fish species. There is no overlap between designated critical habitats and the decision area. Therefore, the Utah GRSG LUP Amendment and FEIS decision will not affect the June sucker or its habitat.

Lahontan cutthroat trout

Lahontan cutthroat trout inhabits both lakes and streams, but is an obligatory stream spawner in habitat that is characterized by well-vegetated and stable streambanks, stream bottoms with relatively silt-free gravel/rubble substrate, cool water, and pools in close proximity to cover and velocity breaks. Known occurrences overlap GRSG mapped habitat on BLM and Split-estate lands on Salt Lake Field Office.

Major impacts to Lahontan cutthroat trout habitat and abundance include: 1) Reduction and alteration of stream discharge; 2) alteration of stream channels and morphology; 3) degradation of water quality; 4) reduction of lake levels and concentrated chemical components in natural lakes; and 5) introductions of non-native fish species (USFWS 1995). There are no actions within this LUP Amendment decision that would alter water availability, decrease water quality, or affect the distribution of non-native fishes. Therefore, the Utah GRSG LUP Amendment and EIS will not affect Lahontan cutthroat trout or its habitat.

Barneby reed-mustard, Barneby ridge cress, Jones cycladenia, Kodachrome bladderpod, Maguire primrose, Pariette cactus, Siler pincushion, Welsh's milkweed, and Winkler cactus

These nine species are not suspected of occurring in any PHMA/GHMA because the species' ranges are considerably outside the range of GRSG (See Figure 4 below), with at least 5 miles between the proposed PHMA/GHMA and known occurrences. Their suitable habitats are not expected to occur in PHMA/GHMA. Enough distance separates these species from PHMA/GHMA that no direct or indirect effects are expected, and the proposed LUP amendments would not affect these plants or their habitats.

Barneby reed-mustard occurs within about 22 miles of PHMA.

Barneby ridge cress occurs within about 8 miles of PHMA.

Jones cycladenia occurs within about 25 miles of PHMA.

Kodachrome bladderpod occurs within about 13 miles of PHMA.

Maguire primrose occurs within about 9 miles of PHMA.

Pariette cactus occurs within about 5 miles of PHMA.

Siler pincushion occurs within about 16 miles of PHMA.

Welsh's milkweed and occurs within about 6 miles of PHMA.

Welsh's milkweed critical habitat occurs within about 6 miles of PHMA.

Winkler cactus occurs within about 11 miles of PHMA.

With no overlap or interaction between the decision areas of the proposed LUP amendments (PHMA/GHMA on BLM and FS managed lands) and suitable habitats for these species, no effects are expected for Barneby ridge cress, Barneby reed-mustard, Jones cycladenia, Kodachrome bladderpod, Maguire primrose, Siler pincushion, Welsh's milkweed, Welsh's milkweed critical habitat, and Winkler cactus. In addition, Any proposed actions that may affect these species and their habitats will be further evaluated at the project level, and adverse impacts would be avoided.

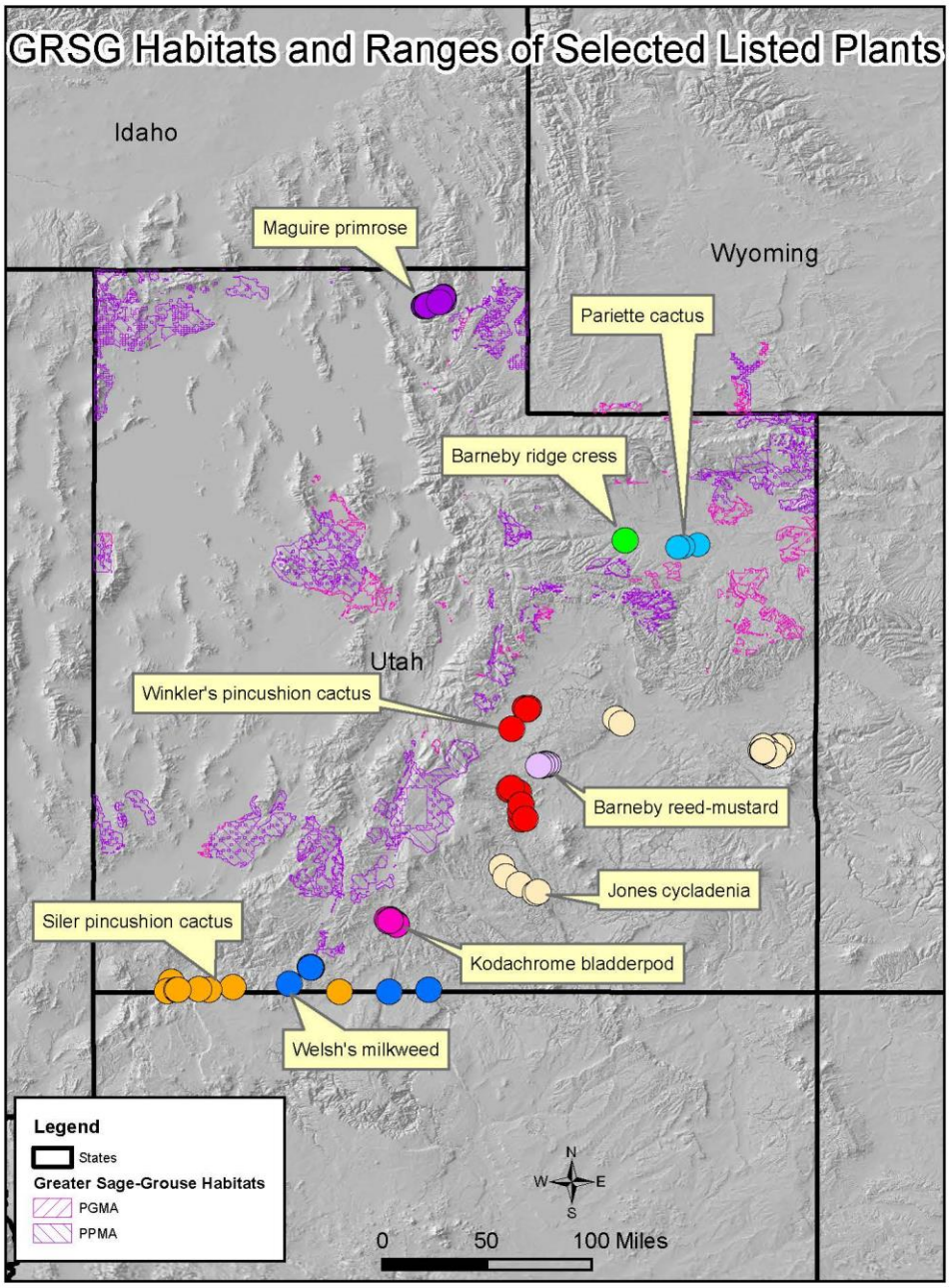

Figure 4. Plant species with ranges considerably outside Greater Sage-grouse habitat

Deseret milkvetch

Deseret milkvetch was considered extinct for decades until its rediscovery in 1981. It was listed in 1999 by the USFWS as threatened. In 2007, the USFWS gave advanced notice of intention to remove Deseret

milkvetch from the list of endangered and threatened plants in the near future (USFWS 2007a). It was determined that previous threats were not as significant as once believed, and that the species is not likely to become in danger of extinction throughout all or a significant portion of its range in the foreseeable future. Surveys conducted in 2006 indicated that the known population had increased by 31 percent since the time of listing (USFWS 2007a). Approximately 67 percent of the species' range is managed by the UDWR as part of the Northwest Manti Wildlife Management Area. UDWR management provides protection against anticipated threats (rural development, cattle grazing and impacts on pollinator habitat), thus mitigating concern for the species.

Deseret milkvetch is known from a single location in Utah County, Utah in the Thistle Creek watershed east of Birdseye, Utah. The total occupied area covers approximately 345 acres (USFWS 2007a). This species is restricted to steep, sandy, west and south facing slopes of the Moroni Formation at elevations from 5,400 to 5,600 feet. The associated vegetation is an open pinyon-juniper community with sagebrush, bitterbrush, Indian ricegrass, and needle-and-thread. The one known location is over 3 miles from the nearest PHMA/GHMA, and the plant's apparent habitat is restricted to the Thistle Creek watershed near Birdseye, UT. Because suitable habitat for this species is not suspected to occur within PHMA/GHMA, the proposed LUP amendments would not affect Deseret milkvetch.

Heliotrope milkvetch

Heliotrope milkvetch occurs only on the Manti-LaSal National Forest, at three locations. All suitable habitat (high elevation, limestone barrens derived from the Flagstaff Geological Formation) has been surveyed for this species, and only the three known occurrences have been found (USFWS 1995). Designated critical habitat is located at the western Heliotrope Mountain population, and this site is about 3.9 miles from PHMA and about 6.5 miles from GHMA. The other two locations (eastern Heliotrope Mountain and White Mountain populations) are closer to PHMA and GHMA, but do not overlap. The eastern Heliotrope Mountain population is about 3.5 miles from PHMA and about 5.1 miles from GHMA. The White Mountain population is about 1.8 miles from PHMA and about 9.5 miles from GHMA. Because there is no overlap between the decision area (PHMA/GHMA) and Heliotrope milkvetch populations or its habitat of high elevation limestone barrens, the Utah GRSG LUP Amendment and EIS will not affect Heliotrope milkvetch .

Heliotrope milkvetch Designated Critical Habitat

Designated critical habitat for Heliotrope milkvetch is located at the western Heliotrope Mountain population, and this site is about 3.9 miles from PHMA and about 6.5 miles from GHMA. Because there is no overlap between the decision area (PHMA/GHMA) and Heliotrope milkvetch designated critical habitat, the Utah GRSG LUP Amendment and EIS will not affect Heliotrope milkvetch designated critical habitat.

Maguire primrose

Maguire primrose is a small, herbaceous, perennial forb with an estimated population size of about 3,000 individuals in six populations, all in Logan Canyon, Utah. The entire known habitat of Maguire primrose lies within Federal lands managed by the Logan Ranger District of the Wasatch-Cache National Forest. It was listed as a threatened species in 1985.

Maguire primrose is found in cool, moist microclimates on dolomitic limestone derived soils. It is found on north facing exposures in cracks and crevices of cliff and boulder faces from 4,800 to 6,000 feet elevation. Known occurrences are all in Logan Canyon, and PHMA is about 9.4 miles from the nearest occurrence.

Vulnerable due to its restricted habitat and small population size, Maguire primrose primary threats include habitat loss due to road construction and recreational activities. The greatest threats to Maguire's primrose are from habitat loss as a result of highway construction and other activities (USFWS 1990). Maintenance and improvements of water pipelines through Logan Canyon could also impact the species. Other threats include camping, rock climbing and horticultural plant collecting.

No change in the current management for Maguire primrose habitats is expected from the proposed LUP amendments. None of the above threats would be influenced by the proposed LUP amendments. Because Maguire primrose grows on steep, rocky, often inaccessible substrates and the habitat would not likely be targeted for GRSG habitat management activities, no effects are anticipated from the Utah GRSG LUP Amendment and EIS. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

Existing conservation measures: Wasatch-Cache NF - Special management has been initiated in Logan Canyon so that rock climbers do not impact the Maguire's Primrose, a threatened plant species. Protective measures will be provided for Maguires Primrose and Frank Smith's Violet populations in the lower portions of Logan Canyon. Wheeler's Angelica habitat will be improved through targeted noxious weed programs and riparian conservation. The Forest Service requirements of the Maguires Primrose Recovery Plan and the Bear River Endemics Conservation Agreement with USFWS will be met.

San Rafael cactus

San Rafael cactus is endemic to Emery and Wayne counties in central Utah. It occurs on benches, hilltops, and gentle slopes in open piñon-juniper and salt desert scrub communities between 6,000 to 6,700 feet in elevation, restricted to limestone gravels, shales, clays and silty substrates of the Mancos, Morrison, Moenkopi and Carmel formations (USFWS 2013d). It is known from five population centers including Mussentuchit, McKay Flat, Wedge, Short Canyon, and Ferron (USFWS 2007b). The species range is centered on the San Rafael Swell and extends into southwestern Emery County.

The threats facing San Rafael cactus described through the listing process included collection for horticultural purposes; ORV and livestock trampling; mineral exploration, including uranium, gypsum, and clay mining; drought; natural herbivory and predation; and known extant areas with fragile ecosystems that are easily degraded. Additional factors reported since the time of listing are global climate change, low fruit/seed output, and the impacts of exotic plant species (USFWS 2007b).

No overlap with GRSG habitat occurs with San Rafael cactus; however a few known sites are within about 1 mile of PHMA, on the gentle slopes below South Horn Mountain. Habitat for San Rafael cactus does not extend up the steep slopes to the higher elevations of South Horn Mountain where PHMA is present on the Manti-LaSal National Forest. No effects, adverse or beneficial, are expected for San Rafael cactus populations or habitat from the proposed LUP amendments due to the distance separating them from the proposed decision area (PHMA/GHMA). Because suitable habitat for this species is not suspected to occur within PHMA/GHMA, the proposed LUP amendments would not affect San Rafael cactus. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

Wright fishhook cactus

Wright fishhook cactus *(Sclerocactus wrightiae*) is a small barrel shaped cactus, with short central spines, listed as endangered in 1979. It occurs in Emery, Sevier, Wayne, and Garfield Counties, Utah. It has been found on soil formations such as Emery sandstone, Mancos shale, Dakota sandstone, Morrison, Summerville, Curtis, Entrada sandstone, Carmel, Moenkopi, and alluvium. Vegetation associations

include semi-barren sites within desert scrub or open pinyon juniper woodland communities at 4,200 to 7,600 feet in elevation.

The primary threats to Wright fishhook cactus at listing included exploration and development of energy and mineral resources, OHV use, illegal collection, and small population sizes. Recreational use, including OHV, grazing, high mortality to recruitment ratios, predation, and drought related impacts are the largest threats today (USFWS 2012b). Illegal collection is still a concern.

No overlap occurs between Wright fishhook cactus habitat and PHMA/GHMA. The species occurs in much the same area as San Rafael cactus described above, being centered in the San Rafael Swell. The western edge of Wright fishhook cactus' range approaches to within about 1 mile of PHMA near South Horn Mountain and within about 1.7 miles of PHMA near Last Chance Creek. Habitat for Wright fishhook cactus does not extend up the steep slopes to the higher elevations of South Horn Mountain or to the top of the limestone cliffs near Last Chance Creek, where PHMA is present on the Manti-LaSal National Forest. No effects, adverse or beneficial, are expected for Wright fishhook cactus populations or habitat from the proposed LUP amendments due to the distance separating it from the proposed decision area (PHMA/GHMA). Because suitable habitat for this species is not suspected to occur within PHMA/GHMA, the proposed LUP amendments would not affect Wright fishhook cactus. Any proposed actions near this species and its habitats will be further evaluated at the project level, and adverse impacts would be avoided.

Attachment B: BUREAU OF LAND MANAGEMENT PLAN COMPONENTS

See accompanying document with the BLM proposed Land Use Plan Amendment components, which is an excerpt from Chapter 2 of the FEIS. This excerpt is provided to facilitate USFWS review of this document.

Bureau of Land Management Proposed Plan Amendment

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

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

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

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

Goal

Goal GRSG-1
Maintain and/or increase GRSG abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in collaboration with other conservation partners.

Objectives

Objective GRSG-1
Designate PHMA for each WAFWA MZ across the current geographic range of GRSG that are large enough to stabilize populations in the short-term and enhance populations over the long-term.

Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. Enhance or improve GRSG habitat (e.g., through restoration or rehabilitation activities) within PHMA that has been impaired or altered.

Objective GRSG-2
In all GRSG habitat, manage activities that result in habitat loss and degradation to provide a net conservation gain of GRSG habitat. Exceptions to net conservation gain for GRSG may be made for vegetation treatments to benefit Utah prairie dog.

Objective GRSG-3
In all GRSG habitat, where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description (ESD), maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing, and winter habitats.

The Habitat Objectives for Greater Sage-Grouse – BLM Proposed Plan (see Table Objective GRSG-3) summarize the characteristics that research has found represent the seasonal habitat needs for GRSG. The specific seasonal components identified in Table Objective GRSG-3 were adjusted based on local science and monitoring data to define the range of characteristics used in the Utah Sub-region. Thus, the habitat objectives provide the broad vegetative conditions we strive to obtain across the landscape that indicate the seasonal habitats used by GRSG. These habitat indicators are consistent with the rangeland health indicators used by the BLM.

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

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.

Table Objective GRSG-3
Habitat Objectives for Greater Sage-Grouse – BLM Proposed Plan

ATTRIBUTE	INDICATORS	DESIRED CONDITION
Breeding and Nesting (February 15-June 15)[1, 2, 3, 4, 5, 6]		
Lek Security	Proximity of trees	Trees absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 km) of occupied leks.[6, 7, 8]
	Proximity of sagebrush to leks	Has adjacent sagebrush cover.[6]
Cover	% of seasonal habitat meeting desired conditions	>80% of the mapped nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).[8]
	Sagebrush canopy cover	≥15%[6, 8, 9]
	Total shrub cover[6, 8, 9]	15-30%: Box Elder, Parker Mountain, Bald Hills, Hamlin Valley, Panguitch, Uintah south of Hwy 40 15-35%: Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40
	Sagebrush height[6, 8, 9]	>12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah >10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40

Table Objective GRSG-3
Habitat Objectives for Greater Sage-Grouse – BLM Proposed Plan

ATTRIBUTE	INDICATORS	DESIRED CONDITION
	Predominant sagebrush shape[10]	>50% in spreading (applicable to the specific sagebrush types prone to columnar vs. spreading shape e.g., Wyoming, not black sage)[6]
	Perennial grass cover[6, 8, 9]	>10%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >5%:Parker Mountain, Panguitch, Uintah south of Highway 40
	Perennial grass and forb height[6, 8, 9]	Provide overhead and lateral concealment from predators.[11]
	Perennial forb canopy cover[6, 8, 9]	>5%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >3%: Parker Mountain, Panguitch, Uintah south of Highway 40
Brood-Rearing/Summer (April 15-August 15)[1]		
Cover	% of Seasonal habitat meeting desired condition	>40% of the mapped brood-rearing/summer habitat meets recommended habitat characteristics where appropriate (relative to ecological site potential, etc.)[8]
	Sagebrush canopy cover[6, 8, 9]	>10%
	Total shrub cover[6, 8, 9]	10-25%: Box Elder, Bald Hills, Hamlin Valley, Panguitch, Rich, Sheeprocks, Ibapah, Parker Mountain, Uintah 10-30%: Carbon, Emery,
	Sagebrush height[6, 8, 9]	>12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah >10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40
	Perennial grass canopy cover and forbs[6, 8, 9]	>15% (Grass: >10%; Forb: >5%): Box Elder, Rich, Sheeprocks, Ibapah, Parker Mountain, Panguitch, Uintah, Carbon, Emery >15% (Grass: >8%; Forb: >7%): Bald Hills, Hamlin Valley,
	Riparian areas/mesic meadows	Proper Functioning Condition[6]
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present[6, 12]
Winter (November 15-March 15)[1]		
Cover and Food	% of seasonal habitat meeting desired conditions	>80% of the mapped wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). [8]
	Sagebrush canopy cover above snow[6, 8,]	>10%
	Sagebrush height above snow[6, 8, 9, 13]	>10 inches (25 cm): Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40

Notes:
1 Specific dates would be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter), in coordination with the State of Utah.
2 Utah Greater Sage-Grouse Working Group 2013
3 Doherty 2008
4 Doherty et al. 2010
5 Holloran and Anderson 2005
6 Stiver et al. 2015 *In Press*
7 Baruch-Mordo et al. 2013
8 Connelly et al. 2000
9 Unpublished data, Utah Community-Based Conservation Program Greater Sage-grouse Statewide Database, Utah State University, Logan, Utah and Brigham Young University, Provo, Utah. Summarization and analysis of nesting and brood-rearing habitat characteristics from data collected through Utah State University and Brigham Young University research efforts. Researchers located the nest and brood sites using radio-marked telemetry methods. Shortly after the site was used by the marked bird (after hatch or use by a brood), vegetation characteristics on the site were measured using the line intercept method for shrub canopy cover and Daubenmire frames for herbaceous cover. Researchers across the various study areas used methods that followed the guidelines identified in Connelly et al. (2003).
10 Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 *In Press*). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
11 Specific height requirements needed to meet the objective will be set at the time of watershed assessments.

Table Objective GRSG-3 Habitat Objectives for Greater Sage-Grouse – BLM Proposed Plan		
ATTRIBUTE	**INDICATORS**	**DESIRED CONDITION**
[12] Preferred forbs are listed in Stiver et al. 2015 *In Press*. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred. [13] 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.		

When using the above indicators and desired conditions to guide management actions or during land health assessments, consider that they are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale. Indicators must be collectively reviewed, assessed based on the site potential, and put into spatial and temporal context to correctly determine habitat suitability, which will include more than one scale and multiple indicators.

Objective GRSG-4

Within PHMA, increase the amount and functionality of seasonal habitats by:

- Maintaining or increasing sagebrush in perennial grasslands, where needed to meet the Habitat Objectives for Greater Sage-Grouse (Table Objective GRSG-3), unless there is a conflict with Utah prairie dog.
- Reducing conifer (e.g., pinyon/juniper) from areas that are most likely to support GRSG at a rate that is at least equal to the rate of encroachment.
- Reducing the extent of annual grasslands.
- Maintaining or improving corridors for migration or movement between seasonal habitats, as well as for long-term genetic connections between populations.
- Maintaining or improving understory (grass, forb) and/or riparian condition within breeding and late brood-rearing habitats.
- Conducting vegetation treatments based on the following 10-year (decadal) acreage objectives:

Population Areas	Mechanical Treatment[1]	Annual Grass Treatment[1]
Box Elder	9,300	17,800
Ibapah; Hamlin Valley	17,900	2,100
Rich; Uintah	40,700	6,800
Carbon	2,600	200
Bald Hills; Panguitch	43,900	8,900
Parker Mountain	32,800	2,200
Sheeprocks	33,700	10,000
Statewide	*180,900*	*48,000*

[1] These acreage figures, based on VDDT modeling, represent an objective for treatment on BLM-administered lands over a 10-year (decadal) timeframe to support achievement or progress toward GRSG habitat objectives (see **Appendix V**, Great Basin Vegetation Modeling using Vegetation Dynamics Development Tool). This accounts for variations in yearly funding availability and does not reflect a maximum or minimum acreage for any one treatment type or total treatment acreage, should funding and site specific conditions allow for more or less treatment acreage than described in order to meet habitat objectives.

Outside PHMA (in adjacent opportunity areas) improve and restore historical GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Statewide, complete a decadal average of 170,200 acres of mechanical treatments and 33,000 acres of annual grass treatments. Prioritization is for completion of treatments within PHMA before treating areas outside.

Objective GRSG-5

Participate in local GRSG conservation efforts (e.g., UDWR, NRCS, local working groups) to implement landscape-scale habitat conservation, to implement consistent management to benefit GRSG, and to gather and use local research and monitoring to promote the conservation of GRSG.

Management Actions

MA-GRSG-1
Identify PHMA and GHMA as follows (**Map 2.6**, Greater Sage-Grouse Priority/General Habitat Management Areas and Sagebrush Focal Areas–Proposed Plan):

Population Area	Acres					
	PHMA			GHMA		
	Total Surface[1]	BLM/FS Surface[2]	Split Estate Minerals[3]	Total Surface[1]	BLM/FS Surface[2]	Split Estate Minerals[3]
Uintah	566,800	341,800	62,200	991,500	301,600	74,200
Carbon	260,100	52,200	115,500	198,700	83,400	18,700
Emery	85,500	81,400	2,700	11,400	7,100	2,600
Parker Mountain	741,300	512,700	79,800	12,900	7,000	420
Panguitch	343,900	222,900	31,300	0	0	0
Bald Hills	326,400	259,400	5,200	21,200	8,300	1,200
Hamlin Valley	143,700	101,500	6,600	0	0	0
Sheeprocks	534,600	419,500	18,100	296,500	106,800	21,200
Ibapah	88,800	48,000	750	10,800	10,100	0
Box Elder	1,135,700	439,200	112,000	0	0	0
Rich	1,051,000	218,800	126,600	197,900	4,400	16,500
Lucerne	0	0	0	37,500	2,300	9,200
Strawberry	161,500	40,900	0	20,600	0	480
WY-Uinta	1,100	1,100	0	20,900	20,900	0
WY-Blacks Fork	23,700	23,700	0	31,100	31,100	0
Statewide	*5,464,100*	*2,763,100*	*560,750*	*1,851,000*	*583,000*	*144,500*
% PHMA/ GHMA	*75%*	*82%*	*79%*	*25%*	*18%*	*21%*

[1]Acreage associated with total PHMA/GHMA polygon, regardless of land ownership.
[2]Acreage within PHMA/GHMA where the BLM and Forest Service have managerial authority on the surface estate.
[3]Acreage where the surface and mineral estates are owned by separate entities. These acres show where the surface estate is not BLM or Forest Service, but that have a federal mineral estate. Minerals decisions apply to the combination of the BLM and Forest Service surface and mineral estates.

Minor adjustments to PHMA/GHMA external boundaries should be made if BLM biologists, in coordination with state of Utah 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. See additional information and protocol on adjusting occupied habitat and PHMA/GHMA boundaries in **Appendix N**, Greater Sage-Grouse Habitat Baseline and Habitat Update Protocol.

In the mapped PHMA and GHMA there may be areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, and pinyon-juniper ecological sites. Areas of non-habitat would be identified during site-specific project review by agency biologists, in discussion with the State of Utah and other agencies, as appropriate. Decisions would apply to existing sagebrush areas and areas with ecological sagebrush potential within PHMA or GHMA, as well as non-habitat if the following conditions are not met.

Application of decisions in non-habitat areas may be excepted in GRSG areas (PHMA/GHMA) if it can be shown that the action would occur in non-habitat and all the following conditions are met:

- access through GRSG existing and potential habitat to the activity in non- habitat occurs only on existing roads, and no improvements to roads would be required in GRSG habitat that would

change road classification;

- no activity would be permitted or authorized if it would establish a valid existing right that would subsequently require construction of new roads within GRSG habitat, unless the activity is allowed in GRSG habitat within PHMA as described in the decisions below;
- the non-habitat does not provide important connectivity between habitats;
- indirect impacts on GRSG habitat and associated populations within the PHMA are reduced or eliminated through onsite mitigation (e.g., sound, tall structures) to the extent that the associated NEPA document demonstrates the project would not impair the function of adjacent seasonal habitats or of the life-history or behavioral needs of the GRSG population.

MA-GRSG-2
Designate SFA as shown on **Map 2.6**, Greater Sage-Grouse Priority/General Habitat Management Areas and Sagebrush Focal Areas–Proposed Plan (228,500 acres of BLM and Forest Service surface estate; 4,900 acres split-estate federal minerals). SFA will be managed as PHMA, with the following additional management:

- Recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights.
- Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.
- Prioritized for management and conservation actions in these areas, including, but not limited to review of livestock grazing permits/leases.

MA-GRSG-3
In PHMA, apply the following management to all discretionary activities not otherwise excluded or closed to minimize and mitigate effects on GRSG and its habitat from the project/activity:

A- Net Conservation Gain

In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM 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. Exceptions to net conservation gain for GRSG may be made for vegetation treatments to benefit Utah prairie dog.

All mitigation would be conducted according to the mitigation framework contained in **Section 2.7.3**, Regional Mitigation, and in **Appendix D**.

B- Disturbance Cap

In PHMA, manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of 1) biologically significant units (BSU) (total PHMA area associated with a GRSG population area) and 2) within proposed project analysis area. See **Appendix E** for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area.

If the 3 percent anthropogenic disturbance cap is exceeded on all lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872 {as amended}, valid existing rights, etc.) will be permitted by the BLM within GRSG PHMA in any given BSU 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 PHMA, then no further anthropogenic disturbance will be permitted by the 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 Mining Law of 1872 {as amended}, valid existing rights, etc.).

An area with disturbance is not excluded from the 3 percent until it has been restored to provide GRSG habitat. The objective of successful restoration is to provide for the needs of GRSG, as evidenced by one of the following:

- Vegetative cover is consistent with the GRSG habitat objectives and the ESD (Objective GRSG-2), or
- Monitoring indicates the area is regularly used by GRSG to sustain one or more seasonal habitat requirements (nesting, brood-rearing, winter).

Final restoration success and approval for abandonment for disturbances will be subject to an interdisciplinary review of available monitoring data and final monitoring reports.

C- Density of Energy/Mining Facilities

Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is collocated into an existing disturbed area (subject to applicable laws and regulations, such as the Mining Law of 1872 {as amended}, valid existing rights, etc.). Energy and mining facilities to which this action applies are:

- Oil and gas wells and development facilities,
- Coal mines,
- Wind towers,
- Solar fields,
- Geothermal wells/developments, and
- Active locatable, leasable, and saleable developments.

D- Predation

In PHMA, eliminate or minimize external food sources for corvids, particularly dumps, or waste transfer facilities. Apply BMPs to development activities to reduce opportunities for GRSG predators (e.g., limiting food sources, nest/perches deterrents, road kill).

Apply habitat management practices (e.g. grazing management, vegetation treatments) that decrease the effectiveness of predators.

Collaborate with applicable government entities to implement programs to control predator populations of GRSG (e.g., ravens, red fox, badgers, raccoons, raptors).

E- Noise Restrictions

In PHMA, limit noise from discretionary activities (during construction, operation, or maintenance) to not exceed 10 decibels above ambient sound levels at occupied leks from 2 hours before to 2 hours after

official sunrise and sunset during breeding season (e.g., while males are strutting); support the establishment of ambient baseline noise levels for PHMA habitat area leks.

Limit project related noise in other PHMA habitats and seasons where it would be expected to reduce functionality of habitats that support associated GRSG populations.

As additional research and information emerges, specific new limitations appropriate to the type of projects being considered would be evaluated and appropriate measures would be implemented where necessary to minimize potential for noise impacts on PHMA GRSG population behavioral cycles.

F- Tall Structure Restrictions

In PHMA, limit the placement of permanent tall structures within GRSG breeding and nesting habitats.

For the purposes of this restriction, a tall structure is any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that are naturally absent, or that decreases the use of an area by GRSG. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography.

G- Seasonal Restrictions

In PHMA, in coordination with state of Utah biologists, apply seasonal restrictions during the period specified below to manage discretionary surface disturbing activities and uses on public lands to prevent disturbance to GRSG during seasonal life cycle periods as follows:

- In breeding (leks), nesting and early brood-rearing habitat from Feb 15 – Jun 15
- In brood rearing habitat from Apr 15 – Aug 15
- In winter habitat from Nov 15 – Mar 15

Specific time and distance determinations would be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) in order to better protect GRSG, in coordination with state of Utah biologists.

H- Buffers

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 USGS Report *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Open File Report 2014-1239) in accordance with **Appendix F**, Applying Lek-Buffer Distances.

I- Required Design Features

In PHMA, apply the RDFs from the applicable sections identified in **Appendix G** when authorizing/permitting site-specific activities/projects for wildland fire management actions, travel and transportation, lands and realty, fluid minerals, nonenergy leasable minerals, coal, mineral materials, and locatable minerals (consistent with applicable law).

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 and/or may require slight variations. All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic

considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat;
- A specific RDF will provide no additional protection to GRSG or its habitat.

MA-GRSG-4
In PHMA and in adjacent opportunity areas, maintain, improve and restore GRSG habitat to support GRSG populations and to maintain or enhance connectivity.

Vegetation treatments would be applied to meet GRSG habitat objectives and provide additional GRSG habitat.

Adjust PHMA boundaries to include additional restored GRSG habitat and habitat identified during survey or inventory work. Changes to maps and associated management would occur through the appropriate BLM planning processes (e.g., plan maintenance or plan amendment), as described in **Appendix N**.

MA-GRSG-5
In GHMA, apply the following management to meet the objective of a net conservation gain for discretionary actions that could result in habitat loss and degradation:

A- Existing Management

Implement GRSG management actions included in the existing RMPs and project- specific mitigation measures associated with existing decisions.

B- Net Conservation Gain

In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM 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. Exceptions to net conservation gain for GRSG may be made for vegetation treatments to benefit Utah prairie dog.

All mitigation would be conducted according to the mitigation framework contained in **Section 2.7.3**, Regional Mitigation, and in **Appendix D**.

C- Buffers

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 USGS Report *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Open File Report 2014-1239) in accordance with **Appendix F**.

D- Required Design Features

In GHMA, apply the fluid mineral RDFs that are associated with GHMA identified in **Appendix G** when authorizing/permitting site-specific fluid mineral development activities/projects.

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 and/or may require slight variations. All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

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

MA-GRSG-6
Sage-Grouse Management outside PHMA/GHMA

Proposed projects within State of Utah SGMAs and USFWS PACs, as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and implement measures to mitigate impacts when preparing site-specific planning and environmental compliance documents.

Outside of PHMA, prior to site-specific authorizations, the BLM would evaluate habitat conditions and may require surveys to determine if the project area contains GRSG habitat (FLPMA, 43 USC 1701 Sec. 201 (a); BLM Manual 6840.04 D3; BLM-M-E2). Surveys would be required prior to authorizing discrete anthropogenic disturbances within 4 miles of an occupied lek that is located in PHMA, but only in existing sagebrush.

If an area is determined to be GRSG habitat (e.g., nesting, brood-rearing, winter, transition), mitigation will be considered as part of the project level NEPA analysis and will be attached as conditions of approval (COAs) to new discretionary actions, if deemed necessary to protect the habitat (BLM Manual 6840.04 D 5). Measures that may be considered include those identified in **Appendix G**.

Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that would create a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas

Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks.

Outside PHMA, portions of opportunity areas (**Map 2.4** and **Map 2.6**) within 4 miles of a lek that is located in PHMA would be managed with the following allocations:

- Fluid minerals would be open for leasing with controlled surface use (CSU) stipulations (noise and tall structures).
- Lands ROWs, permits, and leases would be avoided, applying avoidance criteria for noise and tall structures.

Do not site wind energy development in opportunity areas within 5 miles from occupied GRSG leks that are in PHMA.

Outside of PHMA, discrete anthropogenic disturbances should not be authorized in areas that have been treated with the intent of improving or creating new GRSG habitat, unless the NEPA document associated with the action demonstrates it would have a neutral or beneficial effect on GRSG.

MA-GRSG-7
Adaptive Management

As described in **Section 2.7.1** this plan establishes soft and hard triggers for both GRSG populations and habitat. The specific triggers and additional detail on the management responses are identified in **Appendix B**.

If monitoring indicates the soft-trigger is met, the BLM will determine if there is a specific cause or causes that are contributing to the decline. If it is determined that the decline is related to a natural population variation, no specific management actions would be required. However, if BLM management actions are determined to cause or contribute to the decline, the BLM manager would apply measures within their implementation-level discretion to mitigate the decline of populations and/or habitats to the area where the trigger has been met. These measures would apply more conservative or restrictive implementation conservation conditions, terms, or decisions within the agencies' discretion to mitigate the decline of populations and/or habitats.

If monitoring indicates the hard trigger is met, a set of specific management actions from the BLM Proposed Plan will immediately be replaced with or adjusted by different management actions in the area where the trigger has been met. Table B.1 of **Appendix B** identifies the management actions from the BLM Proposed Plan, and the corresponding new management actions that will be immediately implemented to the specific area in the event a hard trigger is met. In addition to these specific changes, the BLM will review available and pertinent data for the area, in coordination GRSG biologists from multiple agencies including the UDWR, USFWS, and NRCS, to determine the causal factor(s) and implement a corrective strategy. The final strategy associated with a hard trigger being met would be the changes identified in Table B.1 of **Appendix B**, and could also include the need to further amend or revise the RMP to address the situation and modify management accordingly, for the area where the trigger was met.

Vegetation

Objective

Objective VEG-1
In all SFA and PHMA, the desired condition is to maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).

Management Actions

MA-VEG-1
In PHMA, where necessary to meet GRSG habitat objectives, treat areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas, annual grasslands).

In PHMA, prioritize implementation of restoration/treatment projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (e.g., proximity to existing GRSG populations, ecological site potential, resistance and resilience), documented in **Appendix K**.

In PHMA, prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance.

Apply seasonal restrictions to avoid treating areas during seasons of use, as needed, when implementing vegetation treatments (see MA-GRSG-3G).

In PHMA, avoid sagebrush reduction treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population. Coordinate with the State of Utah and USFWS prior to conducting sagebrush treatment projects within nesting and winter habitat.

Use collaborative planning efforts to develop and implement habitat restoration projects. Expertise and ideas from entities such as local landowners, local GRSG working groups, and other federal, state, county, and private organizations should be solicited and considered in development of restoration projects.

In PHMA, implement project design features that will contribute to the most favorable conditions for success when planning and implementing restoration/vegetation treatment projects. Examples include, but are not limited to the following:

- Review of available plant species and their adaptation to the site when developing seed mixes.
- The need to reduce non-native annual grass densities and competition through herbicide, targeted grazing, tillage, etc.
- Assessment of on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider the use of passive restoration techniques.
- Use of site preparation techniques that retain existing desirable vegetation.
- Use of "mother plant" techniques or planting of satellite populations of desirable plants to serve as seed sources.
- The need for post-treatment control of non-native annual grass and other invasive species.

Upon completion of vegetation treatments, monitor and manage the project area to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance treatments.

MA-VEG-2
Remove conifers encroaching into sagebrush habitats. When conducting conifer treatments:

- Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or phase II.
- Treat areas in late Phase II or Phase III condition to create movement corridors, connect habitats, or to break up continuous, hazardous fuels and reduce the potential for catastrophic fire.
- Prioritize methods to reduce conifer canopy cover to those that maintain the understory vegetation as the preferred treatment methods (e.g., mechanical, lop and scatter).
- Require that vegetation treatments conducted within 0.6 miles of a lek include an objective of reducing conifer, where technically feasible, to less than 5 percent canopy cover, with preference for complete removal.
- Include stipulations to avoid removing old-growth pinyon/juniper stands (e.g., Tausch et al. 2009; Miller et al. 1999).
- Use of site-specific analysis and tools like VDDT and the FIAT report (Chambers et al. 2014) will help refine the location for specific areas to be treated.

MA-VEG-3
In PHMA manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge.

MA-VEG-4
In PHMA, include GRSG habitat objectives in restoration/treatment projects. Treatment objectives should include short-term and long-term habitat conditions, and they should include specific objectives for the establishment of sagebrush cover and height, as well as cover and heights for understory perennial grasses and forbs necessary for GRSG seasonal habitats (see Objective-GRSG-3).

Make meeting the GRSG objectives for the restoration/treatment project one of the primary priorities for the project and subsequent land uses, recognizing that managing for other special status species may result in treatment objectives that may not meet GRSG seasonal habitat objectives (e.g., winter habitat cover

requirements vs. creation of Utah prairie dog habitat). Where GRSG habitat overlaps with that of federally listed threatened or endangered species (e.g., Utah prairie dogs), coordinate with species-specific experts to develop conservation and recovery objectives and allow habitat treatments that will benefit both species.

MA-VEG-5
In PHMA, prioritize the use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, desirable non-native seeds may be used as long as they support GRSG habitat objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the principle objective for rehabilitation efforts.

MA-VEG-6
In PHMA, design post restoration management to ensure long term persistence. This could include changes in livestock grazing management, wild horse and burro management and travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG, as well as monitoring and maintaining the treated area.

MA-VEG-7
In PHMA, limit commercial seed or live plant collection to levels that ensure long- term maintenance of the GRSG habitat objectives. Locations, species allowed for collection, and limits on the amounts to be collected will be developed on a case-by- case basis following environmental review of annual site-specific conditions. Commercial collection during sensitive seasonal periods (see MA-GRSG-3G) will include mitigation, developed to reflect the site-specific conditions on the ground, that could include, but is not necessarily limited to, restrictions on the timing and method of collection activities, limiting the number of individuals collecting, providing portions of collected seeds for use in local restoration projects, etc.

MA-VEG-8
In PHMA, allow for seed collection and use in restoration/reclamation activities. Prioritize use of seed from areas as close as possible to where the seed will be used to capture local adaptations.

MA-VEG-9
In PHMA, diversify the perennial grass and forb components through additional seeding in areas where historical seedings (e.g., crested wheatgrass) have been recolonized by sagebrush.

MA-VEG-10
Follow the applicable and technically feasible RDFs in **Appendix G** for vegetation projects/activities (fuels management) at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity;
- An alternative RDF 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.

MA-VEG-11
In PHMA, design post Emergency Stabilization and Rehabilitation/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 and burro, and travel management, etc., to achieve and maintain the desired condition of Emergency Stabilization and Rehabilitation projects to benefit GRSG (Eiswerth and Shonkwiler 2006).

Monitor and control invasive vegetation post-wildfire for at least 3 years.

MA-VEG-12
<u>Integrated Invasive Species Management</u>

In PHMA, integrated Vegetation Management would be used to control, suppress, and eradicate noxious and invasive species per BLM Handbook H-1740-2.

MA-VEG-13
In PHMA, treatments of Mormon cricket outbreaks would be collaborated with partners at the federal, state, and local levels to maintain and enhance GRSG habitats.

Fire Management

Management Actions

MA-FIRE-1
In collaboration with the USFWS and relevant state agencies, complete and maintain GRSG Landscape Wildland Fire and Invasive Species Habitat Assessments to prioritize at risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting GRSG populations. These assessments and subsequent assessment updates would also be a collaborative effort to take into account other GRSG priorities identified in this plan. **Appendix K** describes a minimal framework example and suggested approach for this assessment.

Implementation actions will be tiered to the local GRSG Landscape Wildland Fire and Invasive Species Assessment, using best available science related to the conservation of GRSG.

In collaboration with USFWS and relevant state agencies, BLM planning units would identify annual treatment needs for wildfire and invasive species management as identified in local unit level Landscape Wildfire and Invasive Species Assessments. Annual treatment needs would be coordinated across state/regional scales and across jurisdictional boundaries for long-term conservation of GRSG.

Annually complete a review of landscape assessment implementation efforts with appropriate USFWS and state agency personnel.

MA-FIRE-2
Fuels Management

Follow the applicable and technically feasible RDFs in **Appendix G** for fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity;
- An alternative RDF 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.

MA-FIRE-3
In PHMA, fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat.

- In collaboration with USFWS and relevant state agencies, BLM planning units with large blocks of GRSG habitat will develop, using the assessment process described in **Appendix K**, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by

wildfires if the action is not taken.

- Use green strips and/or fuel breaks to protect GRSG habitat from fire events.
- When possible, locate fuel breaks along existing roads, ROWs, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops).
- Avoid constructing fuel breaks through large areas of intact GRSG habitat, unless the associated NEPA document demonstrates a biological need for the fuel break to maintain or protect habitat for the GRSG population. Coordinate with the State of Utah and USFWS prior to constructing fuel breaks within nesting and winter habitat.
- Using an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as conifer reduction, grazing, prescribed fire, chemical, biological, and mechanical treatments may be acceptable, given site-specific variables.
- Remove encroaching conifer stands as a fuels management tool, where environmental review documents it would protect or improve GRSG habitat.
- Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success for native seed availability is low, desirable non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and desirable non-native species, as appropriate, to provide for fire breaks.
- Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance actions. Control invasive vegetation post-treatment.
- Apply seasonal restrictions, as needed, for implementing fuels management treatments according to the type of seasonal habitats present (see MA-GRSG-3G).

In PHMA, avoid sagebrush reduction fuels treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population. Treatments in winter habitat should be designed to maintain sagebrush, especially tall sagebrush (sagebrush capable of standing above heavier than normal snowfall), which would be available to GRSG above snow during a severe winter. Prior to conducting fuels treatments in winter habitat, coordinate with the State of Utah and USFWS to design the treatment to strategically reduce wildfire risk around or in the winter habitat.

MA-FIRE-4
If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:

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

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

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

MA-FIRE-5
In PHMA, during fuels management project design, consider the use of targeted livestock grazing to strategically reduce fine fuels and, if used, implement grazing management that will accomplish this objective. If implementing targeted grazing, implement measures to minimize impacts on native perennial grasses.

MA-FIRE-6
Preparedness

Follow the applicable and technically feasible RDFs in **Appendix G** for fire and fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity;
- An alternative RDF 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.

Implement a coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions and predicted weather patterns) for GRSG habitat.

Develop wildfire prevention plans that explain the resource value of GRSG habitat and include fire prevention messages and actions to reduce human-caused ignitions.

MA-FIRE-7
Fire Management – (Suppression)

Follow the applicable and technically feasible RDFs in **Appendix G** for fire and fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity:

- A RDF is documented to not be applicable to the site-specific conditions of the project/activity;
- An alternative RDF 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.

MA-FIRE-8
Fire fighter and public safety are the highest priority. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction.

PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the GRSG Landscape Wildland Fire Invasive Species Habitat Assessments described in **Appendix K**.

In GHMA or areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent PHMA.

MA-FIRE-9

Within acceptable risk levels use a full range of fire management strategies and tactics, including the management of wildfires to achieve resource objectives, across the range of GRSG habitat consistent with LUP direction.

In PHMA, burnout operations areas should be avoided by constructing direct fire lines, whenever safe and practical to do so.

Livestock Grazing/Range Management

Management Actions

MA-GRA-1
PHMA and GHMA would be available for livestock grazing. Active animal unit months (AUMs) for livestock grazing would be 329,521 on BLM lands. Make adjustments to permitted AUMs consistent with regulation and the remaining grazing direction. In addition, on an annual basis livestock numbers and the season of use can be adjusted within the terms and conditions of the permit.

Make adjustments to permitted use and annual adjustments to levels of livestock use consistent with regulation and the direction identified below where livestock grazing is identified as a causal factor to not meeting standards or habitat objectives.

MA-GRA-2
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 SFA first followed by PHMA outside the SFA. 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 (ex., fire) and legal obligations.

MA-GRA-3
In PHMA, consult, cooperate, and collaborate with other land owners and management agencies (e.g., private and SITLA) to develop plans which provide for landscape level approaches to habitat improvement. Manage unfenced private and SITLA lands within a grazing allotment that are under exchange of use agreements or percent public land use as a single unit that will have the same management as the public lands.

MA-GRA-4
Evaluate Utah's Rangeland Health Standards and process grazing permits. Focus monitoring and management activities on allotments found not to be achieving Utah's Rangeland Health Standards where livestock grazing is identified as a causal factor and that have the best opportunities for conserving, enhancing or restoring habitat for GRSG.

Use ESDs and/or other appropriate information to determine the desired plant community within proper functioning ecological processes for conducting land health assessments to evaluate the achievement or non-achievement of rangeland health standards.

MA-GRA-5
In PHMA and GHMA, conduct land health assessments that include indicators and measurements of structure, condition, composition, etc., of vegetation specific to achieving GRSG habitat objectives (Objective GRSG-3), including within wetlands and riparian areas. Prioritize land health assessments in SFA, followed by PHMA outside of the SFA. Conduct land health assessments at the watershed scale and use the GRSG habitat objectives when assessing the applicable standard in GRSG habitats.

MA-GRA-6
In PHMA, implement management actions (e.g., allotment management plans, term permit renewals, or other agreements) necessary to meet land health standards and to conserve, enhance or restore GRSG habitat through specific objectives (Objective GRSG-3). If an effective grazing system that meets specific GRSG habitat objectives is not already in place, consider singly, or in combination, changes in the following:

- Rotation systems (e.g., rest rotation, deferred rotation)
- Season or timing of use
- Distribution of livestock use;
- Intensity of use (e.g., objectives for utilization or stubble height)
- Type of livestock (e.g., cattle, sheep, horses, and goats), unless such a change conflicts with other species management
- Class of livestock (e.g., yearlings vs. cow-calf pairs)
- Duration of grazing use and rest periods
- Stocking rates

The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on Table Objective GRSG-3, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above.

MA-GRA-7
In PHMA, during drought periods, prioritize evaluating effects of the drought relative to GRSG needs for food and cover.

Initiate emergency management measures (e.g. delaying turnout, adjusting the amount and/or duration of livestock grazing, implement other terms of the permit) during times of drought to protect GRSG habitat, in accordance with IM-2013-094 (Resource Management During Drought), or other agency policies.

Implement post-drought management to allow for vegetation recovery that meets GRSG needs.

MA-GRA-8
In PHMA, manage riparian areas and wet meadows for proper functioning condition.

MA-GRA-9
In PHMA, assess livestock grazing in riparian and meadow complexes and ensure recovery or maintenance of appropriate vegetation and water quality. Where recovery or maintenance is not occurring and the causal factor is livestock grazing, reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer by adjusting grazing management practices (e.g., use fencing/herding techniques, or changes in seasonal use or livestock distribution).

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

MA-GRA-10
In PHMA, limit authorization of new water developments to projects that would have a neutral effect or be beneficial to GRSG habitat (such as by shifting livestock use away from critical areas). New

developments that divert surface water must be designed to maintain riparian or wet meadow vegetation and hydrology to meet GRSG needs.

MA-GRA-11
In PHMA, evaluate existing water developments (springs, seeps, etc., and their associated pipelines) to determine if modifications are necessary to maintain or improve riparian areas and GRSG habitat. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG.

MA-GRA-12
In PHMA, ensure that vegetation treatments conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock).

MA-GRA-13
In PHMA, evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If existing seedings provide value in conserving or enhancing GRSG habitats, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat during the land health assessments.

MA-GRA-14
In PHMA, design new structural range improvements to have a neutral effect or conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.

MA-GRA-15
In PHMA, evaluate existing structural range improvements to make sure they have a neutral effect or conserve, enhance or restore GRSG habitat.

MA-GRA-16
To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates. Prioritize actions in SFA first, then PHMA.

Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes").

MA-GRA-17
In PHMA, monitor for and treat noxious weeds and treat invasive species where needed, associated with existing range improvements.

MA-GRA-18
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 should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks.

Wild Horses and Burros

Guidelines

MA-WHB-1
Manage herd management areas (HMAs) in GRSG habitat within established Appropriate Management Level (AML) ranges to achieve and maintain GRSG habitat objectives (Objective-GRSG-3).

MA-WHB-2
Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are:

1. HMAs containing PHMA;
2. HMAs containing only GHMA;
3. HMAs containing sagebrush habitat outside of PHMA and GHMA mapped habitat; and
4. HMAs without GRSG habitat.

MA-WHB-3
Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts.

MA-WHB-4
In PHMA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.

MA-WHB-5
In PHMA, monitor the effects of WHB use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions.

MA-WHB-6
Develop or amend herd management plans to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with an emphasis placed on PHMA.

MA-WHB-7
Consider removals or exclusion of wild horses/burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat.

MA-WHB-8
When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effect on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.

MA-WHB-9
Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program.

Lands and Realty

Management Actions

MA-LAR-1
In PHMA, manage lands ROWs, permits, and leases as follows (**Map 2.15**):

- Open: 18,900 acres (associated with designated above-ground ROW corridors)
- Avoided: 1,997,000 acres
- Excluded: 10,500 acres

MA-LAR-2
Linear and Site-Type ROWs, Permits, and Leases (excluding wind and solar)

PHMA would be avoidance areas for new linear and site type ROWs, permits, and leases except for within ROW corridors designated for aboveground use. Placement of new ROWs, permits, and leases in PHMA should be avoided if at all possible. Where avoidance is not possible in PHMA, placement of a new ROW/permit/lease could be allowed if it applies the management for discretionary activities in PHMA identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, buffers, tall structure restrictions, seasonal restrictions, and applicable RDFs).

In PHMA, lands ROWs, permits and leases that cannot be avoided should be located in areas that minimize the effect on the GRSG population (e.g., non-habitat areas, least suitable habitat, collocated with existing disturbances).

In PHMA, new proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by FERC would be subject to all GRSG ROW avoidance allocations and pertinent management for discretionary activities in MA- GRSG-3.

Outside PHMA, portions of opportunity areas within 4-miles of a lek that is located in PHMA would be avoidance areas for new ROWs, permits and leases, applying stipulations for noise and tall structures.

In addition to the above requirements, the subsequent conditions would apply to specific types of ROW authorizations:

Transmission Lines
PHMA 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 excepted projects, must comply with the conservation measures outlined in this plan, including the RDFs and avoidance criteria presented in MA-GRSG-03. The BLM is currently processing an application for TransWest Express (including those portions of Energy Gateway South that are collocated) and the NEPA review for this project is well underway. The BLM is analyzing GRSG mitigation measures through the project's NEPA review process.

In PHMA, high voltage transmission lines (100 kV or greater) would be avoided if possible. If avoidance is not possible, they would be placed in designated corridors where technically feasible. Where not technically feasible, lines should be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG. New ROWs constructed adjacent to existing infrastructure will be constructed as close as technically feasible to existing infrastructure to limit disturbance to the smallest footprint.

In PHMA outside of designated corridors, new transmission lines must be buried where technically feasible. Where burying transmission lines is not technically feasible:

- new transmission lines must be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG; and
- would be subject to GRSG ROW avoidance criteria described above.

In PHMA, if an existing transmission line is being upgraded to a higher voltage transmission line outside an existing corridor:

- the existing transmission line must be removed within a reasonable amount of time after the new line is installed and energized; and
- the new line must be constructed in the same alignment as the existing line unless an alternate route would benefit GRSG or GRSG habitat.

In PHMA, where existing guy wires are determined to have a negative impact on GRSG or its habitat, they should be removed or appropriately marked with bird flight diverters to make them more visible to GRSG in flight.

Pipelines

In PHMA, major pipelines (greater than 24 inches) that cannot avoid PHMA would be placed in designated corridors where technically feasible. Where not technically feasible, pipelines should be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG.

Communication Sites

In PHMA, new communication towers that cannot avoid PHMA must be located, where technically feasible, within an existing communication site. New sites would be considered where necessary for public safety.

MA-LAR-3
Road ROWs

In PHMA, new road ROWs would be authorized when necessary for public safety, administrative access, or subject to valid existing rights. If the new ROW is necessary for public safety, administrative access, or subject to valid existing rights and creates new surface disturbance, then avoid, minimize, and compensate for the impacts.

In PHMA, limit route construction to realignments of existing ROWs if the realignment maintains or enhances GRSG habitat, eliminates the need to authorize a new ROW to construct a new road, or is necessary for public safety or public need.

In PHMA, subject to valid existing rights, new road ROWs/easements would be authorized only when necessary for public safety or administrative access or, if it would create no new or de minimis new surface disturbance.

In PHMA, collocate new ROWs as close as technically possible to existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary.

In PHMA, existing Federal Highway Act Appropriation ROWs will be managed as valid existing rights, and new Federal Highway Act ROWs would continue to be considered and subject to all GRSG ROW plan restrictions.

MA-LAR-4
In PHMA, designate ROW corridors as identified on **Map 2.20**:

- Retain 17,600 acres of existing designated ROW corridor
- Retain 44,300 acres of existing designated ROW corridor, but stipulate new developments be limited to underground use only
- Undesignate 18,200 acres of existing designated ROW corridor

In PHMA, placement of new ROWs in corridors should be avoided if at all possible. Where avoidance is not possible:

- Allow new linear ROWs in designated corridors.
- New ROWs constructed in designated corridors will be constructed as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint, unless using a different alignment better minimizes impacts on GRSG.
- Apply the pertinent management for discretionary activities in PHMA identified in MA-GRSG-3.

MA-LAR-5
In PHMA, when a ROW grant expires, is relinquished, or terminated, required rehabilitation as a term and condition of the FLPMA ROW grant, in compliance with 43 CFR 2805.12(i).

- the lease holder will be required to restore the site by removing overhead lines and other infrastructure, and;
- eliminate existing raven nesting opportunities created by anthropogenic development on public lands (e.g., remove power line and communication facilities no longer in service).

In PHMA, during renewal, amendment or reauthorization of existing permits, work with existing ROW holders to mitigate impacts of existing ROW infrastructure. Where technically feasible, require ROW holders to bury or relocate existing power lines to minimize long-term impacts on GRSG habitat. Where the potential long-term impacts of relocating or burying the line would be greater than the existing impacts, do not pursue the mitigation. If relocation or burying is not feasible or would result in severe short-term or greater long-term impacts on GRSG habitat, incorporate additional terms and conditions in the ROW authorization for protection of GRSG habitat.

Work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation.

MA-LAR-6
In PHMA, where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, remove the features and restore the habitat.

MA-LAR-7
In GHMA, manage ROWs, permits, and leases as follows (**Map 2.15**):

- Open: 484,900 acres
- Avoided: 0 acres
- Excluded: 17,600 acres

New ROWs (including permits and leases) authorizations would be allowed if they apply the pertinent management for discretionary activities in GHMA identified in MA-GRSG-5.

MA-LAR-8
In GHMA, retain 74,700 acres of designated ROW corridors as identified on **Map 2.20**.

MA-LAR-9
Land Tenure

Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of the GRSG.

MA-LAR-10
In PHMA, where suitable conservation actions cannot be achieved, seek to acquire state and private lands with intact federal mineral estate by donation, purchase or exchange in order to best conserve, enhance or restore GRSG habitat.

MA-LAR-11
Withdrawal

SFA would be recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights. Other federal lands or non-federal lands with federal mineral interests within PHMA or GHMA that are not already withdrawn or recommended for withdrawal would be available for locatable mineral entry.

MA-LAR-12
Wind Energy Development

PHMA would be designated as exclusion areas for wind energy development (2,026,400 acres) (**Map 2.31**).

Do not site wind energy development in opportunity areas within 5 miles from occupied GRSG leks that are in PHMA.

Manage wind energy development in GHMA as follows:

- Open – 484,900 acres
- Avoided – 0 acres
- Excluded – 17,600 acres

New wind ROW authorizations would be allowed in GHMA if they apply the pertinent management for discretionary activities identified in MA-GRSG-5.

MA-LAR-13
Solar Energy Development

As noted in **Chapter 1**, the BLM's Approved Resource Management Plan Amendments/ROD for Solar Energy Development in Six Southwestern States (October 2012) excluded all GRSG occupied habitat to new utility-scale solar development. Because the existing land use plans already exclude solar development in GRSG habitat; this plan amendment process does not need to make additional decisions related to solar development (**Map 2.32**).

Minerals

Management Action

MA-MIN-1
Allow exploration for all minerals (e.g., geophysical, trenching, drilling, etc.) within mapped occupied GRSG habitat areas that are not closed to leasing, permitting, etc., to obtain exploratory information. In areas where leasing, permitting, etc. is still available, minerals exploration shall be subject to the pertinent management for discretionary activities in PHMA (MA-GRSG-3) and GHMA (MA-GRSG-5).

Nonenergy Leasable Minerals

Management Actions

MA-MIN-2
In PHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (**Map 2.38**):

- Open to Leasing Consideration – 0 acres
- Closed to Leasing – 2,587,100 acres

In PHMA, close federal lands and non-federal lands with federal mineral interests to nonenergy leasable mineral leasing. However, expansion of existing operations could be considered if the new lease is contiguous with an existing operation and the new lease (construction, operation, or maintenance) applies the pertinent management for discretionary activities in PHMA identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).

MA-MIN-3
In GHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (**Map 2.38**):

- Open to Leasing Consideration – 619,500 acres
- Closed to Leasing – 27,600 acres

New leasing and development in GHMA would be considered if consistent with the pertinent management for discretionary activities described in MA-GRSG-5.

MA-MIN-4
In PHMA, exploration and prospecting activities associated with nonenergy leasable minerals would be required to comply with the same stipulations identified for leasing and development, above. In addition:

- The exploration/prospecting activity does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter) (MA- GRSG-3G);
- Facilities associated with exploration/prospecting activities will be removed before the next breeding season.
- Disturbances will be restored.

Coal

Management Actions

MA-MIN-5
Leases Associated with Surface Mining

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 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

MA-MIN-6
Leases Associated with Underground Mining

Consider leasing PHMA for coal that would be extracted through underground mining. Require the following stipulations as part of any new lease or lease modification:

- In PHMA, appurtenant facilities would not be placed in GRSG habitat, where technically feasible.
- In PHMA, if placement of facilities outside of GRSG habitat is not technically feasible, disturbances associated with the lease (construction, operation, or maintenance) can be allowed if they are consistent with the pertinent management for discretionary activities identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, noise restrictions, seasonal restrictions, etc.).

If the above criteria cannot be met, do not grant new leases or modifications.

MA-MIN-7
New leasing for underground mining of coal in GHMA would be considered if consistent with the pertinent management for discretionary activities described in MA-GRSG-5.

MA-MIN-8
In PHMA, exploration activities needed to meet data adequacy standards associated with potential coal leasing would be required to comply with the pertinent management for discretionary activities identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, buffers, noise restrictions, seasonal restrictions, etc.).

MA-MIN-9
For coal mining operations on existing leases:

Underground mining: In PHMA, unless required for technical or safety reasons, do not authorize new appurtenant surface facilities for existing underground mining. If new appurtenant surface facilities associated the existing mine leases cannot be located outside of PHMA, collocate them with any existing disturbed areas, if possible. If collocation is not possible, then construct new facilities to minimize disturbed areas while meeting mine safety standards/requirements, as identified by MSHA mine-plan approval process, and locate the facilities in an area least harmful to GRSG habitat based on vegetation, topography, or other habitat features.

MA-MIN-10
For coal mining operations on existing leases:

In GHMA, new disturbances could be considered if consistent with the pertinent management for discretionary activities described in MA-GRSG-5.

Locatable Minerals

Management Actions

MA-MIN-11
SFA would be recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights.

Other federal lands or non-federal lands with federal mineral interests within PHMA or GHMA that are not already withdrawn would be available for locatable mineral entry. Areas that are recommended for withdrawal would continue to be managed as they are currently managed.

In PHMA, to the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance from locatable mineral development and apply management to minimize and mitigate impacts. To the extent allowable by law, work with claimants to voluntarily apply the pertinent management for discretionary activities in PHMA identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs) and in GHMA identified in MA-GRSG-5 (i.e., mitigation and buffers).

Regardless of whether agreements with the claimant incorporates the 3 percent disturbance cap (MA-GRSG-3B), disturbance from locatable mineral development would be included as disturbance when calculating disturbance for other land uses.

Mineral Materials

Management Actions

MA-MIN-12
In PHMA, manage mineral materials as follows (**Map 2.47**):

- open to mineral materials development: 0 acres
- closed to mineral materials development: 2,587,100 acres

MA-MIN-13
Close PHMA to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met at all phases of the development (construction and long-term operation of facilities):

- the activity is within the BSU and project area disturbance cap (MA- GRSG-3B);
- the activity is subject to the provisions set forth in the mitigation framework (MA-GRSG-3A);
- all applicable RDFs are applied (MA-GRSG-3I); and
- the activity applies the other pertinent management for discretionary activities in PHMA in MA-GRSG-3.

In GHMA, new mineral material developments could be considered if consistent with the pertinent management for discretionary activities described in MA-GRSG- 5.

Fluid Minerals

Objectives

Objective MIN-1
Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral

resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority 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 USC 226(p) and 43 CFR 3162.3-1(h).

Objective MIN-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, minimize, and compensate for adverse impacts on 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 (APD) for the lease to avoid, minimize, and compensate for impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such federal leases.

Management Actions

MA-MIN-14
Manage fluid mineral leasing in PHMA as follows (**Map 2.53**):

- open to leasing, subject to standard stipulations: 0 acres
- open to leasing, subject to CSU and/or TL stipulations: 0 acres
- open to leasing, subject to NSO stipulations: 2,516,200 acres
- closed to leasing: 70,900 acres

Unleased Federal Fluid Mineral Estate

Management Actions

MA-MIN-15
Unleased Areas within PHMA

PHMA would be designated as open to leasing fluid minerals, subject to NSO stipulations.

In SFA, there would be no waivers, exceptions, or modifications. In the remainder of PHMA, no waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:

- Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or,
- Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.

Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this LUPA. 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.

Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action

satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.

In addition, any lease activities would apply the pertinent management for discretionary activities in PHMA identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).

Outside PHMA, portions of opportunity areas within 4 miles of a lek that is located in PHMA would be open for leasing with CSU stipulations (avoiding noise and tall structures that could affect adjacent GRSG use of PHMA).

MA-MIN-16
Unleased Areas within GHMA

Manage fluid mineral leasing in GHMA as follows (**Map 2.53**):

- open to leasing, subject to standard stipulations: 228,100 acres
- open to leasing, subject to CSU and/or TL stipulations: 279,100 acres
- open to leasing, subject to NSO stipulations: 22,500 acres
- closed to leasing: 27,800 acres
- planning decision not mapped: 89,600 acres

In GHMA, new development of fluid mineral leases could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA- GRSG-5.

Leased Federal Fluid Mineral Estate

Management Actions

MA-MIN-17
Apply the following conservation measures through implementation decisions (e.g., approval of an APD, geothermal drilling permit, Sundry Notice, Master Development Plans, etc.) and upon completion of the environmental record of review (43 CFR 3162.5). In this process, evaluate whether the conservation measures are “reasonable” (43 CFR 3101.1-2) with the valid existing rights.

MA-MIN-18
In PHMA, avoid, minimize, and compensate for impacts on GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases.

Where possible, place development outside of PHMA. 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 per 640, and/or 3 percent disturbance cap, apply other measures to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in **Appendix D**. If the lease is entirely within PHMA, if feasible, apply the lek buffers from MA-GRSG-3H. If this is not technically feasible, locate infrastructure in areas that will minimize habitat loss. Require any development to be placed at the most distal part of the lease from the lek or in areas least harmful to GRSG populations and habitat (e.g., areas where local terrain

features such as ridges and ravines may reduce habitat importance or shield nearby habitat from disruptive factors).

For geophysical exploration activities, include seasonal TLs and RDFs as permit COAs to eliminate or minimize surface-disturbing and disruptive activities within nesting and brood-rearing habitat and winter concentration areas.

MA-MIN-19
To the extent consistent with existing lease-rights, apply the pertinent management for discretionary activities in PHMA identified in MA-GRSG-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs) and in GHMA identified in MA-GRSG-5 (i.e., mitigation, buffers, and RDFs).

MA-MIN-20
In PHMA, operators must submit a master development plan with site-specific plans of development for roads, wells, pipelines and other infrastructure prior to any development being authorized. The BLM will evaluate the plan through the NEPA process.

MA-MIN-21
In PHMA, encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6.

MA-MIN-22
In PHMA, identify areas where acquisitions (including federal mineral rights) or conservation easements, would benefit GRSG habitat.

MA-MIN-23
In PHMA, require a full reclamation bond specific to the site in accordance with 43 CFR 3104.2, 3104.3, 3104.5, and 36 CFR 228.109. Insure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors will perform the work.

Mineral Split Estate

Management Actions

MA-MIN-24
Where the federal government manages the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.

Where the federal government manages the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.

Comprehensive Travel and Transportation Management

Management Actions

MA-TTM-1
Manage OHV use in GRSG habitat as follows (**Map 2.59**):

- Open to cross-country use: 525 acres (one area each in Parker Mountain and Uintah Population Areas)
- Limited to existing routes: 1,274,700 acres
- Limited to designated routes: 1,220,500 acres
- Closed: 33,200 acres

MA-TTM-2
PHMA and GHMA that do not have designated routes in a Travel Management Plan would be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use).

OHV Areas designated as "closed" would be managed as areas closed to motorized vehicles. OHV Areas designated as "limited existing" within PHMA would be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel plan. Individual route designations would occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" would automatically transition to "limited to designated roads, primitive roads and trails."

MA-TTM-3
Implementation level travel planning efforts would be guided by the goals, objectives and guidelines outlined in the GRSG section, relevant national and Utah specific guidance as well as the following:

- A timeline to complete travel planning efforts in would be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation.
- During subsequent travel management planning, consultation "with interested user groups, federal, state, county, and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, a public outreach plan to fully engage all interested stakeholders will be incorporated into future travel management plans.
- Among other designation criteria from 43 CFR 8342.1(b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats."
- During subsequent travel management planning, all routes would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive GRSG habitat.
- During subsequent travel planning, threats to GRSG and their habitat would be considered when evaluating route designations and/or closures.
- During subsequent travel management planning, routes that do not have a purpose or need would be considered for closure.
- During subsequent travel management planning, routes that are duplicative, parallel, or redundant

would be considered for closure.

- During subsequent travel management planning, seasonal restrictions on OHV use would be considered in important seasonal habitats where OHV use is a threat. During subsequent travel management planning, consider limiting over snow vehicles designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through March 31.
- During subsequent travel management planning, routes not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only.
- During subsequent travel management planning, consider prioritizing restoration of routes not designated in a Travel Management Plan.
- During subsequent travel management plan implementation, consider using seed mixes or transplant techniques that will maintain or enhance GRSG habitat when rehabilitating linear disturbances.
- During subsequent travel management plan implementation, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Consider using time of day limits (e.g., no use between 6:00 pm and 9:00 am) to reduce impacts on GRSG during breeding periods.

MA-TTM-4
In PHMA, complete transportation plans in accordance with National BLM Travel Management guidance, requiring the BLM to maintain a current action plan and planning schedule to most effectively target available resources. The following GRSG population areas are Utah's top priority areas to designate comprehensive travel plans:

- Sheeprocks
- Bald Hills
- Box Elder
- Rich
- Ibapah
- Hamlin Valley

MA-TTM-5
In PHMA, travel systems would be managed with an emphasis on improving the sustainability of the travel network in a comprehensive manner to minimize impacts on GRSG, maintain motorist safety, and prevent unauthorized cross country travel while meeting access needs. To do so, it may be necessary to improve portions of existing routes, close existing routes or create new routes that meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning would be placed on having a neutral or positive effect on GRSG habitat.

MA-TTM-6
In PHMA, when considering upgrade of existing routes that would change route category (BLM route categories: road, primitive road, or trail) or capacity, consider the larger transportation network while providing for protection of GRSG habitat.

MA-TTM-7
In PHMA, use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance. Apply additional effective mitigation necessary to offset the resulting loss of GRSG habitat.

Plan for new routes in consideration of the larger transportation network objectives and needs while providing for protection of GRSG habitat.

MA-TTM-8
In PHMA, when reseeding roads, primitive roads and trails, use appropriate seed mixes and consider the use of transplanted sagebrush.

MA-TTM-9
Develop an educational process to advise OHV users of the potential for conflict with GRSG.

MA-TTM-10
In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).

Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or 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 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.

Recreation

Management Actions

MA-REC-1
In PHMA, only allow BLM special recreation permits (SRPs) that have neutral or beneficial effect on GRSG and their habitat. Evaluate existing SRPs for adverse effect on GRSG and their habitat. Modify or cancel the permit, as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival).

Identify permit stipulations that require the permittee to implement any necessary habitat restoration activities after SRP events. Restoration activities must be consistent with GRSG habitat objectives.

MA-REC-2
In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development would have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.

Areas of Critical Environmental Concern (ACEC)

No additional ACECs are designated.

Attachment C: FOREST SERVICE PLAN COMPONENTS

See accompanying document with the Forest Service proposed Land Use Plan Amendment components, which is an excerpt from Chapter 2 of the FEIS. This excerpt is provided to facilitate USFWS review of this document.

Utah Forest Service Proposed Plan Amendment

Forest Service Plan Components

On April 9, 2012, the USDA adopted final planning regulations for the National Forest System at 36 CFR part 219. The regulations, known collectively as the 2012 Planning Rule, provide broad programmatic direction in developing and carrying out land management planning and set out requirements for plan components (36 CFR 219.7(e)) and other content in land management plans. Forest Service Handbook (FSH) 1909.12 provides procedural guidance for implementing land management planning direction for the 2012 Planning Rule. Every Forest Service plan must include the following components18:

- *Desired condition*: A description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but do not include completion dates.
- *Guideline*: A constraint on project and activity decisionmaking that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are established to help achieve or maintain a desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.
- *Objective*: A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets.
- *Standard*: A mandatory constraint on project and activity decisionmaking, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

The direction in the standards and guidelines will be applied consistent with applicable valid existing rights, laws, and regulations.

The Forest Service has developed two Proposed Plans to be applied in the Utah Sub-region. This Proposed Plan applies to the National Forest System lands within the boundaries of the State of Utah: Uinta-Wasatch-Cache National Forest, Ashley National Forest, Manti-La Sal National Forest, Fishlake National Forest, and Dixie National Forest.

[18] Plan component definitions are based on generally accepted meanings under the 1982 rule and the Forest Service Plan Wording Style Guide 2009, http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5260265.pdf.

General Greater Sage-Grouse

Desired Conditions

GRSG-GEN-DC-001
The landscape for GRSG encompasses large contiguous areas of native vegetation, approximately 6 to 62 square miles in area, to provide for multiple aspects of species life requirements. Within these landscapes, a variety of sagebrush-community compositions exist without invasive species, which have variations in subspecies composition, co-dominant vegetation, shrub cover, herbaceous cover, and stand structure, to meet seasonal requirements for food, cover, and nesting for GRSG.

GRSG-GEN-DC-002
Anthropogenic disturbance is focused in non-habitat areas outside of PHMA, SFA, and GHMA[19]. Disturbance in general management areas is limited, and there is little to no disturbance in PHMA and SFA except for valid existing rights and existing authorized uses.

GRSG-GEN-DC-003
In GRSG seasonal habitats, including all seasonal habitats, 70 percent of lands capable of producing sagebrush have 10 to 30 percent sagebrush canopy cover and less than 10 percent conifer canopy cover. In addition, within breeding and nesting habitat, sufficient herbaceous vegetation structure and height provides overhead and lateral concealment for nesting and early brood rearing life stages. Within brood rearing habitat, wet meadows and riparian areas sustain a rich diversity of perennial forb species relative to site potential. Within winter habitat, sufficient sagebrush height and density provides food and cover for GRSG during this seasonal period. Specific desired conditions for GRSG based on seasonal habitat requirements are in Table GRSG-GEN-DC-003, Seasonal Habitat Desired Conditions for Greater Sage-Grouse.

Table GRSG-GEN-DC-003
Seasonal Habitat Desired Conditions for Greater Sage-grouse

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING[1,2,3] (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks.[4]		
Lek Security	Proximity of trees [5]	Trees or other tall structures are none to uncommon within 1.86 miles of leks[6, 7]
	Proximity of sagebrush to leks [6]	Adjacent protective sagebrush cover within 328 feet of lek [6]
Cover	Seasonal habitat extent [7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [6, 7, 8]	15 to 25%
	Sagebrush height [7] Arid sites [6,7,9] Mesic sites[6,7,10]	 12 to 32 inches 16 to 32 inches
	Predominant sagebrush shape [6]	>50% in spreading [11]
	Perennial grass canopy cover [6,7] Arid sites [7,9] Mesic sites [7,10]	 ≥10% ≥15%
	Perennial grass height[6,7,8]	Provide overhead and lateral concealment from predators[7, 15]
	Perennial forb canopy cover [6,7,8] Arid sites [9] Mesic sites [10]	 ≥5%[6,7] ≥10%[6,7]
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)		
Cover	Seasonal habitat extent [7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height [7,8]	16 to 32 inches

[19] PHMA and GHMA may contain non-habitat, but management direction would not apply to those areas of non-habitat. However, management direction would apply to all areas within SFA including nonhabitat.

Table GRSG-GEN-DC-003
Seasonal Habitat Desired Conditions for Greater Sage-grouse

ATTRIBUTE	INDICATORS	DESIRED CONDTION
	Perennial grass canopy cover and forbs [7,8]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability [6,7]	Preferred forbs are common with several preferred species present[13]
WINTER[1] (Seasonal Use Period November 1-February 28)		
Cover and Food	Seasonal habitat extent [6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow [6,7,8]	>10%
	Sagebrush height above snow [6,7,8]	>10 inches [14]

[1]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.
[2] Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.
[3] Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.
[4] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[5] Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.
[6] Stiver et al. 2015 *In Press*.
[7] Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.
[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.
[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (Stiver et al. 2015 *In Press*).
[12] 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.
[13] Preferred forbs are listed in Table III-2 of the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015 *In Press*). 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 of the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015 *In Press*).
[14] 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.
[15] Projects will be designed to provide overhead and lateral concealment of nests on a site specific basis.

Standards

GRSG-GEN-ST-004
In PHMA, SFA, and Anthro Mountain, do not issue new discretionary written authorizations unless all existing discrete anthropogenic disturbances cover less than 3 percent of the total GRSG habitat within the BSU and the proposed project area, regardless of ownership, and the new use will not cause exceedance of the 3 percent cap (**Appendix E**).

GRSG-GEN-ST-005
In PHMA, SFA, GHMA, and Anthro Mountain, only allow new authorized land uses if the residual impacts to GRSG or their habitats are fully offset by compensatory mitigation projects that provide a net conservation gain to the species, which will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Any compensatory mitigation will be durable, timely, and in addition to what would have resulted without the compensatory mitigation as addressed in the Regional Mitigation Strategy (**Appendix D**).

GRSG-GEN-ST-006
During lekking (March 1 to April 30) restrict surface disturbing and disruptive activities, including noise at 10 decibels above ambient (not to exceed 20-24 decibels) measured at the perimeter of an occupied lek, to lekking birds from 6:00 pm to 9:00 am within a buffer distance[20] of 3.1 miles.

Guidelines

GRSG-GEN-GL-007
During breeding and nesting (March 1 to June 15), surface disturbing and disruptive activities to nesting birds should be avoided.

GRSG-GEN-GL-008
When breeding and nesting habitat overlaps with other seasonal habitats, habitat should be managed for breeding and nesting desired conditions in Table GRSG- GEN-DC-003.

GRSG-GEN-GL-009
Development of tall structures within 2 miles from the perimeter of occupied leks, as determined by local conditions (e.g., vegetation or topography), with the potential to disrupt breeding or nesting by creating new perching/nesting opportunities for avian predators or by decreasing the use of an area, should be restricted within nesting habitat.

Adaptive Management

Standards

GRSG-AM-ST-010
If a hard trigger is met, immediate action is necessary to stop a severe deviation from GRSG conservation objectives. The larger deviation from natural variation associated with a hard trigger would correspond with a greater change in management. Upon reaching a hard trigger, an appropriate component of a more restrictive alternative analyzed in the EIS will be implemented without further action by the Forest Service. The Forest Service will review available and pertinent data, in coordination with GRSG biologists from multiple agencies (**Appendix B**).

GRSG-AM-ST-011
If a soft trigger is met, the Forest Service will determine the specific cause or causes that are contributing to the decline. In completing this evaluation, the Forest Service will coordinate with GRSG biologists from multiple agencies. If it is determined that the decline is related to a natural variation in the population, no specific management actions would be required. However, if Forest Service management actions are determined to be the cause or contribute to the decline, the Forest Service would apply measures within their implementation-level discretion to mitigate the decline of populations and/or habitat. These measures would apply more conservative or restrictive implementation-level conservation conditions, terms, or decisions within the agency's discretion to mitigate the decline (**Appendix B**).

[20] Plan buffer distances reflect lower-interpreted range from 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: USGS Open-File Report 2014–1239, 14 p., http://dx.doi.org/10.3133/ofr20141239.

Lands and Realty

Special Use Authorizations (non-recreation)

Objectives

GRSG-LR-SUA-O-012
In brood rearing and nesting habitats, retrofit existing tall structures (e.g., power poles, and cellular towers) with perch deterrents or other anti-perching devices within 2 years of signing the ROD.

Standards

GRSG-LR-SUA-ST-013
In PHMA, SFA, and Anthro Mountain, restrict issuance of new lands special use authorizations (SUAs) that authorize infrastructure, such as high-voltage transmission lines, major pipelines, hydropower, distribution lines, and cellular towers. Exceptions must be limited and based on rationale (e.g., monitoring, modeling, or best available science) that explicitly demonstrates that adverse impacts to GRSG will be avoided by the exception. Existing authorized uses will continue to be recognized.

GRSG-LR-SUA-ST-014
In GHMA, new lands SUAs may be issued for infrastructure, such as high-voltage transmission lines, major pipelines, hydropower, distribution lines, and cellular towers, if they can be located within existing designated corridors or ROWs and the authorization includes stipulations to protect GRSG and their habitats. Existing authorized uses will continue to be recognized.

GRSG-LR-SUA-ST-015
In PHMA, SFA, GHMA, and Anthro Mountain, do not authorize temporary lands special uses (i.e., facilities or activities) that result in loss of habitat or would have long-term (i.e., greater than 5 years) negative impact on GRSG or their habitats.

GRSG-LR-SUA-ST-016
In PHMA, SFA, GHMA, and Anthro Mountain, require protective stipulations (e.g., noise, tall structure, guy wire removal, perch deterrent installation) when issuing new authorizations or during renewal, amendment, or reissuance of existing authorizations that authorize infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers).

GRSG-LR-SUA-ST-017
In PHMA, SFA, GHMA, and Anthro Mountain, locate upgrades to existing transmission lines within the existing designated corridors or ROWs unless an alternate route would benefit GRSG or their habitats.

GRSG-LR-SUA-ST-018
In PHMA, SFA, GHMA, and Anthro Mountain, when a lands SUA is revoked or terminated and no future use is contemplated, require the authorization holder to remove overhead lines and other surface infrastructure in compliance with 36 CFR 251.60(i).

GRSG-LR-SUA-ST-019
In PHMA, SFA, GHMA, and Anthro Mountain, if the potential long-term (i.e., greater than 5 years) impacts of mitigation (e.g., relocating or burying transmission lines and pipelines) to GRSG or their habitats are greater than the potential impacts from infrastructure associated with a new lands SUA, do not pursue the mitigation. If mitigation is not feasible or would result in short-term (i.e., less than 5 years) or long-term impacts, incorporate additional terms and conditions in the SUA for protection of GRSG or their habitats.

GRSG-LR-SUA-ST-020
In PHMA, SFA, GHMA, and Anthro Mountain, collocate new infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers) with existing infrastructure to limit disturbance to the smallest footprint, or where it best limits impacts to GRSG or their habitats. If collocation of new infrastructure cannot be accomplished, locate it adjacent to existing infrastructure, roads, or already disturbed areas. New communication tower sites may be authorized for public safety.

Guideline

GRSG-LR-SUA-GL-021
In PHMA, SFA, and Anthro Mountain, outside of existing designated corridors and ROWs, new transmission lines and pipelines should be buried to limit disturbance to the smallest footprint unless explicit rationale is provided that the biological impacts to GRSG are being avoided. When new transmission lines and pipelines are not buried, locate them adjacent to existing transmission lines and pipelines.

Land Ownership Adjustments

Standard

GRSG-LR-LOA-ST-022
In PHMA, SFA, GHMA, and Anthro Mountain, do not approve landownership adjustments unless the action results in a net conservation gain to GRSG or it will not directly or indirectly adversely impact GRSG conservation.

Guideline

GRSG-LR-LOA-GL-023
In PHMA, SFA, and GHMA with minority federal ownership, and Anthro Mountain, consider landownership adjustments to achieve a landownership pattern (e.g., consolidation, reducing fragmentation) that supports improved GRSG population trends and habitats.

Land Withdrawal

Guideline

GRSG-LR-LW-GL-024
In PHMA, SFA, and Anthro Mountain, use land withdrawals as a tool, where appropriate, to prevent activities that will be detrimental to GRSG or their habitats.

Wind and Solar

Standards

GRSG-WS-ST-025
In PHMA, SFA, GHMA, and Anthro Mountain, do not authorize new solar utility- scale and/or commercial energy development except for on-site power generation associated with existing industrial infrastructure (e.g., mine site).

GRSG-WS-ST-026
In PHMA, SFA, GHMA, and Anthro Mountain, do not authorize new wind utility- scale and/or commercial energy development except for on-site power generation associated with existing industrial infrastructure (e.g., mine site).

Greater Sage-Grouse Habitat

Objective

GRSG-GRSGH-O-027
Every 10 years for the next 50 years, improve GRSG habitat by removing invading conifers and other undesirable species based upon the number of acres shown in Table GRSG-GRSGH-O-027, Treatment Acres per Decade.

Table GRSG-GRSGH-O-027
Treatment Acres per Decade[1]

Forest	MECHANICAL[2]	PRESCRIBED FIRE[3]	GRASS RESTORATION[4]
Ashley	10,000	0	2,000
Dixie	13,000	1,000	7,000
Fishlake	7,000	0	1,000
Manti-La Sal	3,000	0	4,000
Uinta-Wasatch-Cache	9,000	0	0

1 These are estimates of treatments required to achieve and/or maintain desired habitat conditions over a period of 10 years. There are many dynamic and highly variable disturbances that may happen over that period of time that could have a significant effect on the amount, type, and timing of treatment needed. Those disturbances are factored into the 10-year simulation using stochastic, not deterministic, techniques. Probabilities of events such as large wildfires are used in the model to make the simulation as realistic as possible, given empirical data about such events in the past, but the results of the simulation cannot be used to predict the future occurrence of such events, including their timing, size, or location, which are essentially random.
2 Removal of conifers that have invaded sagebrush including phase one juniper that is 10 percent or less and reducing sagebrush cover in areas over 30 percent canopy cover
3 Acres are those that are greater than 30 percent sagebrush canopy cover and/or invaded by 10 percent or greater conifer.
4 Acres presently dominated by annual grasses that could be improved by herbicide application and seeding of perennial vegetation

Standard

GRSG-GRSGH-ST-028
Design habitat restoration projects to move towards desired conditions (Table GRSG-GEN-DC-003) and incorporate the concepts outlined in **Appendix K**.

Guidelines

GRSG-GRSGH-GL-029
Sagebrush removal in GRSG breeding and nesting and wintering habitats should be avoided unless necessary to support attainment of desired habitat conditions (Table GRSG-GEN-DC-003).

GRSG-GRSGH-GL-030
When removing conifers that are encroaching into GRSG habitat, avoid persistent woodlands (i.e., old growth relative to the site or more than 100 years old).

GRSG-GRSGH-GL-031
In PHMA, SFA, GHMA, and Anthro Mountain, actions and authorizations should include design features to limit the spread and effect of undesirable nonnative plant species.

GRSG-GRSGH-GL-032
To facilitate safe and effective fire management actions, in PHMA, SFA, GHMA, and Anthro Mountain, fuels treatments in high-risk areas (i.e., areas likely to experience wildfire at an intensity level that might result in movement away from the GRSG desired conditions in GRSG-GEN-DC-003) should be designed to reduce the spread and/or intensity of wildfire or the susceptibility of GRSG values to move away from desired conditions (GRSG-GEN-DC-003).

GRSG-GRSGH-GL-033
In PHMA, SFA, GHMA, and Anthro Mountain, native plant species should be used, when possible, to restore, enhance, or maintain desired habitat conditions (Table GRSG-GEN-DC-003).

GRSG-GRSGH-GL-034
In PHMA, SFA, and Anthro Mountain, vegetation treatment projects should only be conducted if they restore, enhance, or maintain desired conditions. (Table GRSG- GEN-DC-003).

Livestock Grazing

Desired Condition

GRSG-LG-DC-035
In PHMA, SFA, GHMA, and Anthro Mountain, livestock grazing is managed to ensure adequate nesting cover and does not conflict with attainment of other vegetation attributes (Table GRSG-GEN-DC-003).

Standard

GRSG-LG-ST-036
In PHMA, SFA, and Anthro Mountain, do not approve construction of water developments unless beneficial to GRSG habitat.

Guidelines

GRSG-LG-GL-037
Grazing guidelines should be applied in each of the seasonal habitats in Table GRSG- LG-GL-037, Grazing Guidelines for Greater Sage-Grouse Seasonal Habitat. If values in Table GRSG-LG-GL-037 guidelines cannot be achieved based upon a site-specific analysis using ESDs, long-term ecological site capability analysis, or other similar analysis, adjust grazing management to move towards desired habitat conditions in Table GRSG-GEN-DC-003 consistent with the ecological site capability. Do not use drought and degraded habitat condition to adjust values. Grazing guidelines in Table GRSG-LG-GL-037 would not apply to isolated parcels of National Forest System lands that have less than 200 acres of GRSG habitat.

Table GRSG-LG-GL-037
Grazing Guidelines for Greater Sage-Grouse Seasonal Habitat

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] within 4 miles of occupied leks	Perennial grass height: [2] When grazing occurs during breeding and nesting season (March 1 to June 15) manage for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (June 16 to October 30) manage for 4 inches [4,5,6] of perennial grass height.
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation [7, 8]
Winter [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of GRSG see Table GRSG-GEN-DC-003.
[2] Grass heights only apply in breeding and nesting habitat with ≥10 percent sagebrush cover to support nesting.
[3] Holloran et al. 2005. *Greater sage-grouse nesting habitat selection and success in Wyoming*.
[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).
[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of greater sage-grouse Centrocercus urophasianus nesting and brood-rearing habitats*. Wildlife Biology 13(1): 42-50.
[6] Stubble height to be measured at the end of the growing season.
[7] Crawford et al. 2004. Ecology and Management of sage-grouse and sage-grouse habitat. "In riparian brood-rearing habitat, sage-grouse prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth stimulated by moderate livestock grazing (Neel 1980, Evans 1986). "Moderate use equates to a 10-cm residual stubble height for most grasses and sedges."
[8] Stubble height to be measured in the meadow areas used by GRSG for brood-rearing (not on the hydric greenline).

GRSG-LG-GL-038
In PHMA, SFA, and Anthro Mountain, consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities arise under applicable regulations, where removal of livestock grazing would enhance the ability to achieve desired habitat conditions (Table GRSG-GEN- DC-003).

GRSG-LG-GL-039
Bedding sheep and placing camps within 1.2 miles from the perimeter of a lek during lekking (March 1 to April 30) should be restricted.

GRSG-LG-GL-040
During the breeding and nesting season (March 1 to June 15), trailing livestock through breeding and nesting habitat should be minimized. Specific routes should be identified, existing trails should be used, and stopovers on active leks should be avoided.

GRSG-LG-GL-041
Fences should not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, or other design features).

GRSG-LG-GL-042
New permanent livestock facilities (e.g., windmills, water tanks, and corrals) should not be constructed within 1.2 miles from the perimeter of occupied leks.

Fire Management

Desired Condition

GRSG-FM-DC-043
In PHMA, SFA, GHMA, and Anthro Mountain, the extent and spread of wildfire resulting in loss of sagebrush is minimized, considering firefighter and public safety and other high priority values.

Standards

GRSG-FM-ST-044
In PHMA, SFA, GHMA, and Anthro Mountain, do not use prescribed fire, except for pile burning, in 12-inch or less precipitation zones unless necessary to facilitate site preparation for restoration of GRSG habitat consistent with desired conditions in Table GRSG-GEN-DC-003.

GRSG-FM-ST-045
In PHMA, SFA, GHMA, and Anthro Mountain, if it is necessary to use prescribed fire to facilitate site preparation for restoration of GRSG habitat consistent with desired conditions in Table GRSG-GEN-DC-003, the associated NEPA analysis must identify how the project would move towards GRSG desired conditions, why alternative techniques were not selected, and how potential threats to GRSG habitat would be minimized.

Guidelines

GRSG-FM-GL-046
In wintering or breeding and nesting habitat, sagebrush removal or manipulation, including prescribed fire, should be restricted unless the removal strategically reduces the potential impacts from wildfire.

GRSG-FM-GL-047
In PHMA, SFA, GHMA, and Anthro Mountain, when reseeding in fuel breaks, fire resistant native plant species should be used if available, or consider using fire resistance non-native species to meet resource objectives, if analysis demonstrates that nonnative plants will not damage GRSG habitat in the long-term.

GRSG-FM-GL-048
In PHMA, SFA, GHMA, and Anthro Mountain, fuel treatments should be designed to restore, enhance, or maintain GRSG habitat.

GRSG-FM-GL-049
Locating temporary wildfire suppression facilities (e.g., incident command posts, spike camps, helibases, and mobile retardant plants) in PHMA, SFA, GHMA, and Anthro Mountain should be avoided.

GRSG-FM-GL-050
In PHMA, SFA, GHMA, and Anthro Mountain, cross-country vehicle travel during fire operations should be restricted whenever safe and practical to do so, as determined by fireline leadership, and incident commanders.

GRSG-FM-GL-051
In PHMA, SFA, GHMA, and Anthro Mountain, use fire management tactics and strategies that seek to minimize loss of existing sagebrush habitat. The safest and most practical means to do so will be determined by fireline leadership and incident commanders.

GRSG-FM-GL-052
In PHMA, SFA, GHMA, and Anthro Mountain, prescribed fire prescriptions should minimize undesirable effects on vegetation and/or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of hydrophobicity).

GRSG-FM-GL-053
In PHMA, SFA, GHMA, and Anthro Mountain, roads and natural fuel breaks should be incorporated into fuel break design to improve effectiveness and minimize loss of existing sagebrush habitat.

GRSG-FM-GL-054
In PHMA, SFA, GHMA, and Anthro Mountain, all fire associated vehicles and equipment should be inspected and cleaned using standardized protocols and procedures and approved vehicle/equipment decontamination systems before entering and exiting the area to minimize the introduction of invasive annual grasses and other invasive plant species and noxious weeds.

GRSG-FM-GL-055
Unit-specific GRSG fire management toolboxes containing maps, lists, contact information for qualified resource advisors, local guidance, and relevant information should be developed and used.

GRSG-FM-GL-056
Localized maps of PHMA, SFA, GHMA and Anthro Mountain should be provided to dispatch officers and extended attack incident commanders to use when prioritizing wildfire suppression resources and designing suppression tactics.

GRSG-FM-GL-057
In or near PHMA, SFA, GHMA, and Anthro Mountain, a GRSG resource advisor should be assigned to all extended attack fires.

GRSG-FM-GL-058
On critical fire weather days, protection of GRSG habitat should receive high consideration, along with other high values, when positioning resources.

GRSG-FM-GL-059
Line officers should be involved in setting pre-season wildfire response priorities and, during periods of multiple fires, prioritizing protection of PHMA, SFA, and GHMA.

GRSG-FM-GL-060
In PHMA, SFA, GHMA, and Anthro Mountain, consider using fire retardant and mechanized equipment only if it is likely to result in minimizing burned acreage.

GRSG-FM-GL-061
In PHMA, SFA, GHMA, and Anthro Mountain, to minimize sagebrush loss, mop- up should be conducted where the burned areas adjoin unburned islands, doglegs, or other habitat features, as safety and available resources allows.

Recreation

Desired Condition

GRSG-R-DC-062
In PHMA, SFA, and Anthro Mountain, recreation activities are balanced with the ability of the land to support them, while meeting GRSG seasonal habitat desired conditions (GRSG-GEN-DC-003) and creating minimal user conflicts.

Standard

GRSG-R-ST-063
In PHMA, SFA, GHMA, and Anthro Mountain, do not authorize temporary recreation uses (i.e., facilities or activities) that result in loss of habitat or would have long-term (greater than 5 years) negative impacts on GRSG or their habitats.

Guidelines

GRSG-R-GL-064
In PHMA, SFA, GHMA, and Anthro Mountain, terms and conditions that protect and/or restore GRSG habitat within the permit area should be included in new recreation SUAs. During renewal, amendment, or reauthorization, terms and conditions in existing permits and operating plans should be modified to protect and/or restore GRSG habitat.

GRSG-R-GL-065
In PHMA, SFA, and Anthro Mountain, new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, and campgrounds), including SUAs for facilities and activities, should not be approved unless the development results in a net conservation gain to GRSG and/or their habitats or the development is required for visitor safety.

Roads and Transportation

Desired Condition

GRSG-RT-DC-066
In PHMA, SFA, GHMA, and Anthro Mountain, within the travel management system, GRSG experience minimal disturbance during breeding and nesting (March 1 to June and wintering (November 1 to February 28) periods.

Standards

GRSG-RT-ST-067
In PHMA, SFA, GHMA, and Anthro Mountain, do not construct or allow new road or trail construction (does not apply to realignments for resource protection) except when necessary for administrative access, public safety, or to access valid existing rights. If necessary to construct new roads and trails for one of these purposes, construct them to the minimum standard, length, and number and avoid, minimize, and compensate for the impacts.

GRSG-RT-ST-068
Do not conduct or allow road and trail maintenance activities within 2 miles from the perimeter of active leks during lekking (March 1 to April 30) from 6:00 pm – 9:00 am.

GRSG-RT-ST-069
In PHMA, SFA, and Anthro Mountain, prohibit public access on temporary energy development roads, unless consistent with all other terms and conditions included in the forest plan.

Guidelines

GRSG-RT-GL-070
In PHMA, SFA, and Anthro Mountain, new roads and road realignments should be designed and administered to reduce collisions with GRSG.

GRSG-RT-GL-071
In PHMA, SFA, and Anthro Mountain, road construction within riparian areas and mesic meadows should be restricted. If not possible to restrict construction within riparian areas and mesic meadows, roads should be designed and constructed at right angles to ephemeral drainages and stream crossings, unless topography prevents doing so.

GRSG-RT-GL-072
In PHMA, SFA, GHMA, and Anthro Mountain, when decommissioning roads and unauthorized routes, restoration activity should be designed to move habitat towards desired conditions (Table GRSG-GEN-DC-003).

GRSG-RT-GL-073
In PHMA, SFA, GHMA, and Anthro Mountain, dust abatement terms and conditions should be included in road use permits when dust has the potential to impact GRSG.

GRSG-RT-GL-074
In PHMA, SFA, GHMA, and Anthro Mountain, road and road-way maintenance activities should be designed and implemented to reduce the risk of vehicle or human-caused wildfires and the spread of invasive plants. Such activities include but are not limited to the removal or mowing of vegetation a car-width off the edge of roads; use of weed-free earth-moving equipment, gravel, fill, or other materials; and blading or pulling roadsides and ditches that are infested with noxious weeds only if required for public safety or protection of the roadway.

Minerals

Fluid Minerals – Unleased

Standards

GRSG-M-FMUL-ST-075
In PHMA and Anthro Mountain, any new oil and gas leases must include an NSO stipulation. There will be no waivers or modifications. An exception could be granted by the authorized officer with unanimous concurrence from a team of agency GRSG experts from the USFWS, Forest Service, and UDWR if:

- There would be no direct, indirect, or cumulative effects to GRSG or their habitats or
- Granting the exception provides an alternative to a similar action occurring on a nearby parcel and
- The exception provides a clear net conservation gain to GRSG.

GRSG-M-FMUL-ST-076
In SFA, there will be no surface occupancy and no waivers, exceptions, or modifications for fluid mineral leasing.

Fluid Minerals – Leased

Standards

GRSG-M-FML-ST-077
In PHMA, SFA, and Anthro Mountain, when approving the Surface Use Plan of Operation portion of the APD on existing leases that are not yet developed, require that leaseholders avoid and minimize surface disturbing and disruptive activities consistent with the rights granted in the lease.

GRSG-M-FML-ST-078
In PHMA, SFA, and Anthro Mountain, when facilities are no longer needed or leases are relinquished, require reclamation plans to include terms and conditions to restore habitat to desired conditions as described in Table GRSG-GEN-DC-003.

GRSG-M-FML-ST-079
In general management areas, authorize new transmission line corridors, transmission line ROWs, transmission line construction, or transmission line-facility construction associated with fluid mineral leases with stipulations necessary to protect GRSG and their habitats, consistent with the terms and conditions of the permit.

GRSG-M-FML-ST-080
Locate compressor stations on portions of a lease that are non-habitat and are not used by GRSG, and if there would be no direct, indirect, or cumulative effects on GRSG or their habitat. If this is not possible, work with the operator to use mufflers, sound insulation, or other features to reduce noise, consistent with Standard GRSG-GEN-ST-006.

GRSG-M-FML-ST-081
In PHMA, SFA, GHMA, and Anthro Mountain, when authorizing development of fluid mineral resources, work with the operator to minimize impacts to GRSG and their habitat, such as locating facilities in non-habitat areas first and then in the least suitable habitat.

GRSG-M-FML-ST-082
Apply the following COAs on existing fluid mineral leases in Anthro Mountain:

- Use a phased approach for development in GRSG habitat.
- No well pads or permanent structures will be permitted within a 0.6 mile buffer of an occupied lek.
- Project-related activities and vehicle access will not be allowed in or through the 0.6 mile lek buffer.
- No project-related vehicles or activities (including routine maintenance, production vehicles, or work-over rigs) will be allowed from 1 hour before sunset to 2 hours after sunrise within mapped GRSG habitat from March 1 to May 31.
- No surface disturbing activities (including construction, drilling, and well- flaring) will be allowed for wells located within mapped GRSG habitat from March 1 through June 30.
- No well pad construction, road construction, drilling, or work-over rigs will be allowed on ridge tops from November 1 to March 1 within 4 miles of a lek.
- Within mapped GRSG habitat, disturbance will be limited to an average of one disturbance per square mile (640 acres). Disturbance should be clustered in areas of habitat most distal from leks or areas of habitat least important to GRSG.
- Disturbance within the mapped GRSG habitat on Anthro Mountain will be no more than 3 percent.
- Within 4 miles of a lek, well pads and roads should avoid openings in the pinyon/juniper tracts. If avoidance of an opening is not possible, then well pads and roads should be located as close to the edge of the opening as possible.
- Noise levels at leks must be limited to no more than 10 decibels above ambient (not to exceed 20-24 decibels), measured at the perimeter of a lek, during the breeding season (March 1 to May 31).
- Low profile tanks will be required for all well pads within mapped GRSG habitat.
- Raptor perch avoidance devices will be installed on any required tank batteries in GRSG habitat.
- Closed-loop drilling will be used for wells within GRSG habitat.
- If a new lek is discovered outside of mapped GRSG habitat, contiguous GRSG habitat within 4 miles of the lek will be mapped. Apply the same protections to the new mapped habitat and the new lek.

<u>Guidelines</u>

GRSG-M-FML-GL-083
In PHMA, SFA, GHMA, and Anthro Mountain, operators should be encouraged to reduce disturbance to GRSG habitat. At the time of approval of the Surface Use Plan of Operation portion of the APD, terms and conditions should be included to reduce disturbance to GRSG habitat, where appropriate and feasible and consistent with the rights granted to the lessee.

GRSG-M-FML-GL-084
On existing federal leases in PHMA, SFA, and Anthro Mountain when surface occupancy cannot be restricted due to valid existing rights or development requirements, disturbance and surface occupancy should be limited to areas least harmful to GRSG based on vegetation, topography, or other habitat features.

GRSG-M-FML-GL-085
In PHMA, SFA, GHMA, and Anthro Mountain, where the federal government owns the surface and the mineral estate is in non-federal ownership, coordinate with the mineral estate owner/lessee to apply appropriate stipulations, COAs, conservation measures, and RDFs to the appropriate surface management instruments to the maximum extent permissible under existing authorities.

Fluid Minerals – Operations

Standards

GRSG-M-FMO-ST-086
In PHMA, SFA, and Anthro Mountain, do not authorize employee camps.

GRSG-M-FMO-ST-087
In PHMA, SFA, and Anthro Mountain, when feasible, do not locate tanks or other structures that may be used as raptor perches. If this is not feasible, use perch deterrents.

Guidelines

GRSG-M-FMO-GL-088
In PHMA, SFA, and Anthro Mountain, closed- loop systems should be used for drilling operations with no reserve pits, where feasible.

GRSG-M-FMO-GL-089
In PHMA, SFA, GHMA, and Anthro Mountain, during drilling operations, soil compaction should be minimized and soil structure should be maintained using the best available techniques to improve vegetation reestablishment.

GRSG-M-FMO-GL-090
In PHMA, SFA, GHMA, and Anthro Mountain, dams, impoundments and ponds for mineral development should be constructed to reduce potential for West Nile virus. Examples of methods to accomplish this include:

- Increase the depth of ponds to accommodate a greater volume of water than is discharged.
- Build steep shorelines (greater than 2 feet) to reduce shallow water and aquatic vegetation around the perimeter of impoundments, to reduce breeding habitat for mosquitoes.Maintain the water level below that of rooted aquatic and upland vegetation. Avoid flooding terrestrial vegetation in flat terrain or low- lying areas.
- Construct dams or impoundments that restrict down-slope seepage or overflow by digging ponds in flat areas rather than damming natural draws for effluent water storage or lining constructed ponds in areas where seepage is anticipated.
- Line the channel where discharge water flows into the pond with crushed rock or use a horizontal pipe to discharge inflow directly into existing open water.
- Line the overflow spillway with crushed rock and construct the spillway with steep sides.
- Fence pond sites to restrict access by livestock and other wild ungulates.
- Remove or re-inject produced water.
- Treat waters with larvicides to reduce mosquito production where water occurs on the surface.

GRSG-M-FMO-GL-091
In PHMA, SFA, GHMA, and Anthro Mountain, to keep habitat disturbance at a minimum, a phased development approach should be applied to fluid mineral operations, wherever possible, consistent with the rights granted under the lease. Disturbed areas should be reclaimed as soon as they are no longer needed for mineral operations.

Coal Mines - Unleased

Standard

GRSG-M-CMUL-ST-092
In PHMA, SFA, and Anthro Mountain, do not authorize surface disturbances (e.g., appurtenant facilities) for new underground coal mines.

Coal Mines - Leased

Standard

GRSG-M-CML-ST-093
In PHMA, SFA, and Anthro Mountain, do not authorize new appurtenant surface facilities for existing underground mines unless no technically feasible alternative exists. If new appurtenant surface facilities associated with existing mine leases cannot be located outside of PHMA and SFA, collocate them with any existing disturbed areas, if possible. If collocation is not possible, then construct new facilities to minimize disturbed areas while meeting mine safety standards and requirements as identified by Mine Safety and Health Administration mine-plan approval process, and locate the facilities in an area least harmful to GRSG habitats based on vegetation, topography, or other habitat features.

Guideline

GRSG-M-CML-GL-094
In PHMA, SFA, GHMA, and Anthro Mountain, when coal leases are subject to readjustment, additional requirements should be included in the readjusted lease to conserve, enhance, and restore GRSG and their habitat for long-term viability.

Locatable Minerals

Standard

GRSG-M-LM-ST-095
In PHMA, SFA, and Anthro Mountain, only approve Plans of Operation if they include mitigation to protect GRSG and their habitats, consistent with the rights of the mining claimant as granted by the Mining Law of 1872, as amended.

Guidelines

GRSG-M-LM-GL-096
In PHMA, SFA, GHMA, and Anthro Mountain, to keep habitat disturbance at a minimum, a phased development approach should be applied to operations consistent with the rights granted under the Mining Law of 1872, as amended. Disturbed areas should be reclaimed as soon as they are no longer needed for mineral operations.

GRSG-M-LM-GL-097
In PHMA, SFA, GHMA, and Anthro Mountain, abandoned mine sites should be closed or mitigated, subject to valid or existing rights, to reduce predation of GRSG by eliminating tall structures that could provide nesting opportunities and perching sites for predators.

Nonenergy Leasable Minerals

Guideline

GRSG-M-NEL-GL-098
In PHMA, SFA, GHMA, and Anthro Mountain, at the time of issuance of prospecting permits, exploration licenses and leases, or readjustment of leases, the Forest Service should provide recommendations to the BLM for the protection of GRSG and their habitats.

GRSG-M-NEL-GL-099
In PHMA, SFA, GHMA, and Anthro Mountain, the Forest Service should recommend to the BLM that expansion or readjustment of existing leases avoid, minimize, or mitigate the effect on GRSG and their habitat.

Mineral Materials

Standards

GRSG-M-MM-ST-100
In PHMA, SFA, and Anthro Mountain, do not authorize new mineral material disposal or development.

GRSG-M-MM-ST-101
In PHMA, SFA, and Anthro Mountain, free-use mineral material collection permits may be issued and expansion of existing active pits may be allowed, except from March 1 to April 30 between 6:00 pm and 9:00 am within 2 miles from the perimeter of occupied leks, within the BSU and proposed project area, if doing does not exceed the disturbance cap.

GRSG-M-MM-ST-102
In PHMA, SFA, GHMA, and Anthro Mountain, any permit for existing mineral material operations must include appropriate requirements for operation and reclamation of the site to restore, enhance, or maintain desired habitat conditions (Table GRSG-GEN-DC-003).

Attachment D: EXISTING CONSERVATION MEASURES

The following measures apply to the species that were analyzed in the A*nalysis of Effects* section for plants.

Below is a partial list of existing national conservation measures for TEP plants on BLM administered lands.

- *Special Status Species Management, BLM Manual 6840* directs field office managers to implement Special Status Species programs within their area of jurisdiction by:
    - conducting and maintaining current inventories for Special Status Species on public lands;
    - providing for the conservation of Special Status Species in preparing and implementing recovery plans with which BLM has concurred, interagency plans, and conservation agreements;
    - ensuring that all actions comply with the ESA, its implementing regulations, and other directives associated with conserving Special Status Species;
    - coordinating field office activities with federal, state, and local groups to ensure the most effective program for Special Status Species conservation;
    - ensuring actions are evaluated to determine whether Special Status Species objectives are being met;
    - ensuring all actions authorized, funded, or carried out by BLM follow the interagency consultation procedures as outlined in 50 CFR, Part 402; and
    - ensuring results of formal Section 7 consultations, including Threatened and Endangered (T&E) incidental take statements, are implemented.

- All BLM units are subject to national direction regarding treatment of invasive nonnative plants. National direction includes, but is not limited to, BLM Manual and Handbook direction (9011, 9014, 9015, H-9011-1) and the Vegetation Treatments Using Herbicides in 17 Western States Programmatic EIS (BLM 2007a), the Record of Decision for the project (BLM 2007b) and the supporting final Biological Assessment (BA) (BLM 2007c).

    - Mitigation measures in the Record of Decision for the *Vegetation Treatments Using Herbicides in 17 Western States Programmatic EIS* require following all conservation measures listed in the final Biological Assessment for the project (BLM 2007c). Conservation measures listed in the BA include:
        - Surveys of all proposed decision areas with potential habitat for TEP species before treatments
        - Establishment of site-specific no activity buffers; buffer distances vary from 100 to 1,200 feet
        - Pre and post-treatment monitoring
        - Avoidance of OHV use in suitable or occupied lands
        - No use of biocontrol agents that target plants in the same genus as TEP plants
        - Evaluation of biocontrol agents that target plants in the same family as TEP plants
        - Measures related to herbicide drift, runoff, spills
        - Measures related to aerial application
        - Measures related to each of 20 herbicides
    - The following BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management (1997) apply for listed plant species:
        - Standard 4: Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

- Guideline 7. Natural occurrences such as fire, drought, flooding, and prescribed land treatments should be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape, including the maintenance, restoration, or enhancement of habitat to promote and assist the recovery and conservation of threatened, endangered, or other special status species, by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors, and thus minimizing habitat fragmentation.

Dixie National Forest

Species: Last Chance townsendia

Land and Resource Management Plan (USDA Forest Service 1986)

Goal No. 1. . Manage classified species (bald eagle (E), peregrine falcon (E) , Utah prairie dog (TI, Astragalus perianus (E), Bonneville cutthroat trout (S), Colorado River cutthroat trout (SI, (E = Endangered, T = Threatened, S = Sensitive) habitat to maintain or enhance their status through direct habitat improvement and agency cooperation.

Wildlife and Fish Resource Management

General Direction

7. Manage and provide habitat for recovery of endangered and threatened species.

Rights-of-Way and Land Adjustments

3. Classify lands or interest in lands for acquisition where lands are valuable for NFS purposes according to the following priorities:

C. Lands which provide habitat for threatened and endangered species of animals or plants.

4. Classify lands for disposal according to the following priorities:

When critical or unique resouroe (wetlands, floodplains, essential big game winter range, threatened or endangered speoies habitat, historical or cultural resources, critical ecosystems. etc.) exist. Effects are mitigated by reserving interests to proteot the resource, or by exchange where other oritioal resources to be acquired are considered to be of equal or greater value.

Special Stipulations – Oil and Gas

15. Activity Coordination Stipulation. This lease includes lands within *_____. In order to minimize impacts on these resources, special conditions, such as unitization before approval of operations, and/or other limitations to spread surface disturbance activi ties over time and space may be required before approval and commencement of any operations on the lease.

*Visually sensitive areas, Areas of Threatened and Endangered Species.

16. Protection of Endangered or Threatened Species. The Federal surface management agency is responsible for assuring that the area to be disturbed is examined, before undertaking any surface-disturbing activities on lands covered by this lease, to determine effects on any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. If the findings of this examination determine that the operation may detrimentally affect an endangered or threatened species, some restrictions to the operator's plans or even disallowances of use may result. The lessee/operator may, at his discretion and cost, conduct the examination on the lands to be disturbed. This examination must be done by or under the supervision of a qualified resource specialist approved by the surface management agency. An acceptable report must be provided to the surface management agency identifying the anticipated effects or the proposed action on endangered or threatened species or their habitat.

Special Stipulations – Coal

Forest Service Stipulation No. 2

- If there is reason to believe that threatened or endangered (T6E) species of plants or animals, or migratory species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance. The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

Fishlake National Forest

Species: Last Chance townsendia, Ute ladies'-tresses

Land and Resource Management Plan (USDA Forest Service 1986)

Analysis of Management Situation

Resource Elements

Threatened, Endangered, and Sensitive Plants

Habitat for threatened and sensitive species may occur within grazing allotments. When this happens, allotment management plans will recognize and provide for the protection of these species. Sites for the threatened species have been located and mapped. They occur on small areas on the Tushar and Monroe Mountains.

Goals:

Wildlife and Fish Management Direction

Identify and improve habitat for sensitive, threatened and endangered species including participation in recovery efforts for both plants and animals.

General direction

5. Manage and provide habitat for recovery of endangered and threatened species.

6. Do not allow activities or practices that would negatively impact endangered, threatened, or sensitive plant or animal species.

Lands and Realty

3. Classify lands or interest in lands for acquision where lands are valuable for national forest system purposes according to the following priorities:

C. Lands which provide habitat for threatened and endangered species of animals and plants.

4. Classify lands for disposal according to the following priorities:

D. When critical or unique resource (wetlands, floodplains, essential big game winter range, threatened or endangered species habitat, historical or cultural resources, critical exosystems, etc. Effects are mitigated by reserving interests to protect the resource, or by exchange where other critical resources to be acquired are considered to be of equal or greater value.

Stipulations for Mineral Activities

12. Activity Coordination Stipulation . This lease includes lands within *_____ . In order to minimize impacts on these resources, special conditions, such as unitization before approval of operations, and/or other limitations to spread surface disturbance activities over time and space may be required before approval and commencement of any operations on the lease.

*Wilderness Areas, Further Planning Areas, Areas of Threatened and Endangered Species.

13. Protection of Endangered of Threatened Species. The Federal surface management agency is responsible for assuring t h a t the area to be disturbed is examined, before undertaking any surface-disturbing activities on lands covered by this lease, to determine effects on any plant or animal species listed or proposed for listing as endangered or threatened species, some restrictions to the operator's plans or even disallowances of use may result.

The lessee/operator may, at his discretion and cost, conduct the examination on the lands to be distrubed. This examination must be done by or under the supervision of a qualified resource specialist approved by the surface managemnet agency. An acceptable report must be provided to the surface management agency identifying the anticipated effects of the proposed action on endangered or threatened species or their habitat.

Grand Staircase-Escalante National Monument

Species: Ute ladies'-tresses

Monument Management Plan (BLM 2000) Special Status Species

SSP-1: The BLM will continue to consult with the USFWS to ensure that actions authorized by the BLM do not jeopardize the continued existence of any federally listed plant species or result in the destruction or adverse modification of critical habitats. Coordination with the U.S. Forest Service, the Utah Division of Wildlife Resources' Natural Heritage Program, and the National Park Service will also occur in areas where plant species cross jurisdictional lines. The BLM will work with these agencies to develop recovery plans, when needed, and to implement existing recovery plans for all listed species.**SSP-2**: No exceptions for cross-country vehicular travel will be made in known habitat or locations of sensitive plant species.

SSP-3: Surface disturbing research activities will generally not be allowed in threatened or endangered plant species habitat. All scientific research projects in close proximity to listed species populations or habitat will be evaluated by Monument biologists, the USFWS, and appropriate experts before initiation to determine impacts on these populations or habitat. Any research project which may have an effect on populations of listed species will be coordinated with the USFWS and appropriate permits and Section 7 consultation will be completed as determined necessary. Projects which provide new information and understanding of listed species, their populations and/or their habitat, may be allowed after approval by the BLM and the review and issuance of permits by the USFWS. All projects will be evaluated on a case-by-case basis.

SSP-4: The allotment evaluation process will address the protection of endangered species, including the incorporation of the latest research and information in the protection of these species, consistent with the BLM-wide grazing permit review process. Section 7 consultation will be conducted for all allotments that may affect listed species.

SSP-5: Future fuelwood cutting areas will not be designated in listed plant populations (see the Forestry Products section for related decisions).

SSP-6: Areas with threatened or endangered plants will be targeted for noxious weed control activities as a first priority. BLM employees or contractors with appropriate certification will be responsible for use of chemicals in noxious weed removal efforts, and will take precautions to prevent possible effects on non-target species.

SSP-7: Public education about protection of these species will be an integral part of projects and will be provided in interpretive displays and handouts at project sites and visitor centers around the Monument. Information will also be included on the Monument website.

SSP-8:BLM law enforcement personnel and increased field presence of BLM personnel will concentrate efforts in areas with special status species habitat in order to curb non-compliance activities. The BLM is pursuing cooperative agreements with each of the Sheriff departments in Kane and Garfield Counties to facilitate shared law enforcement and support for enforcing established closures.

SSP-9:Communication sites, utility rights-of-way, and road rightsof-way will not be permitted in known special status species populations. As permits are granted for these sites and rights-of-way, surveys will be completed to determine the presence of special status species in the area. If they are found, these activities will be moved to another location.

SSP-10: Reseeding or surface disturbing restoration after fires will not be allowed in areas with special status plant species. Natural diversity and vegetation structure will provide adequate regeneration. Management ignited fires will also not be allowed in these areas unless consultation with the USFWS indicates that fire is necessary for the protection and/or recovery of listed species.

Ute Ladies'-tresses *(Spiranthes diluvialis)*

SSP-18: The information in the **Water** section describes a strategy for assuring water availability. Under that strategy, priority will be to maintain natural flows and flood events. In addition, the maintenance of instream flows will provide adequate water for natural structure and function of riparian vegetation. Ute ladies'-tresses relies on these natural flood events to colonize new areas and maintain healthy and viable populations.

SSP-19: Surveys for this species were initiated the 1999 growing season and results of this survey will be used to determine any further actions.

SSP-20: Appropriate actions will be taken to prevent trampling of the plants by visitors in high-use areas. These actions may include replanting native vegetation or construction of barriers.

SSP-21: Areas may be closed if necessary to protect these plants. Barriers will be constructed and restoration work initiated to stabilize the soil and banks and provide the best possible habitat for this plant.

SSP-22: No expansion of current or new facilities will be permitted where this plant grows.

SSP-23: Existing trails in areas where this plant grows will be relocated away from the plants and potential habitat when possible. These protection measures apply to current as well as future potential habitat areas for this species.

SSP-24: Interpretive materials will be developed to educate the public about Ute ladies'-tresses and the actions being implemented to protect it.

SSP-25: Restoration of the current social trails in known populations will be initiated, including obliteration of the trail by planting native species, and moving soil to return the area to its natural grade. Group size restrictions, allocations, or other measures will be initiated if continued monitoring indicates that visitor use in the area is causing impacts.

Kanab Field Office

Species: Autumn buttercup (Suspected)

Autumn buttercup is not known from BLM or USFS administered lands. The closest field unit to known occurrences is the Kanab Field Office.

Resource Management Plan (BLM 2008b)

The Kanab FO RMP (BLM 2008b) includes a statement related to fluid mineral exploration and development as it relates to TEP species and proposed critical habitat.

> *BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. 1531* et seq.*, including completion of any required procedure for conference or consultation.*

The Kanab FO RMP (BLM 2008b) Appendix 9 includes lease notices for oil and gas activities in areas with special status plant species habitat. IM 2002-174 also directs State Offices to "provide a separate notification to prospective lessees identifying the particular special status species that are present on the lease parcel offered. This information is to be provided through a lease notice and not by lease stipulation (unless otherwise provided in current LUPs). This stipulation would now be attached to most oil and gas leases issued by the Bureau, including areas identified in LUPs as open to standard lease terms.

Lease Notice—Listed Plant Species – from ROD app 9

The lessee/operator is given notice that the lands in this parcel contain suitable habitat for federally listed plant species under the ESA. The following avoidance and minimization measures have been developed to facilitate review and analysis of any submitted permits under the authority of this lease:

1. Site inventories:

    a. Must be conducted to determine habitat suitability.
    b. Are required in known or potential habitat for all areas proposed for surface disturbance before initiation of project activities, at a time when the plant can be detected, and during appropriate flowering periods.
    c. Documentation should include but not be limited to individual plant locations and suitable habitat distributions.
    d. All surveys must be conducted by qualified individuals.

2. Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated.

3. Project activities must be designed to avoid direct disturbance to populations and to individual plants:

    a. Designs will avoid concentrating water flows or sediments into plant occupied habitat.
    b. Construction will occur down-slope of plants and populations where feasible; if well pads and roads must be sited up-slope, buffers of 100 feet minimum between surface disturbances and plants and populations will be incorporated.
    c. Where populations occur within 200 feet of well pads, establish a buffer or fence the individuals or groups of individuals during and post-construction.
    d. Areas for avoidance will be visually identifiable in the field (e.g., flagging, temporary fencing, or rebar).
    e. For surface pipelines, use a 10-foot buffer from any plant locations:

- i. If on a slope, use stabilizing construction techniques to ensure the pipelines do not move toward the population.

4. For riparian/wetland-associated species (e.g., Ute ladies-tresses), avoid loss or disturbance of riparian habitats:

    a. Ensure that water extraction or disposal practices do not result in change of hydrologic regime.

5. Limit disturbances to and within suitable habitat by staying on designated routes.

6. Limit new access routes created by the project.

7. Place signing to limit all-terrain vehicle (ATV) travel in sensitive areas.

8. Implement dust abatement practices near occupied plant habitat.

9. All disturbed areas will be revegetated with native species composed of species indigenous to the area.

10. Post-construction monitoring for invasive species will be required.

11. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in plant habitat. Ensure that such directional drilling does not intercept or degrade alluvial aquifers.

12. Lease activities will require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, Section 7 consultation reinitiated. Additional measures to avoid or minimize effects on the species may be developed and implemented in consultation with the USFWS between the lease sale stage and lease development stage to ensure continued compliance with the ESA.

Manti-La Sal National Forest

Species: Clay phacelia (Suspected)

Land and Resource Management Plan (Forest Service 1986)

Forestwide goals

- Protect, maintain, and/or improve habitat for threatened or endangered and sensitive plants and animals.
- Habitats of threatened and endangered species would be maintained. Habitat would be surveyed and appropriate action taken. Habitats for sensitive species would be managed to reduce the potential of these species becoming threatened or endangered.
- Desired conditions
- Habitats of threatened and endangered species would be maintained. Habitat would be surveyed and appropriate action taken. Habitats for sensitive species would be managed to reduce the potential of these species becoming threatened or endangered.
- Endangered, threatened, and sensitive plant species populations and their habitats would be maintained and improved. Land disturbing activities would be reviewed for endangered, threatened, and sensitive plant species and clearance would be made before the projects are approved, thus, providing the safeguards needed for their protection and continued existence.

Wildlife and Fish General Management

General direction

- 02 Manage habitat for recover of endangered and threatened species.
- 04 Manage habitat of sensitive species to keep them from becoming threatened or endangered.

Rights-of-Way and Land adjustments

03 Classify lands or interest in lands for acquisition where lands are valuable for NFS purposes according to the following priorities:

B. Lands which provide habitat for threatened and endangered species of animals and plants.

E. When important or unique resources (wetlands, floodplains, essential big-game winter range, threatened or endangered species habitat, historical or cultural resources, critical eco- systems),

Appendix B Mineral stipulations and mitigation statements

Forest Service Stipulation #2

- If there is reason to believe that threatened or endangered (T&E) species of plants or animals, or migratory species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.
- The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

Surface disturbance stipulations

6. Protection of Threatened or Endangered Species

- The Forest Service is responsible for assuring adequate protection for threatened and endangered species occurring in the area to be disturbed. Before undertaking any surface disturbing activities on lands covered by this lease, the lessee shall contact the appropriate Forest Service officer to be advised of the occurrence of, and requirements for protection of, any plant or animal species listed or proposed for listing as endangered or threatened or their habitat. Lessee may be required to complete inventories under guidelines provided by the Forest Service if areas of proposed surface disturbance may result in adverse impacts on threatened or endangered species. Presence of such species may result in some restrictions to the operator's plans or even disallowing any use or occupancy that would detrimentally affect any of the identified species.
- Discovery of any threatened or endangered species during operations will require cessation of such operations until the appropriate Forest Service officer and the authorized officer of the Bureau of Land Management have been advised and approved protective measures implemented.

Special Stipulations

15. Activity Coordination Stipulation

This lease includes lands within*_____ , which has resource values sensitive to high levels of activity. In order to minimize impacts on these resources, special conditions, such as unitization before approval of operations, and/or other limitations to spread surface disturbance activities over time and space may be required before approval and commencement of any operations on the lease.

*Wilderness Area, Further Planning Areas, Areas of Threatened and Endangered Species

16. Protection of Endangered or Threatened Species

The Federal Surface Management Agency is responsible for assuring that the area to be disturbed is examined before undertaking any surface-disturbing activities on lands covered by this lease, to determine effects on any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. If the findings of this examination determine that the operation may detrimentally affect an endangered or threatened species, or its habitat, some restrictions to the operator's plans or even disallowance of use may result.

Appendix C: Unsuitability and Multiple Use Management Evaluation

CRITERION NUMBER 9 - Federally designated critical habitat or threatened or endangered plant and animal species and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

Exceptions - A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat.

Exemptions - This criterion does not apply to lands: To which the operator made substantial legal and financial commitments before January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION NUMBER 10 - Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

Exceptions - A lease may be issued and mine operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

Exemptions - This criterion does not apply to lands: To which the operator made substantial legal and financial commitments before January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

Appendix D: Energy Transportation and Utility Corridor Evaluation

Exclusion Areas

The following areas have been identified as exclusion areas:

1. Research Natural Areas
   - Elk Knolls
   - Nelson Mountain (Proposed)
   - Mount Peale (Proposed)
   - Cliff Dwellers Pasture (Proposed)
2. Great Basin Experimental Range
3. Scenic, Wilderness, and Recreation Areas
   - Dark Canyon Wilderness Area
   - Straight Canyon & Joe's Valley Recreation Area
   - Ferron Reservoir Recreation Area
   - Huntington Canyon Recreation Area
   - Hammond Canyon Archeological and Scenic Area

Price Field Office

Species: Last Chance townsendia

Resource Management Plan (BLM 2008c)

- The BLM submitted a Biological Assessment (BA) and requested initiation of formal consultation on July 21, 2008. The USFWS responded with a Biological Opinion (BO) on October 27, 2008, completing the formal Section 7 consultation process. The BO concurred (see Appendix R-4) with the determinations made in the BA regarding potential effects on listed threatened and endangered species located within the
- planning area. The entire BO is attached to this Record of Decision (ROD) as a CD. The BO be a part of the implementation of the Approved RMP. These are committed measures that will be included as part of the proposed action of any subsequent site specific activities authorized by the RMP. Should any changes be made in any of the conservation measures identified in the BO, Section 7 consultation with USFWS will be re-initiated.
- The BLM, in coordination with the USFWS developed the majority of these committed conservation measures as part of a programmatic Section 7 consultation that was completed in 2007. Some modifications and additional measures were developed during the consultation process specific to the Price RMP. All site specific actions potentially impacting listed species or their critical habitat will implement these measures. Incorporating

these measures will ensure that the BLM is in compliance with the Endangered Species Act and will help UDWR and BLM meet necessary management and recovery goals.

- BLM notes that the Biological Opinion (Appendix R-4 and attached CD), provides a number of recommended conservation measures that are beyond the scope of this Approved RMP, but may be considered in tiered consultation with this programmatic opinion when project-specific analysis is conducted in the future. These recommended conservation measures are optional measures, additional to the committed mitigation contained in the Approved RMP, that BLM will consider at the appropriate time and as deemed necessary to manage and recover listed and candidate plant and animal species occurring within the planning area.

Management Decisions

VEG-5: In areas where multiple resources are potentially affected by surface disturbance (e.g., crucial wildlife habitat, livestock pastures, threatened and endangered [T&E] and special status species habitat, and occupied wild horse and burro range), coordinate implementation of any offsite mitigation with other affected agencies and the overlapping resource values. This strategy will enable identification of a suitable mitigation method and location to best accomplish the objective of offsetting the impacts and to ensure that benefits of the mitigation are distributed among all users and resources affected. The BLM will approach compensatory mitigation on an "as appropriate" basis where it can be performed onsite, and on a voluntary basis where it is performed offsite, or, in accordance with current guidance.

Special Status Species (SSS)

Goals:

- Maintain, protect, and enhance habitats (including but not limited to designated critical habitat) and actively promote recovery, maintenance, protection, and enhancement of populations and habitats of BLM, non-listed, special status plant and animal species to ensure that actions authorized, funded, or carried out do not contribute to the need for these species to be listed as T&E under the Endangered Species Act (ESA).
- Assist in managing, conserving, and recovering listed threatened and endangered plant and animal species found within the Price planning area, where appropriate.

The Biological Opinion for the Resource Management Plan includes recommended resource protection measures (USFWS 2008) that were integrated into the Approved Resource Management Plan (BLM 2008c). All recommended resource measures are listed in the Biological Opinion. They provide protection for riparian areas, wetlands, springs, habitat and other elements important for federally listed species. Several measures relate specifically to listed species:

All species

- Avoid land trades/disposals of listed species habitats.
- Avoid the broad-scale use of pesticides and insecticides in habitats of listed species during sensitive time periods such as breeding and nesting seasons.
- Disturbance of all suitable habitats for listed and sensitive species will be improved to provide adequate habitat (pre-disturbance condition or better).
- Decommission unnecessary roads and reclaim unauthorized illegal trails in habitats important to listed and sensitive species.
- Where appropriate at designated recreation sites, design recreation activities that are predictable for wildlife; i.e. provide well-marked trails or boardwalks to encourage controlled and predictable human use away from listed and sensitive species habitats, and discourage off-trail hiking and creation of alternate routes.
- Where recreation conflicts with use by listed and sensitive species, and area closures are not proactical, provide on-site monitoring to educate users and control use.
- Sponsor programs and post signs that educate users about the value of riparian habitat to listed and sensitive species.

Plants

- Avoid use of aerosol insecticides within 3 miles of listed plant populations to protect pollinators.
- Direct recreational activities away from occupied habitats of listed and sensitive plant species.

Richfield Field Office

Species: Last Chance townsendia

Resource Management Plan

Decision REC–18 has been modified to include language from Chapter 3 in the Proposed Plan/Final EIS. The Decision has been appended to explain that opening the RMZs in the Factory Butte SRMA to cross-country use will not occur until a number of criteria have been met. These criteria include ensuring appropriate infrastructure is in place to protect the threatened and endangered cacti, a monitoring plan is completed and enacted, and the authorized officer formally rescinds the Factory Butte OHV Restriction Order of 2006 when the above is completed. On signature of the ROD/Approved Plan, these cross-country RMZs remain under the Restriction Order until it is formally rescinded.

Best management practices are found in the Approved Resource Management Plan (2008d); they would be used for site-specific projects if feasible.

- Areas considered for prescribed burns shall be surveyed for populations of threatened and endangered species and viable habitat.
- Environmental assessments should continue to be required before excavation permits are issued.
- The environmental assessments should include the presence or absence of threatened, endangered, or SSS and their suitable habitats.
- Seeding and revegetation actions will be adjusted to the special habitat and plant community characteristics of endangered and threatened plant populations.
- The BLM, in coordination with the USFWS developed committed conservation measures as part of a programmatic Section 7 consultation that was completed in 2007. Some modifications and additional measures were developed during the consultation process specific to the Richfield RMP. All site specific level actions potentially impacting listed species or their critical habitat will implement these measures.
- BLM notes that the Biological Opinion (Appendix 4 of the Richfield Resource Management Plan), provides a number of recommended conservation measures that are beyond the scope of this Approved RMP, but may be considered in tiered consultation with this programmatic opinion when project-specific analysis is conducted in the future. These recommended conservation measures are optional measures, additional to the committed mitigation measures contained in the Approved RMP, that BLM will consider at the appropriate time and as deemed necessary to manage and recover listed and candidate plant and animal species occurring within the planning area.
- The SRMA will be designed to protect threatened and endangered (T & E) species and provide a recreational experience that involves a high degree of self-reliance, challenge and risk in a natural setting. It is important to note the Approved RMP does not rescind the Factory Butte OHV Restriction Order (September 2006). The OHV use restrictions set forth in the September 2006 order will remain in effect until the determinations required by the regulation have been met (i.e. infrastructure in place, a monitoring program enacted to protect threatened and endangered cacti, and the Factory Butte OHV Restriction Order has been formally rescinded by the authorized officer).

Desired Outcomes (Goals and Objectives)

- Conserve and recover all SSS (including listed species) and the ecosystems on which they depend.
- Manage, minimize, and mitigate impacts on plant, fish, and animal species and habitats so that the need to list any of these species as threatened or endangered does not become necessary.
- Promote recovery and conservation of special status plant, fish, and animal species, including those listed under the Endangered Species Act (ESA).

- Prevent long-term habitat fragmentation through avoidance and/or site-specific reclamation to return areas to productive levels.
- Continue to work with United States Fish and Wildlife Service (USFWS) and others to ensure that plans and agreements are updated and implemented as necessary to reflect the latest scientific data.
- Where possible, implement the conservation actions identified in the Utah Comprehensive Wildlife Conservation Strategy (Utah Division of Wildlife Resources [UDWR] 2005c), which identifies priority wildlife species and habitats, identifies and assesses threats to their survival, and identifies long-term conservation actions needed,

Overall Special Status Species Management Guidance

SSS-1: For listed species that do not have designated critical habitat, cooperate with the USFWS and other agencies, such as the UDWR, in managing the species and their habitat.

SSS-2: Allow, initiate, or participate in scientific research of listed and sensitive species and their habitats.

SSS-3: Collaborate with the appropriate local, state, and federal agencies to promote public education on species at risk, their importance to the human and biological community, and reasons for protective measures that would be applied to the lands involved.

SSS-4: Implement species-specific conservation measures to avoid or mitigate adverse effects on known populations of listed and non-listed special status plant and animal species on public lands.

SSS-5: Prohibit actions that destroy, adversely modify, or fragment listed threatened or endangered species' habitat.

SSS-6: Maintain the integrity of SSS habitat to provide the quantity, continuity, and quality of habitat necessary to maintain SSS populations.

SSS-7: Conduct habitat improvement treatments for SSS. Future consultation would be needed for biological controls in SSS habitat.

SSS-8: Retain habitat for federally listed and candidate species in federal ownership. Exceptions may be considered in exchanges with the State of Utah and others after

SSS-9: Consider SSS habitat in all wildfire suppression efforts.

SSS-10: Conduct Section 7 consultation with the USFWS if biological treatments as a result of vegetation management actions are proposed in federally listed species habitats.

SSS-11:.Recovery Plans and Conservation Agreements.

SSS-12: Implement the goals and objectives of recovery plans, conservation agreements and strategies, and activity level plans using best available information to recover and conserve species to the point where requirements of the ESA are no longer necessary.

SSS-13: Work with USFWS and others to ensure that plans and agreements are updated and implemented as necessary to reflect the latest scientific data.

SSS-14: Implement the specific goals and objectives of recovery plans, conservation agreements and strategies, and approved activity-level plans.

SSS-15: Recovery Actions for Listed Species

SSS-16: Do not adversely modify or destroy designated critical habitats for federally listed species.

SSS-17: Provide habitat improvements and other management actions to promote conservation and recovery of listed species.

SSS-18: Reintroduction/Translocation of SSS

SSS-19: Allow translocations of listed and non-listed SSS to aid in conservation and recovery efforts. Implement necessary habitat manipulations and monitoring in translocation plans and allow identification and manipulation of Utah prairie dog translocation sites to achieve suitable conditions for successful translocations.

SSS-20: Use strategies to avoid or reduce habitat fragmentation when possible, including:

- Co-locating communication and other facilities
- Employing directional drilling for oil and gas
- Closing and reclaiming roads
- Landscape scale evaluations
- Using topographic and vegetative screening to reduce the influence of intrusions.

SSS-21: Mitigate the effects of proposed projects that have the potential to cause long-term or permanent habitat impacts or losses by enhancing, restoring, or creating other habitat within the project's region of influence. Consider protecting the habitat when the habitat type is rare and under severe development pressures. Protection should only be a portion of the mitigation and must contain elements of restoration or enhancement.

SSS-22: Use species-specific buffers and seasonal, temporal, and spatial restrictions to conserve habitat for SSS (Richfield RMP Appendix 11 and Appendix 14).

Land and Realty Decisions

LAR-3: Consider proposals for wind and solar energy development throughout the RFO except within the following areas:

- WSAs (ROW exclusion areas in accordance with IMP)
- Fremont (Fremont Gorge) suitable wild river corridor
- ACECs
- Areas open to oil and gas leasing with NSO and areas closed to leasing.
- VRM Class I and II areas
- Migratory bird habitats and raptor nesting complexes
- Threatened & Endangered Species habitats

The Biological Opinion for the Resource Management Plan includes recommended resource protection measures (USFWS Undated) that were integrated into the Approved Resource Management Plan (BLM 2008d).All recommended resource measures are listed in the Biological Opinion. They provide protection for riparian areas, wetlands, springs, habitat and other elements important for federally listed species. Several measures relate specifically to listed species:

All species

- Avoid land trades/disposals of listed species habitats.
- Avoid the broad-scale use of pesticides and insecticides in habitats of listed species during sensitive time periods such as breeding and nesting seasons.
- Disturbance of all suitable habitats for listed and sensitive species will be improved to provide adequate habitat (pre-disturbance condition or better).
- Monitor condition of habitat in occupied, suitable, or potentially suitable habitat for listed and sensitive species to ensure maintenance of good to excellent ecological conditions; and consistent with available species-specific habitat requirements.

- Decommission unnecessary roads and reclaim unauthorized illegal trails in habitats important to listed and sensitive species.
- Avoid construction or expansion of recreation facilities within occupied, suitable, and potentially suitable habitat for listed and sensitive species.
- Where appropriate at designated recreation sites, design recreation activities that are predictable for wildlife; i.e. provide well-marked trails or boardwalks to encourage controlled and predictable human use away from listed and sensitive species habitats, and discourage off-trail hiking and creation of alternate routes.
- Where recreation conflicts with use by listed and sensitive species, and area closures are not practical, provide on-site monitoring to educate users and control use.
- Sponsor programs and post signs that educate users about the value of riparian habitat to listed and sensitive species.

Plants

- Avoid use of aerosol insecticides within 3 miles of listed plant populations to protect pollinators.
- Direct recreational activities away from occupied habitats of listed and sensitive plant species.

Salt Lake Field Office

Lands Program

Land Tenure Adjustments

DECISION I - BERMP, 1986

Allow additional disposals/exchanges if following criteria are met:

5) Land tenure adjustment (LTA) results in net gain of significant resource values such as important wildlife habitat. Including Threatened & Endangered species, cultural sites, riparian zones, live water, or would include a net gain of recreational opportunities;

Pony Express Management Plan ROD 1990

Lands Program Decision 3

In order to be considered, exchanges of public land in the Pony Express Resource Area must accomplish one or more of the following criteria:

(1) Increase public ownership within those areas of public land which are not available for disposal or any other transfer from Federal ownership and BLM management (see Table 4 and Figure 2).

(2) Result in a net gain of significant resource values on public land such as important wildlife habitat, cultural sites, riparian zones, live water, and threatened and endangered species.

Wildlife and Fisheries Program Decision 2

All threatened and endangcrcd species are provided for under the Endangered Species Act; however, due to the unusual resource that exists within the Resource Area, additional measures will be made to improve and encourage the propagation of these important species.

Uinta National Forest (Forest Service 2003)

Species: Clay phacelia, Maguire primrose, Ute ladies'-tresses

Land and Resource Management Plan (Forest Service 2003)

FORESTWIDE GOALS

FW-Goal-2 Biologically diverse, sustainable ecosystems maintain or enhance habitats for native flora and fauna, forest and rangeland health, and watershed health.

- **Sub-goal-2-6 (G-2-6):** Ecosystems on the Forest provide and maintain viable and well-distributed populations of flora and fauna. New listings of threatened, endangered, and sensitive species as a result of Forest Service management activities are avoided. Population objectives developed cooperatively with the Utah Division of Wildlife Resources and U.S. Fish and Wildlife Service are achieved. To contribute to species stabilization and full recovery, habitats across all levels or scales for endangered, threatened, and proposed flora and fauna species listed in accordance with the Endangered Species Act are protected and recovered, and sensitive species appearing on the Forest Service Intermountain Region's Sensitive Species list are protected. Newly-developed management direction from recovery plans and conservation strategies to which the Forest Service is a signatory is incorporated as applicable to facilitate protection and/or recovery of threatened, endangered, or sensitive speciesSub-goal-2-13: Participate in the development and implementation of a habitat management strategy for clay phacelia (*Phacelia argillacea*).
- **Sub-goal-2-13 (G-2-13):** Participate in the development and implementation of a habitat management strategy for clay phacelia (*Phacelia argillacea*).
- **Sub-goal-2-14**: Potential habitat for clay phacelia (*Phacelia argillacea*) in the Spanish Fork Canyon area is managed to ensure quality habitat will be available in the future if it becomes necessary to introduce this species onto National Forest System lands to provide for its recovery.
- **Sub-goal-2-15 (G-2-15):** Ute ladies'-tresses (*Spiranthes diluvialis*) colonies are managed so as to contribute to the protection and recovery of the species within the Diamond Fork watershed. If necessary, these colonies will serve as propagation stock for new habitats within this watershed. Bee (pollinator) habitat is identified and protected in association with these plant colonies.

FW-Goal-3 Suitable commodity uses are provided in an environmentally sustainable and acceptable manner to contribute to the social and economic sustainability and diversity of local communities.

- **Sub-goal-3-1(G-3-1)**: If consistent with ecosystem health and integrity, and threatened, endangered, and sensitive species management, forage for livestock grazing on lands identified as suited for this use is provided to support social and economic community stability.

FW-Goal-7 When there is an apparent and overriding benefit, opportunities for consolidation of landownership and subsurface and surface property rights, acquisition of appropriate access, and establishment of identifiable boundaries are pursued.

- **Sub-goal-7-3 (G-7-3):** Within the economic and social constraints of local communities, critical habitat for federally-listed threatened and endangered species and big game winter range under other ownership within and adjacent to the Forest boundary is acquired.

Vegetation Management

Veg-1 Standard: Permits for the collection of federally-listed threatened or endangered plant species may only be issued for scientific and education purposes, and then only if a Recovery Permit has been issued by the U.S. Fish and Wildlife Service.

Veg-3 Guideline: Permits for the collection of seeds or plant cuttings of species that are not federally-listed threatened, endangered, or candidate plants, or Forest Service sensitive plants, may be issued if collection is not likely to adversely impact population viability or have negative ecological effects.

Veg-5 Standard: Except for Forest Service approved scientific projects, restoration projects, or cultural uses, no seeds or plants may be collected in Research Natural Areas, locations where threatened or endangered plant species are known to occur, designated wilderness areas, areas recommended for wilderness designation, or developed recreation sites.

Veg-6 Guideline: Permits may be issued to collect plants for bioprospecting purposes.

Lands and Property Boundary Management

Lands-1 Guideline: Use the following criteria to assist in the identification of lands that could be made available for disposal/conveyance (criteria are not listed in any priority):

6. Additionally, disposal/conveyance of lands should not result in any net loss in critical winter ranges or threatened, endangered, or sensitive species habitats; wetlands; or identified critical access to the Forest.

Wildlife and Fish

WL&F-16 Guideline: Where feasible, provide pollinator habitat adjacent to Ute ladies'-tresses colonies by avoiding the removal of down woody material in the course of any management activities in the lower 7.5 miles of the Diamond Fork River corridor. Where removal cannot be avoided, salvage a portion of down woody material greater than 3 inches in diameter and relocate it to sunny openings adjacent to Ute ladies'-tresses colonies.

Desired Future Conditions

VEGETATION

Known populations of all federally-listed threatened, endangered, proposed, or candidate plant species, and all Forest Service sensitive plant species occurring on the Forest are maintained or increased. Suitable habitat for rare plant species and rare plant communities has been surveyed. Noxious weeds and undesirable invasive plants are effectively combated using integrated pest management. Priority is given to eliminating weeds from critical habitats and preventing new infestations, then to reducing density or eliminating longer-established populations. The Forest uses public education to motivate the public to employ weed prevention practices. Deteriorated vegetated communities are assessed for estimated potential for recovery, and active restoration work completed as appropriate. Suitable habitat conditions are provided for plant-pollinating insects.

Riparian habitat along Diamond Fork Creek is managed to achieve and maintain healthy, dynamic, sustainable communities in which the Ute ladies'-tresses orchid is an integral, if not dominant, component (Forest Service 2003). Potential habitat for clay phacelia (Phacelia argillacea) is protected.

Habitat for the endangered clay phacelia, as identified by Harper and Armstrong (1992), is managed to maintain its integrity. A habitat management strategy for clay phacelia is in place.

Vernal Field Office

Species: Clay reed-mustard, shrubby reed-mustard, Uinta Basin hookless cactus, Ute ladies'-tresses

Resource Management Plan (BLM 2008e)

MANAGEMENT COMMON TO ALL DECISIONS

Goals and Objectives

Desired species, including native, threatened, endangered, and special-status species, are maintained at a level appropriate for the site and species involved.

Goals and Objectives for special status species

- Conserve and protect special status species and enhance their habitats.
- Conserve and recover all state special status species, including federally listed species and the ecosystems on which they depend.
- Implement the management recovery measures necessary to increase populations of special status species, including federally listed animal species, and restore them to their historic ranges by enhancing, protecting, and restoring known and potential habitat and the ecosystems on which they depend.
- Mitigate or reduce long-term habitat fragmentation through avoidance and site-specific reclamation to return areas to productive levels.
- Manage all listed T&E plant and animal species and the habitats on which they depend in such a manner as to conserve and recover these species to the point where protection under the ESA is no longer necessary.
- Manage non-listed sensitive species and the habitats on which they depend in such a manner as to preclude the need to list them as either threatened or endangered under the Endangered Species Act. The guidance for this management is put forth in the BLM 6840 Manual.
- Implement the specific goals and objectives of recovery plans, conservation agreements and strategies, and approved activity level plans. The BLM will continue to work with USFWS and others to ensure that plans and agreements are updated as necessary to reflect the latest scientific data.
- Implement the direction contained in the Northwest National Fire Plan Project Design and Consultation Process and the Counterpart Regulations, including Alternative Consultation Agreements.
  - Implement the management necessary to increase populations of special status species, including federally listed animal species, and restore them to their historic ranges by enhancing, protecting, and restoring known and potential habitat.

Management Decisions for Special Status Species (SSS)

SSS-1: The BLM will continue to implement the specific goals and objectives of all recovery plans, conservation plans and strategies, and activity level plans. Recovery Plan revisions or new Recovery Plans will also be implemented.

SSS-2: The BLM will continue to work with USFWS and others to ensure that plans and agreements are updated as necessary to reflect the latest scientific data. Recovery plans have been finalized for Uinta Basin hookless cactus, shrubby reed–mustard, and clay reed-mustard. A draft plan is being developed by the USFWS for Ute ladies' tresses. A Conservation Plan has been prepared for Horseshoe milkvetch (*Astragalus equisolensis)*, Goodrich beardtongue (*Penstemon goodrichii)*, Graham beardtongue (*Penstemon grahamii),* and White River beardtongue (*Penstemon scarious* var. *albifluvis)*.

SSS-3: Where special status plant species, including listed T&E plant species, occur on public lands in the VPA, the BLM will collaborate with affected and or appropriate local, state, and federal agencies and researchers in the implementation of approved recovery plans and conservation strategies to protect, stabilize, and recover such species and their habitats. In addition to on-the-ground actions, strategies will be developed to provide public education on species at-risk, significance and importance of the species to the human and biological communities, and reasons for protective measures that will be applied to the lands involved. Continue or develop monitoring studies in order to determine population dynam dynamics and trends.

SSS-4: Continue and complete inventories and map current occupied and potential habitats for all listed and non-listed special status plant and animal species.

SSS-5: Develop relevant species-specific plans utilizing USFWS guidelines where applicable. This may include habitat management plans, conservation agreements, or other suitable plans.

SSS-6: In collaboration with the USFWS, UDWR, and other partners, develop and implement habitat management plans or conservation strategies for sensitive species.

SSS-7: As additional data are collected over the life of the RMP, land managers will continually reevaluate population and habitat status. Management emphasis will be to accumulate ecological information and distributional data to enhance the BLM's ability to protect, conserve, recover, and manage these species in the future.

SSS-9: Collaborate with the appropriate local, state, and federal agencies to promote public education on species, their importance to the human and biological community, and reasons for protective measures that will be applied to the lands involved.

SSS-10: Conservation measures developed during the consultation on existing LUPs (June 2007) will be implemented as part of committed mitigation on new oil and gas leases. Vernal RMP Appendix L contains lease notices developed from the conservation measures.

Goals and objectives for vegetation

- Protect special status plant species and their habitats.

Management direction for recreational resources

REC-15: The following recreation management guidelines were developed to help achieve and maintain healthy public lands as defined by the *BLM Utah Standards for Rangeland Health and Guidelines for Grazing Management*. They are listed below with the standard that they apply to:

Rangeland Health Standard 1

- Upland soils exhibit permeability and infiltration rates that sustain or improve
- site productivity, considering the soil type, climate, and landform.
- Designate areas for intensive recreational use or cross-country motorized
- travel where disturbance of soil and vegetation is acceptable, either because impacts are insignificant and/or temporary or because the value of intensive use of the land outweighs whatever ecological changes may occur. Decisions on such designation shall take into account conflicts with other users as well as adverse effects on archaeological or historical sites, T&E species habitat, wildlife habitat, or social values such as beauty, solitude, and quiet.
- In all other areas, travel routes and other disturbances shall be kept to the minimum necessary to provide access and visitor facilities appropriate to the area. Through blocking, signing, and public education, unneeded travel routes shall be eliminated and rehabilitated and unplanned development of new ones discouraged.
- It may be necessary to manage some areas to be entirely free of planned travel routes.

Rangeland Health Standard 3

- Desired species, including native, T&E and special status species, are maintained at a level appropriate for the site and species involved.
- Protect against the establishment and/or spread of noxious or other weeds from intensive recreation, including the use of riding and pack animals, hiking, motorized, or other mechanized vehicles.
- Conduct an educational campaign to inform recreational users about the damage caused by noxious weeds and how their spread can be minimized.
- Where appropriate, apply restrictions, (i.e., do not permit surface-disturbing activities).
- Protect wildlife and plant and/or habitat by:
  - Preserving connectivity and avoiding fragmentation.
  - Controlling recreational activities that will interfere with critical wildlife stages such as nesting, reproduction, or seasonal concentration areas.
  - Avoiding creation of artificial attractions such as the feeding of wild animals or improper disposal of garbage.
  - Where necessary, control recreational use by changing location or kind of activity, season, intensity, distribution, and/or duration in order to protect plant and animal communities, especially those containing special status species, including listed T&E or candidate species.

Wasatch-Cache National Forest (USDA Forest Service 2003)

Species: Clay phacelia, Ute ladies'-tresses

Revised Land and Resource Management Plan (USDA Forest Service 2003)

Botanical Resources Desired Condition

- Management activities provide for ecological conditions that contribute to the recovery of federally listed, proposed, or sensitive species. Native species are present in amounts and distribution similar to historical patterns, including species that were once listed, or proposed for listing, as threatened or endangered under the ESA, or listed as sensitive by the Regional Forester. Populations of non-native plant species are reduced or eradicated in rare plant actual and potential habitat. Habitats are maintained to promote pollinator success and survival. Management activities (recreation, development and other activities) are at a level that maintains desired conditions and habitat dynamics during key life stages. Pro-active efforts are made to educate and inform users of fundamental importance of plant species to society, plant conservation, and biodiversity.

Forestwide Subgoals

Biodiversity and Viability

- **Sub-goal-**3a: Maintain or restore viability of populations of species at risk,

Watch List Plants and Rare Communities

- **Sub-goal-3b**. Maintain pollinators and minimize impacts on pollinators or their habitats.
- **Sub-goal-3c**. Increase understanding of and support research on the distribution, ecology, and threats to plant species at risk, nonvascular plants and rare plant communities.
  Sub-goal-3d. Restore or maintain **fire-adapted ecosystems** (consistent with land uses, historic fire regimes, and other Forest Plan direction) through wildland fire use, prescribed fire, timber harvest or mechanical treatments. See Forestwide Guideline (G for desired landscape structure and patterns.
- **Sub-goal-3e**. Maintain or restore as mature and old age classes 40% of total conifer and 30% of total aspen cover types, well distributed across the landscape.
- **Sub-goal-3f.** Maintain or restore, such that the species that occupy any given site are predominantly native species in the kind and amount that were historically distributed across the landscapes.
- **Sub-goal-3g**. Maintain and/or restore **tall forb communities** to mid seral or potential natural community (PNC) status.
- Sub-goal-3h. Evaluate areas with potential for Research Natural Area designation including Ben Lomond Peak (tall forb values), western portion of the Deseret Peak Wilderness (Great Basin community types and cryptogamic crusts).
- Sub-goal-3i. Maintain viability of species-at-risk (including endangered, threatened and sensitive species and unique communities).
- **Sub-goal-3j**. Manage Forest Service sensitive species to prevent them from being classified as threatened or endangered and where possible provide for delisting as sensitive.

Guidelines

(G23) Avoid actions on the Forest that reduce the viability of any population of plant species classified as Threatened, Endangered, Sensitive or recommended sensitive. Use management actions to protect habitats of plant species at risk from adverse modification or destruction. For species that naturally occur in sites with some disturbance, maintain the appropriate level of disturbance.

(G24) Management activities that negatively affect pollinators (e.g. insecticide, herbicide application and prescribed burns) should not be conducted during the flowering period of any known Threatened, Endangered, and Sensitive plant populations in the application area. An exception to this guideline is the application of *Bacillus thuringiensis*.

(G25) Integrated weed management should be used to maintain or restore habitats for threatened, endangered, proposed and sensitive plants and other native species of concern where they are threatened by noxious weeds or non-native plants. When treating noxious weeds comply with policy in Intermountain Region's Forest Service Manual *2080,* Supplement *#R4 2000-2001-1* (Appendix III).

(G26) Protect key big game calving, fawning and lambing (G39) Manage fire to protect, restore or enhance threatened, endangered, candidate, proposed, and Forest Service sensitive species and their habitats.

Management emphasis

3.2 Terrestrial Habitats (3.2U Undeveloped/3.2D Developed) Emphasis: Manage upland habitats to provide for sustaining and/or recovering desired plant and animal species and/or communities. Maintain or restore lands to meet desired conditions of habitat for threatened, endangered, and sensitive species. Considerations for these areas include winter ranges and corridors for seasonal migrations as well as movement of genetic materials, individuals, and populations; vegetation composition, structure, and pattern needed for life cycle stages; needs for control or eradication of undesirable non-native species; and protection of special or unique habitats.

Desired Future Conditions: Botanical Threatened, Endangered, and Sensitive Species Protection/Recovery

- Rare plant habitats will be managed to maintain or restore and provide for recovery of populations of Threatened and current and proposed Sensitive plant species.
- Riparian plant habitats and rare riparian species will be protected from trampling and overuse by livestock grazing and recreational uses. Populations of non-native plant species will be reduced or eradicated in actual and potential rare plant habitat. Habitats will be maintained to promote pollinator success and survival and to provide for nesting needs. Proper stocking levels and utilization intensities of wildlife will maintain and protect rare plants and their associated habitat. Proactive efforts will be emphasized to educate and inform forest users of the fundamental importance of plant species to society, plant conservation, and biodiversity.
- Cliff, crevice, and ledge habitats will be protected and provide for the viability of a variety of cliff species along with a balance of recreational climbing opportunities.
- Recreational activities (rock climbing, hiking, biking, skiing) in Maguires Primrose and Frank Smith's Violet habitats, will be at a level that maintain individuals and habitat dynamics during key life stages including flowering and fruit production. Continued interactions with the local climbing community will provide for conservation of Logan Canyon endemics and recreational enjoyment. Reconstruction activities associated with Highway 89 will meet the requirements of the Bear River Endemics Conservation Agreement and provide for the viability of the Logan Canyon endemic species.
- Riparian plant habitats and rare riparian species will be protected from trampling and overuse by livestock grazing and recreational uses. Populations of non-native plant species will be reduced or eradicated in actual and potential rare plant habitat.
- Habitats will be maintained to promote pollinator success and survival and to provide for nesting needs. Proper stocking levels and utilization intensities will maintain and protect rare plants and their associated habitat.
- Proactive efforts will educate and inform forest users of the fundamental importance of plant species to society, plant conservation, and biodiversity.
- Protective measures will be provided for Maguires Primrose and Frank Smith's Violet populations in the lower portions of Logan Canyon.
- The US Forest Service requirements of the Maguires Primrose Recovery Plan and the Bear River Endemics Conservation Agreement with US Fish and Wildlife Service will be met.

Wilderness and Recommended Wilderness Areas Desired Future Conditions:

- The Tri-canyon wilderness areas will be recognized and managed as wild areas that have emphasis on maintaining diverse and viable populations and habitat for flora and fauna including threatened, endangered and sensitive species, and valuable watershed while still existing adjacent to large urban areas and high use developed recreation canyons.

Appendix P

Forest Service Biological Evaluation

US Forest Service Biological Evaluation

for the

Land Use Plan Amendment and Final Environmental Impact Statement for the Conservation of Greater Sage-Grouse in Utah, including the Ashley, Fishlake, Manti-La Sal, Dixie, and Uinta-Wasatch-Cache National Forest Plans

May 15, 2015

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ACRONYMS

AMP	allotment management plan
ANF	Ashley National Forest
AUM	animal unit month
BI	beneficial impact
BLM	Bureau of Land Management
BMP	best management practices
BSU	biologically significant unit
COT	Conservation Objectives Team
CSU	controlled surface use
DNF	Dixie National Forest
EIS	environmental impact statement
FNF	Fishlake National Forest
FSM	Forest Service Manual
GHMA	general habitat management area
GIS	geographic information system
GRSG	Greater Sage-Grouse
MIIH	may impact individuals or habitat
MLNF	Manti-La Sal National Forest
NSO	no surface occupancy
NTT	National Technical Team
ORV	off-road vehicle
PHMA	priority habitat management area
SAS	sagebrush associated species
SFA	sagebrush focal areas
SGMA	sage-grouse management area
UDWR	Utah Division of Wildlife
UNF	Uinta National Forest
USDA	United States Department of Agriculture
USFWS	US Fish and Wildlife Service
WCNF	Wasatch-Cache National Forest

1. INTRODUCTION

The purpose of this report is to identify the likely impacts of the Greater Sage-Grouse (GRSG) Planning Decision specifically for the Ashley, Fishlake and Manti-La Sal, Dixie, and Uinta-Wasatch-Cache National Forests on US Department of Agriculture (USDA), Forest Service Region 4 sensitive species.

Sensitive species for Region 4 are listed on the Regional Forester's sensitive species list, which is composed of plants, birds, mammals, amphibians, and fish. Species listed as threatened or endangered by the US Fish and Wildlife Service (USFWS) are addressed in the biological assessment prepared for this project.

This biological evaluation addresses sensitive species that meet the following criteria:

- Species that are known to occur on any of the National Forest System lands listed above, based on confirmed sightings
- Species that may occur on any of the National Forest System lands listed above, based on reliable unconfirmed sightings
- Species that may occur on any of the National Forest System lands listed above, based on the presence of potential habitat

Forest Service Policy—The USDA Forest Service has developed a policy regarding the designation of plant and animal species (Forest Service Manual [FSM] 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following criteria:

- The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend.
- The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline.
- The species' population or habitat is stable but limited.

Forest Service Objectives—Under FSM 2672.41, the objectives for completing biological evaluations for proposed Forest Service programs or activities are as follows:

- To ensure that Forest Service actions do not contribute to loss of viability of any native or desired nonnative plant or contribute to animal species or trends toward the USFWS listing any species the Forest Service Region 2 lists as sensitive
- To comply with the requirements of the Endangered Species Act, actions of federal agencies should not jeopardize or adversely modify critical habitat of federally listed species
- To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process, and to enhance opportunities for mitigation

FSM 2670.22 #2, regarding objectives for sensitive species, states, "Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System Lands." FSM 2600, Section 2671.44 (Supplement 2600-94-2), provides direction on the review of actions and programs authorized, funded, or implemented by the Forest Service, relative to the requirements of the Endangered Species Act.

2. PROJECT HISTORY

GRSG have emerged as a significant conservation concern over the last 10 years. The species has been proposed for listing under the Endangered Species Act as "warranted, but precluded due to higher priorities" because of two primary factors: the large-scale loss and fragmentation of habitats across the species range and a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to GRSG habitat, as summarized in the listing decision, are energy development infrastructure in the eastern portion of the species' range and sagebrush communities converted to annual grasslands by uncharacteristically large wildfires in the western portion of the species range (USFWS 2010).

The Bureau of Land Management (BLM) manages approximately half of the GRSG habitats, whereas the Forest Service manages approximately 8 percent, most of which is on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sagebrush habitats, with about 7.5 million acres in the Intermountain Region. Most habitats on Forest Service-administered lands contribute to summer brood-rearing habitats, and some forests and grasslands contribute important breeding and nesting habitat. In the five National Forests in Utah involved with this process, there are 845,508 acres of GRSG habitat, 91 percent of which is mapped as priority habitat and 9 percent as general habitat.

In 2011 and 2012, the USFWS submitted letters to the BLM and Forest Service recommending that the agencies amend their land use plans to provide adequate regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 National Forests, viewed as "high priority," to ensure appropriate regulatory mechanisms. Following scoping and discussions, the Forest Service added an additional 10 forest plans that would be considered for amendment. The Forest Service is participating in several joint environmental impact statements (EISs) with the BLM to develop records of decision that will be used as a basis for amending land use plans, including all Forest plans in Utah.

Since half of all GRSG habitat is on BLM-administered lands, the BLM is taking the lead on amending or revising land use plans, with the Forest Service as a cooperating agency. The purpose is to guide land management plans that conserve and protect GRSG habitat and to assure the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species.

Adequate regulatory mechanisms are those conservation measures that can be clearly implemented and are demonstrated to be effective in conserving the species.

EISs will be completed for seven GRSG planning subregions: eastern Montana and portions of North and South Dakota; Idaho and southwest Montana; Oregon; Wyoming; northwest Colorado; Utah; and Nevada and northern California. The Forest Service is participating in six of these EISs (excluding Eastern Montana/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision.
(http://fsweb.r4.fs.fed.us/unit/nr/sagegrouse/index.shtml, Accessed April 16, 2013)

This Biological Evaluation is being prepared in relation to the Utah EIS. The Forest Service is planning to amend all land and resource management plans for the GRSG in Utah.

3. PURPOSE AND NEED

The purpose of the land and resource management plan amendment for the GRSG is to identify and incorporate adequate regulatory mechanisms to conserve, enhance, or restore GRSG habitat by reducing, eliminating, or minimizing threats to its habitat. The need to create this amendment arose when the inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The USFWS identified conservation measures in Forest Service land and resource management plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the National Forests in Utah land and resource management plan amendments will focus on areas affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

4. DESCRIPTION OF THE ALTERNATIVES

There are five alternatives to consider under this analysis, the No Action Alternative and four action alternatives: Alternative A—No Action, Alternative B, Alternative C, Alternative D, and Alternative E. A brief description of each is provided below. For a full description of the alternatives, as well as project design criteria, mitigation, and monitoring requirements, please refer to Chapter 2 of the EIS prepared for this project.

One of the key differences between the alternatives is which type of designated habitat each applies to. Designated grouse habitat is divided into two main categories—preliminary priority habitat management area (PHMA) and preliminary general habitat management area (GHMA). PHMA is defined as areas with the highest conservation value to maintaining sustainable GRSG populations. These are breeding, late brood-rearing, and winter concentration areas. GHMA is defined as areas of occupied seasonal or year-round habitat outside of PHMA. There is also a third category, called linkage areas. In the document, “all occupied habitat” refers to all PHMA, GHMA, and linkage areas.

4.1 ALTERNATIVE A: NO ACTION

Under the No Action Alternative the Forest land and resource management plans would not be amended. The existing management direction set forth in the plans for GRSG and sagebrush habitats would continue.

4.2 ALTERNATIVE B

All applicable and appropriate conservation measures that were developed in the National Technical Team’s (NTT) report (NTT 2011) are considered and incorporated into this alternative. These conservation measures would apply only to PHMA, and there would be a 3 percent cap on disturbance in these areas. Additional details about this alternative in PHMA are as follows:

- Travel construction would be limited.
- Minimum standards would be applied.
- There would be no road upgrades.
- Recreation special use permits would be allowed only if they were deemed to have a beneficial impact on GRSG.

- Rights-of-way (ROWs) would be excluded.
- The Forest Service would aim to keep PHMA and to acquire more.
- Grazing direction would be adjusted to improve management for GRSG.
- PHMA would be closed to new fluid minerals leases, and existing leases would have a 4-mile no surface occupancy (NSO) buffer around leks.
- Wildfire and fuels would be managed to protect sagebrush habitats.
- Habitat restoration would be a priority, with a focus on native species.

4.3 ALTERNATIVE C

During scoping, conservation group members submitted suggestions on how to define PHMA and GHMA and were given the opportunity to develop their own conservation measures that would be applied to those areas (proposing more stringent management). All of the reasonable conservation measures across the GRSG range have been consolidated into one alternative; each sub-region will be analyzed in detail.

Alternative C would apply to all designated PHMA, GHMA and linkage areas. There would be a 3 percent cap on disturbance in these areas, and PHMA would be closed to livestock grazing. Additional details about this alternative are as follow:

- Travel construction would be limited in all designated habitat.
- No new roads would be constructed within 4 miles of a lek or occupied habitat.
- Recreation would seasonally prohibit camping and nonmotorized recreation within 4 miles of a lek.
- All designated habitat would be exclusion areas for ROWs and special use permits.
- The Forest Service would aim to keep all designated habitat and would acquire more.
- Wind and solar installations would not be allowed to be sited in designated habitat.
- All designated habitat would be closed to new fluid minerals leases; existing leases would have a 4-mile NSO buffer around leks.
- Wildfire and fuels would be managed to protect and restore sagebrush habitats; areas would be closed to grazing after wildfire.
- All PHMA would be designated as areas of critical environmental concern (ACEC) or as zoological areas.

4.4 ALTERNATIVE D

In this alternative, the Utah sub-region has modified the recommendations from the NTT report and adjusted habitat boundaries based on science, resource trade-offs, scoping comments, and internal staff expertise. This alternative is very similar to the Alternative B. It would be applied to sagebrush ecological sites in PHMA, and there would be a 5 percent cap on disturbance in these areas. Additional details about this alternative are as follows:

- Travel construction would be limited in PHMA, with a disturbance exception allowing the Forests to exceed the 5 percent cap if GRSG populations are doing well
- Recreation special use permits that do not adversely affect the GRSG would be allowed.

- ROWs would be excluded in PHMA, with the exception of transmission lines.
- Grazing direction would be adjusted to improvement management for GRSG in PHMA and other parts of all designated habitat.
- PHMA would be designated as a NSO for new fluid minerals leases; existing leases would have seasonal conditional surface use.
- Wildfire and fuels would be managed to protect sagebrush habitats in all designated habitat.
- Habitat restoration would be a priority, with a focus on native species.

4.5 ALTERNATIVE E

As explained in Chapter 1 of the EIS, the planning area includes all occupied GRSG habitat in Utah (except GRSG habitat on portions of the Sawtooth National Forest that fall within Utah) as well as lands administered by the Ashley National Forest in Wyoming. Because portions of two states fall within the planning area, Alternative E is divided into two alternatives, Alternative E-1 for Utah and Alternative E-2 for that portion of the planning area that falls within Wyoming.

Alternative E-1 is based on the State of Utah's Conservation Plan for Greater Sage-Grouse in Utah; it would apply to all BLM- and Forest Service-administered lands in that state. Alternative E-2 is based on the State of Wyoming's Governor's Executive Order 2011-5, with adjustments by the BLM Interdisciplinary Team, which includes members of the Wyoming Governor's Office.

4.6 THE PROPOSED PLAN

The Proposed Plan was developed as a result of public comments, best science, cooperating agency coordination, and internal review of the Draft Land Use Plan Amendment/EIS. It consists of a combination of various management actions from all the draft alternatives. This alternative includes a 3 percent disturbance cap that would be calculated at two levels. Project level disturbance would be calculated using a density disturbance calculation tool (see Appendix E, FEIS) that is similar to the tool being used in Wyoming. Disturbance would be calculated at both the biologically significant unit (BSU) level and project levels. In Utah, the BSU is synonymous with the PHMA boundary in each population area (in other words, the BSU in the Carbon Population Area is the same as PHMA in the Carbon Population Area). This multistep approach is not considered under the other alternatives in the Draft EIS.

The Proposed Plan includes more specific vegetation objectives, which are included in vegetation objectives tables. These objectives are based on the ecology of GRSG population areas in the planning area. These objectives (Connelly et al. 2004) were used with additional adjustments made, based on local nesting and brood-rearing data that have been collected in conjunction with research projects in Utah. Alternatives proposed under the Draft EIS had included a more generalized objective for desired cover percentages and heights for sagebrush, grasses, and forbs in seasonal habitats. In addition, this alternative includes quantifiable treatment objectives. The acre amount proposed for treatment is equal to the number of acres that the Vegetation Dynamics Development Tool model indicates are necessary to maintain a minimum of 70 percent of land capable of producing sagebrush, with 10 to 30 percent sagebrush canopy cover. Research indicates that when 50 to 70 percent of the landscape includes sagebrush, the likelihood of GRSG persistence increases (Aldridge et al. 2008; Wisdom et al. 2011).

This alternative also includes some lands that have been identified as sagebrush focal areas (SFA). SFA have been determined to be highly important landscapes across the GRSG range. More restrictive management has been placed on lands in SFA to emphasize GRSG protection. SFA include approximately 228,500 acres surface estate and 4,900 acres of split-estate federal minerals in the Box Elder and Rich population areas. It also specifies that lek buffers that will be applied to PHMA and GHMA be consistent with 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 the Buffer Appendix in the FEIS.

Similar to Alternatives B and D, an adaptive management plan is proposed that identifies soft and hard triggers and a management approach for responding to those triggers. If a hard trigger is met, immediate action would be necessary to stop a severe deviation from GRSG conservation objectives. If a soft trigger is met, the specific causes that are contributing to the decline would be analyzed. If Forest Service management actions are determined to be the cause or to be contributing to the decline, the Forest Service would apply measures within its implementation-level discretion to mitigate the decline of populations and habitat.

Additional details about this alternative are the following:

- Travel construction would be limited in PHMA, GHMA, and SFA.
- Temporary recreation special use permits in PHMA would be allowed only if they are deemed to have a net conservation gain to the GRSG.
- ROWs would be avoided in PHMA; major ROWs would be excluded within 4 miles of leks, and minor ROWs would be excluded within 1 mile of leks.
- The Forest Service would keep PHMA and GHMA and would acquire more.
- Grazing direction would be adjusted to improve management for GRSG.
- New fluid minerals leases would have no surface occupation stipulations in PHMA.
- In SFA, there would be NSO and no waivers, exceptions, or modifications for fluid mineral leasing.
- Wildfire and fuels would be managed to protect sagebrush habitats in PHMA and GHMA.
- Habitat restoration would be a priority, with a focus on native species.
- Additional protections for the Anthros Mountain Population on the Ashley National Forest (see Sect. 7.1.9).

5. ANALYSIS AREA

The analysis area consists of National Forest system lands in Utah, including the Ashley, Fishlake and Manti-La Sal, Dixie, and Uinta-Wasatch-Cache National Forests, that have been identified as grouse habitat (Figure 1). This consists of 845,508 total acres of identified GRSG habitat, approximately 11 percent of the 7,663,304 acres that comprise all Forest Service-administered lands in Utah. Table 1 shows the acres of occupied GRSG habitat on each Forest unit.

Table 1 GRSG habitat by forest and percent of land cover for the Utah EIS planning area, from GIS analysis

National Forest	Total PHMA (acres)	Percent of Forest
Ashley	224,822	16
Dixie	183,886	11
Fishlake	180,452	11
Manti-La Sal	96,072	12
Uinta-Wasatch-Cache	160,276	7
TOTAL	**845,508**	**(Average 11.4)**

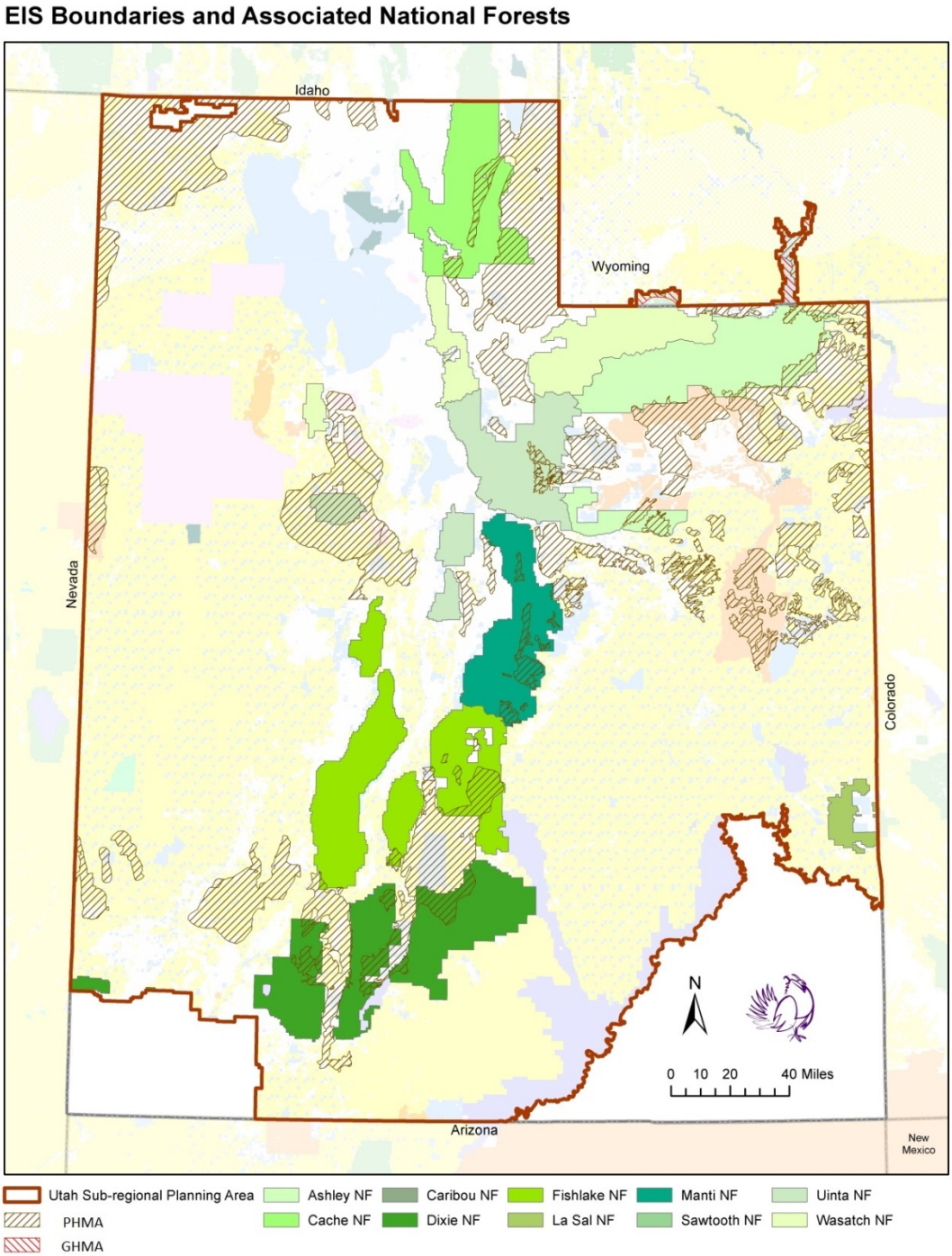

Figure 1 Utah GRSG Planning Area with Forest Service Lands and Proposed PHMA and GHMA

6. SPECIES CONSIDERED IN THE ANALYSIS

The Region 4 sensitive species list (dated February 2013) is composed of plants, birds, mammals, amphibians, and fish identified for that region. The Forest Service conducted a review for Region 4 sensitive species that may occur or be affected by activities associated with the Planning EIS and the Land and Resource Management Plan Forest Amendment for the Greater Sage-Grouse on National Forests in Utah. Existing occurrence information and known or potential habitat was reviewed by searching the Natural Resource Management database. Sources of information in this database are Forest Service records and files, the Utah Natural Heritage Program, Utah Division of Wildlife (UDWR) information, and published research.

Table 2 is a list of USFWS listed, candidate, and proposed species and Forest Service sensitive species known to exist or suspected to exist on Forest Service-administered lands in Utah. (Threatened and endangered species are addressed separately in the biological assessment prepared for this project.) All of the species in Table 2 were considered in this analysis and were compared to the four criteria listed below. These criteria were used to identify species that would experience no impact from implementing the action alternatives and could therefore be eliminated from detailed analysis.

The numerical categories below are referred to as Evaluation Criteria in Table 2:

1. Suitable habitat or elevation range does not exist for these species in the analysis area.

2. The type or intensity of the activity in the proposed action is expected to have no impact/impact on these species or their habitat.

3. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic or opportunistic visitors to the habitats impacted by the proposal but have shown no affiliation to or dependence on these habitats.

4. The associated conservation design or mitigations eliminate any potential for impact on the species.

Species carried forward into Table 3 were not excluded from detailed analysis. This is because they are likely to occur in or near the analysis area, or an action could affect potential habitat in or near the analysis area (negatively or positively, directly, indirectly, or cumulatively).

Table 2 USDA Forest Service Region 4 sensitive species occurring or potentially occurring on National Forest System lands, with those that may be influenced by an action alternative to be further analyzed in this document; the others dismissed from discussion

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
MAMMALS				
Wolverine *Gulo gulo (luscus)*	Montane habitats in conifer, subalpine, and tundra zones.	N	2,3,4	ANF, WCNF
Pygmy rabbit *Brachylagus idahoensis*	Sage-steppe habitats.	Y	Not excluded (see detailed analysis below)	All
Bighorn sheep *Ovis canadensis*	Open or semi-open terrain, with a mix of steep and gentle slopes, broken cliffs, rock outcrops, and canyons.	Y	2,3	ANF, FNF, MLNF, UNF, WCNF
Spotted bat *Euderma maculatum*	Caves, mines, cliffs, abandoned buildings, and snags.	Y	3,4	All
Townsend's western big-eared bat *Corynorhinus townsendii*	Caves, mines, cliffs, abandoned buildings, and snags.	Y	3,4	All
Fisher *Martes pennanti*	Subalpine and montane coniferous habitats, with suspected historical presence in Utah.	N	1,3	UNF
Gray wolf *Canis lupus*	Variety of habitats but very limited distribution in extreme northeastern Utah.	N	2,3	WCNF

[1]ANF = Ashley National Forest; DNF = Dixie National Forest; FNF = Fishlake National Forest; MLNF = Manti-La Sal National Forest; UNF = Uinta National Forest; WCNF = Wasatch-Cache National Forest

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
BIRDS				
Bald eagle *Haliaeetus leucocephalus*	Generally aquatic habitats; prefers fish during nesting and carrion during winter.	Y	2,3	All
Boreal owl *Aegolius funereus*	Mature to late-successional Engelmann spruce and subalpine fir above 9,000 feet.	N	2,3	ANF, WCNF
Flammulated owl *Otus flammeolus*	Forest owl that nests in cavities and caves from 6,000 to 10,000 feet.	N	2,3	All
Great gray owl *Strix nebulosa*	Taiga forest nester, very infrequent winter visitor to Utah.	N	2,3,4,	ANF, WCNF
GRSG *Centrocercus urophasianus*	Sagebrush hills, with forbs and insects for broods below 8,400 feet.	Y	Not excluded (see detailed analysis below)	All
Columbian sharp-tailed grouse *Tympanuchus phasianellus columbianus*	Sagebrush, perennial grasslands, mountain shrub, and riparian deciduous shrub communities.	Y	Not excluded (see detailed analysis below)	WCNF
Northern goshawk *Accipiter gentilis*	Mature forests, large trees on moderate slopes with open understories for nesting.	Y	3,4	All
Peregrine falcon *Falco peregrinus anatum*	Nests on cliffs with a wide view, low disturbance, and abundance of prey.	Y	3,4	All
Three-toed woodpecker *Picoides tridactylus*	Prefers nesting in mid to high elevation mature coniferous forests, especially abundant following wildfires.	Y	3,4	All

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
AMPHIBIANS				
Columbia spotted frog *Rana luteiventris*	Isolated springs and seeps in central through northern Utah.	Y	Not excluded (see detailed analysis below)	ANF, MLNF, UNF, WCNF
Boreal toad *Anaxyrus boreas boreas*	Wetlands at elevations from 7,000 to 11,880 feet.	Y	Not excluded (see detailed analysis below)	All
FISH				
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	Native to Bonneville Basin, in both higher and low elevation cool water systems.	Y	3,4	All
Colorado River cutthroat trout *O. c. pleuriticus*	Native to upper Colorado River drainages. Prefers Cold, clean water environments in high elevation streams and lakes.	Y	3,4	All
Southern leatherside chub *Lepidomeda aliciae*	Native to streams and rivers of southeastern Bonneville Basin, especially southern Utah.	Y	3,4	DNF, FNF, MLNF, UNF
Northern leatherside chub *L. copei*	Native to streams and rivers of southeastern Bonneville Basin, especially central and northern Utah.	Y	3,4	WCNF
PLANTS				
Wonderland Alice flower *Aliciella caespitosa*	Cliffs, crevices, rocky slopes, and arroyos of Navajo and Wingate sandstone. Wayne County, Utah.	N	1	DNF, FNF
Chatterley onion *Allium geyeri* var. *chatterleyi*	Pinyon-juniper, mountain brush, ponderosa pine/manzanita; 6,600 to 8,200 feet.	N	1	MLNF
Sweet-flowered rock jasmine	Alpine tundra. La Sal Mountains; 10,000 to 12,000 feet.	N	1	MLNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Androsace chamaejasme ssp. *carinata*				
Wheeler's angelica *Angelica wheeleri*	Wet or boggy areas near seeps and springs; 5,000 to 10,000 feet.	Y	1,2	UNF, WCNF
Link Trail columbine *Aquilegia flavescens* var. *rubicunda*	Springs and seeps in the Mesa Verde formation with aspen, ponderosa pine, and spruce-fir; Wasatch Plateau, Utah; 6,900 to 8,500 feet.	N	1	MLNF
Graham columbine *A. grahamii*	Cliffs, ledges, and drip-lines of Weber sandstone; 7,300 to 8,000 feet.	N	1	ANF
Petiolate wormwood *Artemisia campestris* ssp. *borealis* var. *petiolata*	Outcrops of Red Pine shale in mountain mahogany, manzanita, and ponderosa pine.	N	1	ANF
Bicknell milkvetch *Astragalus consobrinus*	Volcanic gravel to barren stony hillsides; Emery, Sevier, and Garfield Counties, Utah.	N	1	FNF, MLNF
Dana milkvetch *A. henrimontanensis*	Cool desert shrub. Wyoming and basin big sagebrush, low elevation black sagebrush, pinyon-juniper, and ponderosa pine; 7,000 to 8,000 feet.	N	1	DNF
Isely's milkvetch *A. iselyi*	Seleniferous and gypsiferous clays with pinyon-juniper and desert shrubs; 4,700 to 6,000 feet.	N	1	MLNF
Navajo Lake milkvetch *A. limnocharis* var. *limnocharis*	Escarpment; bristlecone, limber, and ponderosa pine; Shore of Navajo Lake.	N	1	DNF
Table Cliff milkvetch *A. limnocharis* var. *tabulaeus*	Escarpments of limestone; talus slopes, ridge crests and ridgetops; above 9,000 feet.	N	1	DNF
Guard milkvetch *A. zionis* var. *vigulus*	Chaparral, mountain brush, and pinyon-juniper; 6,300 to 9,500 feet.	N	1	DNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Dainty moonwort *Botrychium crenulatum*	Saturated soils, seeps, springs, and streams in spruce forests; 3,000 to 6,000 feet.	N	1	ANF, UNF
Slender moonwort *B. lineare*	Riparian areas and mixed forests; western states, from California to Colorado; Above 9,000 feet.	N	1	ANF, UNF, WCNF
Paradox moonwort *B. paradoxum*	High elevation moist or wet meadows on Aquarius Plateau, Utah; also found in Idaho, Montana, Oregon, and Washington.	N	1	DNF
Aquarius paintbrush *Castilleja aquariensis*	Alpine, sub-alpine meadows, silver sagebrush and high-elevation black sagebrush; 9,600 and 11,200 feet.	Y	Not excluded (see detailed analysis below)	DNF
Tushar paintbrush *C. parvula* var. *parvula*	Alpine and sub-alpine meadows; open escarpments; Tushar Mountains, Utah; 10,000 to 12,100 feet.	N	1	DNF, FNF
Reveal paintbrush *C. p.* var. *revealii*	Escarpments of the Claron formation; gravels and talus; 7,700 to 9,900 feet.	N	1	DNF
Wasatch fitweed *Corydalis caseana* spp. *brachycarpa*	Along streams with montane forest communities; 6,200 to 10,000 feet.	N	1	UNF, WCNF
Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*	Shadescale, mat saltbrush, and scattered pinyon-juniper on Mancos shale; 5,200 to 6,500 feet.	N	1	MLNF
Yellow-white cat's-eye *C. ochroleuca*	Open escarpments; gravels, slopes, and talus of bristlecone, limber, and ponderosa pine; also open pinyon-juniper and cushion plant communities; 7,600 to 9,600 feet.	N	1	DNF
Pinnate spring parsley *Cymopterus beckii*	Cliff crevices or sandy canyon bottoms of Navajo sandstone.	N	1	DNF, MLNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Cedar Breaks biscuitroot *Cymopterus minimus*	Open escarpments of loams, gravel, or talus, with cushion plants, bristlecone, limber, and ponderosa pine; 7,600 to 10,500 feet.	N	1	DNF
Brownie ladyslipper *Cypripedium fasciculatum*	Duff of shaded coniferous forests, typically lodgepole pine; western states, from California to Colorado; 8,100 to 9,600 feet.	N	1	ANF, WCNF
Lesser yellow lady's slipper *Cypripedium parviflorum*	Shaded, moist soils in forested areas; 4400 to 5,300 feet.	N	1	WCNF
Wasatch shooting star *Dodecatheon utahensis*	Shaded, moist cracks and crevices of rock outcrops or faces; Often in spray of waterfalls.	N	1	WCNF
Abajo Peak draba *Draba abajoensis*	Spruce, fir, or pine forests, sub-alpine meadows; Utah, Arizona, and New Mexico; 6,200 to 12,400 feet.	N	1	MLNF
Wasatch draba *D. brachystylis*	Moist areas on rocky slopes with aspen and fir communities; 5,500 to 9,800 feet.	N	1	UNF, WCNF
Burke's draba *D. burkei*	Talus slopes of sub-alpine fir, northern Utah mountains; 84,00 to 9,700 feet.	N	1	WCNF
Rockcress draba *D. globosa*	Alpine slopes and summits; Idaho, Montana, Utah, and Colorado; above 11,200 feet.	N	1	ANF, UNF, WCNF
Maguire draba *D. maguirei*	Talus slopes and rocky outcrops; 5,400 to 8,700 feet.	N	1	WCNF
Mount Belknap draba *D. ramulosa*	Alpine; calcareous talus, rocks, or gravels; 10,800 to 12,000 feet.	N	1	FNF
Santaquin draba *D. santaquinensis*	Cracks and crevices of limestone or dolomite rock faces or cliffs in Santaquin and American Fork Canyons, Utah.	N	1	UNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Creeping draba *D. sobolifera*	Alpine and sub-alpine meadows; open escarpments of volcanic gravel or talus; Tushar Mountains, Utah; 10,000 to 12,000 feet.	N	1	DNF, FNF
Nevada willowherb *Epilobium nevadense*	Pinyon-juniper and mountain brush communities on limestone outcrops.	N	1	FNF
Pine Valley goldenweed *Ericameria crispa*	Tertiary rocks with aspen, mixed conifer, and mountain brush; Pine Valley Mountains, Utah; above 7,500 feet.	N	1	DNF
Carrington daisy *Erigeron carringtonae*	High elevation escarpment ridges of Flagstaff limestone; 10,000 to 11,000 feet.	N	1	MLNF
Cronquist daisy *E. cronquistii*	Cliffs, crevices, and talus of limestone; 5,700 to 9,900 feet.	N	1	WCNF
Garrett's fleabane *E. garrettii*	Moist limestone cliff faces and crevices; 8,850 to 12,500 feet.	N	1	UNF, WCNF
Kachina daisy *E. kachinensis*	Sweeps, hanging gardens, and open slickrock; 5,300 to 8,400 feet.	N	1	MLNF
La Sal daisy *E. mancus*	Alpine and sub-alpine grass/sedge and forb communities; 9,100 to 10,500 feet.	N	1	MLNF
Untermann daisy *E. untermannii*	Open escarpments and sparsely vegetated ridgetops of shale, gravel, siltstone, and occasionally talus, with scattered bristlecone and limber pine, Douglas fir, and pinyon-juniper; 7,000 to 9,400 feet.	Y	1,2	ANF
Widstoe buckwheat *Eriogonum aretioides*	Open escarpments of loams, gravels, and talus with cushion plants, bristlecone, limber, and ponderosa pine; 7,100 to 8,000 feet.	N	1	DNF
Elsinore buckwheat	Igneous outcrops and gravels in shadscale, sagebrush, ponderosa pine, mixed desert shrub, and pinyon-juniper	N	1	FNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
E. batemanii var. *ostlundii*	communities; 5,500 to 6,500 feet.			
Logan buckwheat *E. loganum*	Rocky outcrops and sagebrush/bunchgrass communities; 4,800 to 7,800 feet.	Y	Not excluded (see detailed analysis below)	WCNF
Canyon sweetvetch *Hedysarum occidentale* var. *acnone*	Open slopes in pinyon-juniper, mountain brush, and sagebrush; 5,000 to 8,000 feet.	Y	1,2	MLNF
Jones goldenaster *Heterotheca jonesii*	Crevices and sands of Navajo sandstone; 7,500 to 9,500 feet.	N	1	DNF
Utah ivesia *Ivesia utahensis*	Dry rocky hillsides; 7,000 to 11,000.	N	1	UNF, WCNF
Wasatch jamesia *Jamesia americana* var. *macrocalyx*	Cliffs and rocky places with mountain brush and spruce-fir.	N	1	UNF, WCNF
Zion jamesia *J. a.* var. *zionis*	Hanging gardens and ledges of Navajo sandstone; 3,900 to 6,600 feet.	N	1	DNF
Wasatch pepperweed *Lepidium montanum* var. *alpinum*	Rocky, damp crevices at high elevations with mountain brush and spruce-fir; 6,600 to 10,000 feet.	N	1	UNF, WCNF
Neeses' pepperweed *Lepidium montanum* var. *neeseae*	Escarpments of sandstone with scattered pinyon-juniper, manzanita, and ponderosa pine; 6,400 to 9,500 feet.	N	1	DNF
Garrett baldderpod *Lesquerella garrettii*	Talus and outcrops of limestone in alpine tundra, sub-alpine meadow, and coniferous forests; 9,000 to 12,000 feet.	N	1	UNF, WCNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Canyonlands lomatium *Lomatium latilobum*	Entrada sandstone with pinyon-juniper and desert shrubs; 4,800 to 6,850 feet.	N	1	MLNF
Goodrich blazingstar *Mentzelia goodrichii*	Erosive escarpments and steep slopes of Green River formation; Scattered pinyon-juniper; Tavaputs Plateau, Utah; 7,200 to 8,600 feet.	N	1	ANF
Fish Lake naiad *Najas caespitosa*	Shallow water off Pelican Point Fish Lake, Utah; last recorded in the field in 1940 and may be extirpated.	N	1	FNF
Beaver Mountain groundsel *Packera castoreus*	Endemic to the Tushar Mountains on windswept ridges downward to spruce/fir communities in Piute County, Utah.	N	1	FNF
Podunk groundsel *P. malmstenii*	Open escarpments of gravels or talus with cushion plants, bristlecone, limber, and ponderosa pine; 8,300 to 10,400 feet.	N	1	DNF
Arctic poppy *Papaver radicatum* var. *pygmaeum*	Alpine ridge crests, saddles, and talus slopes of Red Pine shale; above 11,400 feet.	N	1	ANF, WCNF
Paria breadroot *Pediomelum pariense*	Open escarpments with pinyon-juniper and ponderosa pine; 5,600 to 8,000 feet.	N	1	DNF
Stemless beardtongue *Penstemon acaulis*	Mixed desert shrub, black and Wyoming big sagebrush, pinyon-juniper. Utah, Wyoming, and Colorado; 5,500 to 8,200 feet.	Y	Not excluded (see detailed analysis below)	ANF
Red Canyon beardtongue *P. bracteatus*	Open escarpments of gravel or talus in Claron formation with cushion plants, bristlecone, limber, and ponderosa pine; 6,900 to 8,300 feet.	N	1	FNF
Cache beardtongue *P. compactus*	Mountain brush and spruce-fir in or near outcrops of dolomite or limestone.	N	1	WCNF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Little penstemon *P. parvus*	Dry open meadows, silver and high-elevation black sagebrush; 8,500 to 10,000 feet.	Y	Not excluded (see detailed analysis below)	DNF, FNF
Pinyon penstemon *P. pinorum*	Pinyon-juniper and mountain brush communities of Pine Valley Mountains, Utah; 5,600 to 6,700 feet.	N	1	DNF
Ward beardtongue *P. wardii*	Clay semi-barrens with desert shrub, pinyon-juniper, sagebrush, shadscale, or pinyon-juniper; 5,200 to 8,000 feet.	N	1	FNF
Angell cinquefoil *Potentilla angelliae*	Rocky subalpine meadows between 10,900 and 11,100 feet.	N	1	DNF
Cottam cinquefoil *P. cottamii*	Cracks and crevices of quartzite outcrops, often shaded; 7,500 to 10,400 feet.	N	1	WCNF
Arizona willow *Salix arizonica*	Wet meadows and streamside communities. Utah, New Mexico, and Arizona; 8,200 to 10,600 feet.	Y	Not excluded (see detailed analysis below)	DNF, FNF, MLNF
Musinea groundsel *Senecio musiniensis*	Ridgetops, gravels, barrens, and talus slopes of Flagstaff limestone; 9,700 to 10,800 feet.	N	1	MLNF
Maguire campion *Silene petersonii*	Open escarpments of talus or gravel with cushion plants, bristlecone, limber, or ponderosa pine; Utah and Nevada; 7,000 to 11,300 feet.	N	1	DNF, FNF, MLNF
Rock tansy *Sphaeromeria capitata*	Open escarpments of gravels and loam soils with cushion plants, bristlecone, limber, and ponderosa pine; Wyoming, Montana, Colorado, and Utah; 7,500 to 8,000 feet.	N	1	DNF
Caespitose greenthread	Escarpments and slopes of Green River and Uinta formations; scattered pinyon-juniper, salina wildrye;	Y	1,2	ANF

Species	Habitat Description and Range	Known or Suspected to Be in Analysis Area?	Evaluation Criteria	Applicable National Forest1
Thelesperma caespitosum	Wyoming and Utah; 5,900 to 8,800 feet.			
Uinta greenthread *T. pubescens*	Wind-swept ridges in mountain mahogany, Hickey Mountain vicinity; 8,100 to 8,900 feet.	Y	Not excluded (see detailed analysis below)	WCNF
Bicknell thelesperma *T. subnudum* var. *alpinum*	Navajo sandstone and Carmel limestone between 7,300 and 9,000 feet.	N	1	DNF, FNF
Barneby woody aster *Tonestus kingii* var. *barnebyana*	Mountain mahogany and oak communities on rock outcrops.	N	1	FNF, UNF
Sevier townsendia *Townsendia jonesii* var. *lutea*	Salt desert shrub and juniper communities; 5,500 to 6,300 feet.	N	1	FNF
Smith violet *Viola franksmithii*	Shaded limestone cliffs and crevices with Douglas fir, maple, and mountain brush.	N	1	WCNF

[1]Analysis area is outside species' range.
[2]Potential habitat for the species does not exist in GRSG habitat (sagebrush-steppe) or is outside the elevation range of the GRSG.
[3]The type or intensity of the activity in the proposed action is expected to have no impact/effect on these species or their habitat.
[4]Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic, or opportunistic visitors to the habitats impacted by the proposal, but no affiliation or dependence on these habitats has been shown.
[5]The associated conservation design or mitigations eliminate any potential for impact on the species.

Table 3 Species analyzed in detail because they may be affected by one of the action alternatives

Common Name	Scientific Name	Habitat Affinity
AMPHIBIANS		
Boreal toad	*Anaxyrus boreas boreas*	WET, WST, S
Columbia spotted frog	*Rana luteiventris*	WET, WST, S
BIRDS		
GRSG	*Centrocercus urophasianus*	S
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	S, GRA, MS, RIP
Mammals		
Pygmy rabbit	*Brachylagus idahoensis*	S
PLANTS		
Aquarius paintbrush	*Castilleja aquariensis*	S
Logan buckwheat	*Eriogonum loganum*	S
Stemless beardtongue	*Penstemon acaulis*	S
Little Penstemon	*P. parvus*	S
Arizona willow	*Salix arizonica*	FM, WST, RIP
Uinta greenthread	*Thelesperma pubescens*	MS, S

Key: AQ = Aquatic; SF = Spruce-fir; LPP = Lodgepole pine; FM = Forest meadows; GRA = Grassland; MS = Mountain shrub; RIP = Riparian; S = Sagebrush; WAT = Water; WET = Marshes, shallow ponds; WST = Streams

7. SPECIES INFORMATION AND IMPACTS ANALYSIS (DIRECT, INDIRECT, AND CUMULATIVE)

Because of the importance of GRSG and its habitat, it was singled out and is discussed specifically; while pygmy rabbits, Columbian sharp-tailed grouse, Columbia spotted frog, and boreal toad were grouped together for this analysis due to the similarity of the habitats they occupy in terms of association with sagebrush communities.

7.1 GREATER SAGE-GROUSE (*CENTROCERCUS UROPHASIANUS*)

Evaluating Viability

Forest Service policy based on the National Forest Management Act (NFMA) and associated regulations motivate careful consideration of the conservation status of sensitive species. In this section we briefly outline the legal foundation and the policy which establishes our approach to evaluating the contribution of habitat on NFS land to the overall viability of the GRSG, and how that evaluation differs among NFS units depending on the inherent capability and suitability of the environment.

The statutory underpinning for evaluating viability of species expressed in 16 U.S.C. §1604(g)(3)(B) requires the Secretary to promulgate regulations that shall include, but not be limited to:

(3) specifying guidelines for land management plans developed to achieve the goals of the Program which –

(B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, …

The Department published planning regulations in 1982, under which the land management plans associated with the current amendment for GRSG were written. The 1982 regulations included the viability provision at 36 CFR 219.19:

"Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area".

All Forest Plans being considered for amendment to address GRSG conservation and recovery were developed under the 1982 planning regulations. This Biological Evaluation considers management guidance for GRSG on NFS lands in Utah, and assesses the outcomes of five alternatives and the Proposed Alternative for amendment of plans for each of six NFS land management units. The six NFS units differ substantially in the inherent distribution and quality of GRSG habitat. Some NFS units may occur at an elevation and in ecological settings such that they support certain life history needs, but not others. As a result, GRSG may use National Forest System lands for only a portion of the year (e.g. for summer brood-rearing habitat). In contrast other units may provide year-round habitat. Differences among NFS units result largely from the environmental setting, and therefore the inherent capability of the environment to support particular sagebrush ecosystems varies.

As outlined in the *FEIS and referenced in this Biological Evaluation* the capability of NFS lands to support self-sustaining populations of GRSG is limited. The national forests contain relatively small areas of GRSG habitat, and often the habitat on NFS land only contributes to particular life cycle requisites. This is the case on most of the National Forests in Utah.

Consequently, the assessment of whether habitat on NFS land is sufficient to maintain viable populations of GRSG must consider the contribution of habitat on NFS land to GRSG persistence, recognizing the inherent limitations on the ability to meet needs for all GRSG life stages from habitat located exclusively on NFS land. As recognized in the NFMA, the ability of the Forest Service to provide for diversity of animal communities is limited by "the suitability and capability of the specific land area..." 16 U.S.C. & 1604(g)(3)(B). Accordingly, this BE considers the contribution of these six NFS units to GRSG viability as follows:

- Forest plans provide for management of the environment to provide habitat to meet species' requirements associated with the particular seasons and life history stages supported on National Forest System (NFS) lands;

- Because GRSG spend only a portion of the year on NFS lands in response to the inherent capability and suitability of the lands (e.g. breeding habitat occurs off NFS), there are threats and stressors to species' which occur off of NFS land, and therefore over which the Forest Service has no jurisdiction or control;
- Managing habitats on NFS land to contribute to the support of persistent populations on NFS land is not the same as ensuring species viability over its entire range;
- The scale of analysis to assess the contribution of habitat on NFS land to GRSG viability is the planning unit, which is generally considered a national forest.
- The five alternatives and the proposed alternative represent various scenarios for multiple resource management on NFS land with differing outcomes for GRSG. For each alternative, we end our discussion in this Biological Evaluation with a determination regarding the likelihood that the scenario provides conditions to support the ***persistence*** of GRSG on the NFS units ***to meet the associated life cycle requisites*** that land is suitable for and capable of providing, based on the combined outcomes of regulatory restrictions and restoration of habitat.

7.1.1 Life History

GRSG depend on a variety of semiarid shrub-grassland (shrub steppe) habitats throughout their life cycle and are considered obligate users of sagebrush (e.g., *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush), *A. t.* ssp. *vaseyana* (mountain big sagebrush), and *A. t. tridentata* (basin big sagebrush; Baker et al. 1976; Connelly et al. 2000; Connelly et al. 2004; Miller et al. 2011). GRSG also use other sagebrush species (which can be locally important) such as *A. arbuscula* (low sagebrush), *A. nova* (black sagebrush), *A. frigida* (fringed sagebrush), and *A. cana* (silver sagebrush; Schroeder et al. 1999; Connelly et al. 2004). GRSG distribution is strongly correlated with the distribution, connectivity, and patch sizes of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b). GRSG exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas; Connelly et al. 2004; Connelly et al. 2011a). Adult GRSG rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder et al. 1999). (Life history, habitat conditions, and population information sections were copied from Manier et al. [2013], from the USFWS Final Conservation Objectives Team (COT) report [USFWS 2013], and from the BLM draft EIS Chapter 3.)

7.1.2 Habitat and Population Condition by Forest

Greater Sage-Grouse habitats in Utah comprise the southern periphery of the species range. Suitable habitats historically occurred in basin and range conditions, and habitats consist of small to large patches of sagebrush communities in a larger matrix of mountain and canyonland topography. The state supports approximately 8% of the species' range-wide population. The connectivity of suitable habitats with and between adjacent states may be important in assuring the persistence of these populations. Although BLM lands provide the largest amount of habitat in Utah, National Forest system lands provide 845,508 acres of PHMA that are important in providing key habitat for some populations, and in maintaining connectivity for these populations.

Habitat conditions and population information were largely taken from the USFWS Final COT Report (USFWS 2013) and from the BLM Draft EIS Chapter 3. Priority Areas for Conservation (PACs) identified in the COT Report (USFWS 2013) were identified and associated with National Forests potentially supporting habitats in Utah and portions of Utah National Forests extending into Wyoming (i.e., portions of the Uinta-Wasatch-Cache and Ashley). Table 4 displays the COT PACs associated with sage-grouse populations, along with their likelihood of persistence. Analysis of persistence in the COT report, (cf. Garton et al. 2011 and Garton et al. 2015) is evaluated using short- and long-term quasi-extinction time-frames (2037 and 2107, respectively).

Garton et al. (2015) published a follow-up report building on the range-wide analysis of Garton et al. (2011). The 2011 book chapter in Knick and Connelly (eds.) 2011 evaluated changes in GRSG populations from roughly 1965 to 2007 examining population trajectories at multiple spatial scales. The more recent manuscript employed the same analytical methods but extends the field survey data to include 2008 through 2013. Garton et al (2015) provides reconstructed estimates for population trajectories across the species' range using for the array of populations examined in 2011.

From 2007 to 2013, data suggests that minimum counts for breeding males range-wide fell from 109,990 to 48,641, a decline of 56%. Using population persistence models consistent with those from Garton et al. (2011), Garton et al. (2015) examines future scenarios for males range-wide (excluding Colorado) and for individual populations at multiple spatial scales. For example, a minimum number of males counted at leks for the entire range-wide distribution, excluding Colorado, were 40,505 birds in 2013 and projected to decline to 19,517 males in 30 years (2030), and 8,154 males in 100 years (2107) based on the scenario examined.

As outlined in past review, many factors potentially contribute to projected declines (Stiver, et al. 2006, NTT 2011, USFWS 1013; e.g. drought, climate change, disease, invasive plants, wildfire, habitat destruction). Garton et al (2015) suggests that environmental conditions and management actions through 2013 have not reversed the pattern of population declines observed in most populations since the 1970's or 1980's. Alternative A (continue current management) as outlined in this FEIS, most closely reflects the scenario examined in Garton et al (2011) and Garton et al (2015). As noted earlier, the Determinations in this biological evaluation reflect an evaluation of conditions for GRSG and the consequences of management for future populations of GRSG under each of the analyzed alternatives for NFS lands based on requirements for providing environmental conditions to assure the persistence of GRSG habitats within the capability of the unit to support these habitats when GRSG use them. . The evaluation for each alternative carefully considers the context provided by the Garton et al (2011) and Garton et al (2015) analysis for those population using NFS lands.

Table 4. Likelihood of persistence of GRSG populations by management zones, and associated Priority Areas for Conservation in Utah that include National Forests based on analysis of population data through 2007 (USFWS 2013).

Population Area	Fewer than 200 Males/500 Birds in 2007	Percent Chance of Fewer than 50 Birds/20 Males in 2037	Percent Chance of Fewer than 500 Birds/200 Males in 2037	Percent Chance of Fewer than 50 Birds/20 Males in 2107	Percent Chance of Fewer than 500 Birds/200 Males In 2107
Management Zone II: Wyoming Basin	NA	0.1	0.2	16.1	16.2
9a-Wyoming Basin	N	0	0	9.9	10.7
9b-Rich-Morgan Summit (Wyoming Basin in Utah)[1]	N				
9c-Uintah (Wyoming Basin in Utah)	N				
Management Zone III: Southern Great Basin	NA	0	0	6.5	7.8
10a-Strawberry Valley (northeast Utah)	Y	0.8	51.8	8.8	78.6
10b-Carbon County (northeast Utah)	Y	0.8	51.8	8.8	78.6
11-Sheeprock (Utah, a.k.a. Tooele-Juab Counties)	Y	56.6	100	100	100
12-Emery (Utah, a.k.a. Sanpete-Emery Counties)	Y	77.2	100	99.2	100
13a-Greater Parker Mountain (part of south-central Utah)	N	0.0	3.2	1.1	21.0
13b-Panguitch (part of south-central Utah)	N	0.0	3.2	1.1	21.0

[1] This UT management area includes Summit-Morgan Counties, which is described separately by Garton et al. (2011) as a subpopulation in Management Zone III. Numbers for columns 2-4 for this population are 20.6, 100, 41.8, and 100, respectively (Garton et al. 2011).

Ashley National Forest

The Ashley National Forest falls within the Uinta Sage-grouse Management Area (PAC 9c). Throughout the area (not just in the National Forest) there were an estimated 452 males on leks as of 2011. In the northern portion of this area is the Diamond Mountain and Browns Park population, a significant population center for GRSG in Utah, Colorado, and Wyoming. Limited data are available for some of the leks throughout this area. Some show declines, while a few others showed limited recovery during the past 20 years. Two of the largest leks in the area showed significant increases in recent years. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was zero and 11 percent chance of the population dropping below 500 birds/200 males by 2037 and 2107, respectively. Sagebrush communities on the Ashley National Forest contribute to breeding, nesting and brood-rearing habitats in northeastern Utah. Winter habitats are found primarily off-Forest at lower eleveations.

The central and southern portions of the management area provide habitats for small isolated populations with low connectivity and low potential for habitat improvement. These populations are largely a function of the availability of suitable sagebrush habitats in otherwise unsuitable landscapes. The Anthros Mounatin population is an example. Although the population, and its associated habitats, are isolated from other populations, there is evidence that in may be important in providing connectivity between populations to the west (e.g. Strawberry) and to the east (e.g. Tavaputs). There are a total of 170,130 acres of PHMA and 54,692 acres of GHMA on the Ashley National Forest.

Dixie National Forest

The Dixie National Forest includes a portion of the Greater Parker Mountain Sage-Grouse Management Area and the Panguitch Management Area in south-central Utah (PACs 13a and 13b). The Parker Mountain area had an estimated 821 males on leks in 2011. Only a portion of the aforementioned leks, male grouse, and habitat is in the Forest. The Panguitch portion has more than a dozen leks that are often interconnected, with an estimated 304 males in 2011. Only a few leks are found on Forest Service lands. There is a high degree of variability in the number of males in attendance among these leks. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), estimated that there was 3.2 percent and a 21 percent probability of the population dropping below 500 birds/200 males by 2037 and 2107, respectively

Portions of the Parker population that are in the Forest boundaries are part of one of the most contiguous and connected GRSG habitats in the state. It is generally made of a single large gently sloping plateau with black sagebrush on the flats and big sagebrush in the drainages and on the uplands. It contains stringers of aspen at the higher elevations. For the Panguitch area, the population is distributed north-south in a series of linked valleys and benches and with suitable sage-grouse habitats constrained by mountains and canyons. Movement of GRSG from one valley or bench to another among seasons is necessary to meet their seasonal habitat requirements in the highly variable annual weather conditions of this region. This area has the highest potential for increase in Utah due to habitat treatments to remove pinyon-juniper encroachment into sagebrush habitats. In the Dixie National Forest, there are 183,886 acres of PHMA.

Fishlake National Forest

The southern end the Fishlake National Forest, at, also includes a portion of the Greater Parker Mountain Sage-Grouse Management Area (PAC 13a) in south-central Utah. The Parker Mountain area had an estimated 821 males on leks in 2011 and contains one of the most contiguous and connected habitats in the state. Only a portion of the aforementioned leks, male grouse, and habitat occurs on the Forest, generally the higher elevation sagebrush habitat. At the northernmost point of the Fishlake National Forest, there is also a small portion of the Emery Sage-Grouse Management Area (PAC 12). This is a small isolated population using patches high elevation sagebrush steppe communities constrained by mountain and canyon areas. On the Fishlake National Forest, there are 180,452 acres of PHMA. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) estimate that there was a 3.2 percent and a 21 percent probability of the Greater Parker population dropping below 500 birds/200 males by 2037 and 2107, respectively. The Emery population was assigned a 100% chance of dropping below 500 birds/200 males in 2037. This is a function of a a naturally small, isolated population that is already below that threshold.

Manti-La Sal National Forest

The Manti-La Sal National Forest contains a portion of the Carbon Sage-Grouse Management Area (PAC 10b) in the northern portion of the Colorado Plateau in central Utah. This management area (across all jurisdictions of lands) had an estimated 119 males on leks as of 2011. In addition, on the southern boundary of the Manti-La Sal National Forest, there is a small isolated population called the Emery Sage-Grouse Management Area. In both of these areas, lek count data from 1970 to 2000 are incomplete; some lek groups show declines, while others appear to be stable. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) suggested that there was 51.8 percent and 100 percent chance respectively of both the Carbon and Emery populations dropping below 500 birds/200 males by 2037.

The Carbon population area is characterized by highly broken terrain, with deep canyons and mid-elevation plateaus. Telemetry studies in the area suggest that occasionally GRSG move to and from the adjacent Strawberry Valley population. The Emery area, supports a small, mostly isolated GRSG population that occupies high elevation sagebrush steppe on the eastern slope of the Wasatch Plateau. Although no direct movement between these areas has been documented, this population is relatively close to the south-central Utah population (Parker Mountain portion). On the Manti-La Sal National Forest, there are 96,072 acres of PHMA.

Uinta-Wasatch-Cache National Forest

The Uinta-Wasatch-Cache National Forest is a consolidated land management unit that contains portions of multiple GRSG management areas in the northern portion of Utah. The Rich-Morgan-Summit Sage-Grouse Management Area in northeastern Utah is a part of the Wyoming Basin population (PAC 9a), a significant population center for grouse in Utah, Idaho, Colorado, and Wyoming. This management area also includes part of what is mapped in Garton et al. (2011) as Summit-Morgan Counties in Management Zone III. This portion of the population is regarded as stable, with a potential for growth, and resiliency to known threats.. Based on a ten-year average count of males on leks (on all land jurisdictions), the area had an estimated 1,223 males as of 2011. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) suggested that there was zero and 11 percent probability of the population dropping below 500 birds/200 males by 2037 and 2107, respectively. The habitat is

composed of mountain and big sagebrush communities, with differing levels of forb and grass diversity and abundance, based on past and current management regimes.

The Strawberry Valley Sage-Grouse Management Area (PAC 10a) in central Utah is a significant population center for GRSG in the state, with NFS lands providing a large contribution to the habitat. This management area had an estimated 82 males on leks as of 2011. Significant restoration has been conducted on this population primarily consisting of harrow and mowing treatments, and it is the most intensively managed in Utah. This population is regarded as stable with a high potential for growth. The baseline (2007) population was below 500 birds/200 males. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) estimated that there was 51.8 and 78.6 percent chance of the population dropping below 500 birds/200 males by 2037 and 2107, respectively. Habitat consists of mountain big sagebrush in Strawberry Valley, with silver sagebrush in the more mesic sites and stringers of aspen at higher elevations. The migratory and wintering area to the east is drier and comprised of Wyoming big sagebrush communities, with more pinyon-juniper moving off the slopes into the valleys.

The Sheeprock population (PAC 11) is an isolated population center and is also known as the Sheeprock Mountains Management Area. Garton et al. (2011) refers to this area as the Tooele-Juab Counties population. This population had an estimated 102 males on leks as of 2011. This population is regarded as stable, with a potential for growth. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011) suggested that there was a 56.5 percent and a 100 percent probability of the population dropping below 50 birds/20 males by 2037 and 2107, respectively; and a 100 percent chance of falling below 500 birds/200 males by 2037. The population is isolated from other sage-grouse populations in Utah by landscapes that have been significantly altered by urbanization and agricultural uses on private lands. Habitat is composed of Wyoming big sagebrush and less diverse understories than would be found in more mesic high elevation sites.

There are 139,159 acres of PHMA and 21,117 acres of GHMA on the Uinta-Wasatch-Cache National Forest.

7.1.3 Threats by Forest

Table 5 identifies potential threats (USFWS 2013) for the GRSG populations on Utah's National Forests and those portions that extend into Wyoming, as well as the contribution of management on Forest Service-administered lands to contend with those threats. These threats were further refined for the specific National Forests associated with the populations.

Ashley National Forest

Key threats to GRSG on and around the Ashley National Forest are predation, wildfire, invasive plants and noxious weeds, avian diseases, and existing and future anthropogenic uses. GRSG in the management area generally show resiliency to known threats. Small, naturally isolated populations on the Ashley National Forest may be at increased risk due to further habitat loss from anthropogenic uses.

Dixie National Forest

Key GRSG threats on and adjacent to the Dixie National Forest are loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased predation due to expansion of, or changes in, the

native predator community in response to anthropogenic factors, and reduced habitat connectivity. Additionally local issues may be impacts from historical and current livestock grazing, energy development, and adjacent residential and commercial development.

Fishlake National Forest

Key GRSG threats on and around the Fishlake National Forest are loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased predation because of expansion of, or changes in, the native predator community in response to anthropogenic factors, and habitat lossf or degradation of habitat that results in a loss of GRSG habitat connectivity. Local issues are livestock grazing, degraded sagebrush habitats, with sagebrush that is too dense in some areas and only adequate in others.

Table 5 Potential threats for GRSG populations on National Forest System lands in Utah and the portion of those forests that extend into Wyoming, based on the COT Report (USFWS 2013)[2]. Specific characteristics associated with each category of threat are further described in the COT report, NTT report and the Greater Sage Grouse Conservation Strategy.

COT Report Population Area	Isolated/Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
9a-Wyoming Basin	N	L	N	L	L	L	Y	L	Y	Y	L	Y	L
Ashley National Forest—Wyoming	N	N	N	L	L	L	L	L	L	Y	L	Y	N
W-C National Forest—Wyoming	N	N	N	L	L	L	L	L	L	Y	L	Y	N
9b-Wyoming Basin (Rich/ Summit)	N	N	N	Y	Y	Y	Y	N	Y	N	N	Y	Y
9c-Wyoming Basin (Uinta)	N	N	N	Y	Y	Y	L	Y	Y	N	N	Y	Y
Ashley National Forest—Utah	N	L	N	Y	Y	Y	Y	L	Y	Y	L	Y	N
W-C National	N	L	N	Y	Y	Y	L	N	L	Y	L	Y	N

[2] Threats are characterized as: Y = threat is present and widespread, L = threat present but localized, N = threat is not known to be present, and U = Unknown.

COT Report Population Area	Isolated/Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
Forest—Utah													
10a—Strawberry	Y	N	N	Y	Y	Y	Y	N	Y	N	N	Y	N
Uinta National Forest	Y	N	N	Y	Y	Y	Y	N	Y	N	N	Y	N
10b-Carbon	Y	N	N	Y	N	Y	Y	Y	Y	N	N	Y	N
Manti-La Sal National Forest	Y	N	N	Y	N	Y	Y	Y	Y	N	N	Y	N
11-Sheep Rock	Y	N	N	Y	L	L	Y	Y	L	N	Y	L	N
Uinta National Forest—Vernon Unit	Y	N	N	Y	L	L	Y	Y	L	N	Y	L	N
12-Emery	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	N
13a-Parker	N	N	N	Y	Y	Y	N	N	Y	N	N	Y	N
13b-Pnguitch	N	N	Y	Y	Y	Y	Y	L	Y	N	N	Y	L
Dixie-Fishlake National Forest	N	Y	N	Y	Y	Y	L	L	Y	Y	N	Y	L

Manti-La Sal National Forest

Key threats to GRSG and their habitats on and around the Manti-La Sal National Forest include habitat loss and isolation due to a variety of factors, including energy development (oil and gas), checkerboard ownership, wildfire, and pinyon-juniper encroachment. In addition, invasive species, predation, and disease have been and could continue to be a threat. A few of the smaller isolated populations within suitable habitat patches may be at further risk from anthropogenic uses within these areas.

Uinta-Wasatch-Cache National Forest

Key threats to GRSG on and around the Uinta-Wasatch-Cache National Forest are wildfire, invasive species (cheatgrass and knapweed), pinyon-juniper encroachment, predation, recreation-related impacts, private land management and development, isolation of some small populations, a lack of water resources at arid sites due to water being piped for livestock, and some historical and current livestock operations.

7.1.4 Alternative A—No Action

Recreation/Travel Management

Alternative A would maintain current land management; however, few Forests have specific conservation parameters in land use plans for sagebrush or GRSG.

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the Forest relative to GRSG. There would be minimal seasonal restrictions on casual use, and some of the areas in GRSG habitat would remain open to cross country travel, especially in winter. In general, the more acres and lineal miles of routes that are designated in an area, the greater the likelihood of habitat degradation or loss, and disturbance to GRSG. In addition, less restrictive travel conditions usually mean higher concentrations of human use next to motorized routes. This can cause disruption of nesting activities, abandonment of young, and temporary displacement.

This alternative has the highest potential to impact GRSG due to the lack of restrictions on activities that cause these impacts. Therefore all direct and indirect impacts on the species and its habitat would likely allow current trends to continue. In addition, impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. This alternative has the highest potential to impact GRSG due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

Fire and Fuels

[Suggest citing appropriate references on effects of fire and summarizing in 2 or 3 sentences. Then consider providing sussinct overview of Alternative A as done in Idaho BE. This would largely eliminate first 3 paragraphs of this section.] Fire (both lightning-caused and human-caused fire) in sagebrush ecosystems is one of the primary risks to the greater sage-grouse, especially as part of the positive feedback loop between exotic invasive annual grasses and fire frequency (USFWS 2013). Most sagebrush species are killed by wildfires, and recovery requires many years, especially in the case of large fires (Connelly et al. 2004).

Fire risk is extremely high throughout the planning area and is listed as one of the most significant threats to GRSG in the Box Elder, Ibapah, Hamlin Valley, Uintah, Carbon, Emery, Sheeprock, and Bald Hills population areas (USFWS 2013). Existing forest plans typically do not include specific management for fuels treatments in sagebrush habitat.

Both prescribed fire and non-fire fuels treatments are allowed in current forest plans, and fire suppression is prioritized to protect human life and specific resource values at risk. Alternative A would continue to manage wildfire and prescribed burns under current direction which would have the fewest restrictions for fire and fuels management actions and a high potential for vegetation disturbance. Prescribed burns could be used within sagebrush habitat where needed to control fuel loading. Policies would not prioritize protection or restoration of mature sagebrush habitat. Increased human activity and noise associated with wildland fire suppression and prescribed fire in areas occupied by sage-grouse could disrupt nesting, breeding, or foraging behavior. Important habitats could be removed or degraded because of the use of heavy equipment or hand tools. Other potential impacts may include injuring or killing eggs/chicks, causing changes in species movement patterns due to areas devoid of vegetation, or reducing population viability and increasing the contribution to the need to list the species.

In addition, suppression may initially result in higher rates of juniper encroachment in some areas. In the initial stages of encroachment (phase 1), fuel loadings remain consistent with the sagebrush understory. As juniper encroachment advances (phases 2 and 3) and the understory begins to thin, the depleted understory causes the stands to become resistant to wildfire and further alter fire return intervals. During years of high fire danger, the resulting heavy fuel loadings in these stands can contribute to larger-scale wildfire events and confound control efforts due to extreme fire behavior.

Invasive Plants

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. They may cause declines in native plant populations, including sagebrush habitat, through competitive exclusion and niche displacement, among other mechanisms, particularly by changing the fire regime resulting in the loss or significant resuction in shrub cover. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that GRSG use for food and cover.

Invasive plant communities do not provide suitable GRSG habitat, since the species requires sagebrush, a variety of native forbs, and very often the insects associated with them. GRSG eat sagebrush year-round and use it exclusively throughout the winter for food and cover. Along with competing with vegetation essential to GRSG, invasive plants fragment GRSG habitat and reduce habitat quality. Invasive plants may also alter long-term changes in ecosystem processes, such as fire cycles and other disturbances that persist even after invasive plants are removed (Connelly et al. 2004, pp. 5-9).

The spread and establishment of invasive species is a major threat to the population areas of Utah (USFWS 2013). Under current management (Alternative A), the Forest Service uses mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. This issue is intimately tied to the threat from fire and fuels management actions, which reduce weeds and create fire breaks.

Under Alternative A, the Forest Service would continue to control noxious weeds and invasive species using integrated weed management actions, in cooperation with state and federal agencies, affected counties, and adjoining private landowners. However, there are no specific

objectives in forest plans to focus these efforts on eradicating cheatgrass or sagebrush communities. These actions would improve GRSG habitat, along with other vegetation types, but would not specifically prioritize management in these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach onto sagebrush ecosystems, which reduce and eventually eliminate GRSG habitat in these areas. Pinyon-juniper invasion reduces shrub cover, and the season of available succulent forbs is shortened due to soil moisture depletion (Crawford et al. 2004, p.8). In higher elevation areas, Douglas-fir may also encroach onto mountain big sagebrush communities.

To treat pinyon-juniper, the Forest Service frequently uses mechanical and chemical treatments, hand-cutting, and prescribed burning to reduce conifer encroachment onto sagebrush communities. Conifer encroachment is a substantial threat to the Box Elder, Panguitch, Parker Mountain, Emery, and Uintah GRSG population areas.

Fire suppression policies can contribute to increased pinyon-juniper spread (USFWS 2013). Alternative A does not take any specific actions to prevent conifer encroachment, but many forest plans contain objectives for maintaining, improving, or restoring sagebrush plant communities often for big game winter range and livestock grazing. However, these approaches do not specifically address the threat of conifer encroachment to benefit GRSG and thus would likely have limited effectiveness in controlling the invasion.

Minerals and Energy Development

Energy development can result in direct habitat loss, degradation of important habitats by roads, pipelines, and power lines, and noise and direct human disturbance. The interaction and intensity of impacts could cumulatively or individually lead to habitat loss and fragmentation in the long term (Connelly et al. 2000, Holloran and Anderson 2005, pp. 57-60). Renewable energy facilities, including those for solar and wind power, typically require many of the same features for construction and operation as do nonrenewable energy resources. Therefore, direct impacts from habitat losses and disturbance through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development (USFWS 2010, pp. 13951-2).

Under Alternative A, all mineral leasing and development and wind energy development would continue to be managed under current direction. A small percentage of PHMA would be closed to nonenergy leasable mineral leasing, with the remainder of all designated habitats open to leasing (including new lease expansion), with no cap on surface-disturbing activities. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on GRSG and their habitat including habitat loss and degradation by roads, pipelines and power lines, higher levels of noise, increased presence of roads/humans, and a larger number of anthropogenic structures in an otherwise open landscape that could result in abandonment of leks, decreased attendance at the leks that do persist, lower nest initiation, poor nest success, decreased yearling survival, and avoidance of energy infrastructure in important wintering habitat.

Infrastructure

Human developments, such as power lines, communication towers, fences, roads, and railroads, contribute to habitat loss; power lines and roads have the largest impacts (Connelly et al. 2004;

Naugle et al. 2011). Human disturbance increases over the short term during infrastructure construction.

In the long term, increased threats from avian predators perching on infrastructure may cause GRSG numbers to decline. Power lines can directly affect GRSG by posing a collision and electrocution hazard, increasing predation, reducing connectivity, and facilitating the invasion of exotic plants (Braun 1998, pp. 145-146; Connelly et al. 2004, pp. 12, 25). Power lines are linear and often extend for many miles. Thus, ground disturbance from power line construction, as well as vehicle and human presence during maintenance, may introduce or spread invasive weeds over large areas, thereby degrading habitat.

Cellular and other communications towers could cause GRSG mortality via collisions, influence movements to avoid tall structures or electromagnetic radiation, or provide perches for corvids (primarily ravens) and raptors (Connelly et al. 2004, p. 7).

Wisdom et al. (2011) reported the mean distance to cellular towers in extirpated GRSG range at 13.7 miles, was almost twice that of occupied range, at 7 miles. GRSG have been observed to avoid brood-rearing habitats within 3 miles of power lines (LeBeau 2012). Higher densities of power lines within 4 miles of a lek negatively influence attendance (Walker et al. 2007).

Additionally, the tendency of GRSG to fly relatively low in low light or when harried may put them at high risk of collision with power lines (Manier et al. 2013, p. 81). In addition, research suggests that road traffic within 4.7 miles of leks negatively influence male lek attendance (Connelly et al. 2004). Lek count trends have been found to be lower near interstate, federal, and state highways, compared to secondary roads (Johnson et al. 2011). Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats.

Other impacts are facilitation of predator movements, spread of invasive plants, and human disturbance from noise and traffic (Forman and Alexander 1998, pp. 207-231). Habitat loss may be reduced by closing and reclaiming unused, minimally used, and unnecessary roads in and around sagebrush habitats during seasonal use by GRSG (NTT 2011, p. 11).

Railroads presumably have the same potential impacts on GRSG as do roads because they create linear corridors in sagebrush habitats, resulting in habitat loss and fragmentation, and other disturbance. In addition, fence poles provide predator perch sites and potentially predator corridors along fences (particularly if a road is nearby). Fences and their associated roads may allow for the invasion or spread of invasive weeds along the fencing corridor. Furthermore, fences may effectively fragment habitat because GRSG may avoid habitat around the fences to escape predation (Braun 1998, p.145).

Cross-country motorized recreation, even in winter, is very destructive to GRSG and would continue under Alternative A. Also, there would be no changes to the current approach to exchanging, acquiring, and disposing of lands or with permitting ROWs on Forest Service-administered lands.

All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation, which could result in habitat loss or degradation for GRSG. Indirect impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most project proponents would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on GRSG and habitat.

Livestock Grazing and Feral Horses

Livestock grazing may have both beneficial and detrimental impacts on sagebrush habitats, depending on site-specific management (USFWS 2010, p. 13998). Grazing can be used as a tool to reduce fuel load, reduce spread of noxious and exotic weeds, protect intact sagebrush habitat, and increase habitat extent and continuity (Connelly et al. 2004).

Rangelands meeting forest plan standards may also provide effective wildlife habitat. However, grazing at inappropriate intensity, season, or location may degrade sagebrush ecosystems over the long term by changing plant communities and soils. This could lead to lost vegetation cover and plant litter, increased erosion, decreased water quality, and reduced overall habitat quality for wildlife, including GRSG (Knick and Hanser 2011, Connelly et al. 2004).

The reduction of grass heights from grazing could reduce cover suitability and habitat availability by increasing exposure to predators. Livestock may also occasionally trample nests and eggs (Coates 2007, pp. 28, 33) or disturb reproduction in other ways. At the planning scale, the Forest Service can decide whether areas would be open or closed to livestock grazing. Future impacts would be eliminated in areas closed to grazing, but past impacts would likely persist, and closing grazing may result in other impacts, such as fuel buildup.

At the implementation level, the Forest Service can consider changes in grazing practices or systems, which could reduce grazing intensity or change the season of use, for example. In addition, changes in grazing management in riparian and wet meadows can reduce impacts in these important seasonal habitats.

Approximately 40,000 free-roaming horses and burros live in the western US and are found in approximately 18 percent of occupied GRSG range (Connelly et al, 2004; Beever and Aldridge 2011), primarily on BLM-administered lands. A horse consumes 20 to 65 percent more forage than a cow of equivalent size; also, horses can use higher elevation areas and steeper slopes, so they graze a wider swath of sagebrush (Connelly et al. 2004).

Under Alternative A, the Forest Service would continue to make GRSG habitat available for livestock grazing. Active animal unit months (AUMs) for permitted livestock grazing would be 329,521 on BLM-administered lands and 265,373 on Forest Service-administered lands; however, the number of AUMs on a permit may be adjusted during permit renewals, allotment management plan (AMP) development, or other appropriate administrative activity.

Wild horse and burro AUMs would also remain at current levels. These policies may contribute to GRSG habitat degradation if current grazing practices are not meeting forest plan proper use parameters. Under Alternative A, there would be no change in the numbers, timing, or method of livestock grazing in the Forest, nor would there be any changes to wild horse or burro management.

Other potential impacts on GRSG habitat are overgrazing, reduction in cover and structure, loss of diversity due to consumption, and degradation of meadow/wetland/spring/stream habitat crucial for reproduction.

7.1.5 Alternative B

Recreation/Travel Management

Under this alternative there would be limited opportunities for road construction and improvement in PHMA, with minimum standards applied and no upgrading of current roads. PGMA would be designated as per the travel management plan in the current planning document. Routes would be evaluated for seasonal closure to reduce functional loss of habitat and habitat degradation from routes in important habitats. The habitat disturbance limitation of 3 percent would apply for new roads associated with valid existing rights. In addition, recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG; no cross-country driving would be permitted in PHMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influences on sagebrush habitats and GRSG by minimizing human use and road construction and upgrading. Not allowing upgrades of existing roads would also limit disturbance and degradation within GRSG habitat.

Fire

Fire is among the greatest threats to GRSG in Utah. Under Alternative B, fuels treatments in PHMA would be designed and implemented to emphasize protection of existing sagebrush ecosystems. Fuels management programs would consider GRSG habitat needs, and fire suppression would prioritize protection of habitat, after life and property. Grazing management would be considered as a tool to reduce fuel loading. These policies would be likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, these policies would protect GRSG and habitat more than Alternative A.

Invasive Plants

Under Alternative B, the Forest Service would continue to control noxious weeds and invasive species using integrated weed management actions, in accordance with existing plans to control, suppress, and eradicate noxious and invasive species. Vegetation management and restoration programs would prioritize sagebrush reestablishment and weed control as part of habitat management, and grazing management programs would consider noxious weed control. These policies would likely protect more acres of sagebrush from invasive weeds because of the greater emphasis they place on sagebrush reestablishment. However, the actual change in the probability of invasive weed establishment would depend on the resources available to devote to the effort.

Conifer Encroachment

Under Alternative B, encroaching conifers would be monitored and controlled in fuels treatment areas and in relation to PHMA. Restoration in seasonal habitats would be prioritized, which would reduce degradation and habitat loss for GRSG. As a result, more emphasis would be placed on conserving and restoring sagebrush ecosystems than those described under Alternative A.

Minerals and Energy Development

Under Alternative B, lands in PHMA would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting existing mines to expand. This action would greatly reduce the acreage open to mineral leasing, compared to Alternative A. Lands in PHMA would also be classified as unsuitable for surface exploration for coal and would be proposed for withdrawal from locatable mineral entry.

Unleased areas in PHMA would be closed to fluid mineral leasing, greatly increasing the habitat acreage protected from energy development. Conservation measures, including NSO stipulations, would be applied to existing lease areas. GHMA would remain open to leasing and energy development, with appropriate conservation measures. These policies would reduce the acreage affected by energy development in the planning area, compared to Alternative A, by limiting the impacts of energy development, including disturbance and habitat degradation. Alternative B would provide protection now and in the future for the most important GRSG habitats, which encompass many acres.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and degradation of habitat. Under Alternative B, PHMA would be exclusion for new ROWs, and the acreage excluded from ROW construction would be greatly increased over Alternative A (GHMA would be ROW avoidance). The acreage limited to existing routes would be greatly increased over Alternative A, and the acres open to off-road vehicles (ORVs) would decrease. These policies would protect PHMA from ROW and road construction more than Alternative A. Under Alternative B, PHMA would be managed as exclusion, and GHMA would be managed as avoidance for new ROW projects.

Livestock Grazing and Feral Horses

Excessive or poorly managed grazing may degrade GRSG habitat. Alternative B would not reduce the area open to livestock or feral horse grazing, nor would it directly reduce AUMs. However, in PHMA, the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments through AMPs or permit renewals. Alternative B would adjust grazing direction in GRSG PHMA, which accounts for about 10 percent of Forest Service-administered lands in Utah. The impacts from livestock grazing, vegetation disturbance, and range improvements would be similar under Alternative B as it would be under Alternative A; the exception is that it would provide a few more restrictions to protect GRSG habitat. Not only would that minimize disturbance, but it would provide a very minor positive impact on the PHMA habitat, likely creating small pockets of improved areas for productive GRSG breeding, nesting, and brood rearing.

7.1.6 Alternative C

Recreation/Travel Management

Impacts would be similar to those described under B except in PHMA camping and other non-motorized recreation would be prohibited during certain seasons within 4 miles of a lek. In addition, there would be no new route construction within 4 miles of a lek, thereby reducing disturbance to nesting and brood-rearing GRSG and their habitat in comparison to alternatives A and B.

Fire

Alternative C would follow the same policies as Alternative B, with the additional provision that livestock would be excluded from habitat areas post-fire to allow for recovery. As with Alternative B, these policies would prioritize sagebrush preservation more than current management under Alternative A and thus would conserve more sagebrush associated species (SAS) habitat. Alternative C would have the most protective measures for GRSG. In this alternative, all occupied habitat would be managed as an exclusion area for new ROW projects.

In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat conservation and management.

Alternative C would have the fewest negative impacts and the most positive impacts on wildlife species whose ranges overlap with GHMA and PHMA. Impacts would be similar to those described under Alternative B, except that the same protections would be expanded to include all occupied habitat.

Invasive Plants

Alternative C would follow the same approach as Alternative A, using integrated vegetation management to control, suppress, and eradicate noxious and invasive plants. As under Alternative B, vegetation management would prioritize sagebrush reestablishment and weed control. In addition, Alternative C would help to develop methods for prioritizing and restoring sagebrush steppe invaded by or even once reseeded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A, further increasing habitat effectiveness. However, the actual change in invasive weed establishment would depend on the resources available.

Conifer Encroachment

Impacts from conifer encroachment under Alternative C would be the same as those described under Alternative B, but with an emphasis on a wider range of GRSG habitats focusing on sagebrush communities in general and increasing habitat quantity and effectiveness.

Minerals and Energy Development

Under Alternative C, lands in all occupied habitat would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting existing mines to expand. This would greatly reduce the acreage open to mineral leasing. Under Alternative C, policy changes would be the same as those described for Alternative B but would have greater impacts because they would be applied to all occupied habitat (845,508 acres). Lands in PHMA and GHMA would also be defined as unsuitable for surface coal exploration and would be proposed for withdrawal from locatable mineral entry.

Unleased areas would be closed to fluid mineral leasing, greatly increasing the extent of habitat protected from energy development. Conservation measures, including NSO stipulations, would be applied to existing lease areas. These policies would substantially reduce the available acreage for energy development, which would limit such impacts as disturbance and habitat degradation. Under this alternative, impacts would be similar to those described under Alternative B, except that the protections would be expanded to include PHMA and GHMA.

Infrastructure

Under Alternative C, all occupied GRSG habitat would be exclusion areas for new ROWs; the acreage excluded from ROW construction would be greatly increased over Alternative A. Under Alternative C, impacts would be much the same as those described for Alternative B, but they would be applicable to a larger area of GRSG habitat, thereby offering more positive impacts. The acreage limiting motorized travel to existing routes would be greatly increased over Alternative A, and ORV use would not be permitted in habitat areas. These policies would protect GRSG-occupied habitat from ROW and road construction more than Alternatives A, B, D, or E.

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation or loss.

Livestock Grazing and Feral Horses

Alternative C1

Under Alternative C1, grazing would be closed in GRSG habitat for livestock. This change would avoid direct impacts of grazing, such as nest trampling, loss of herbaceous cover, erosion, and diminished water quality. However, removing livestock grazing may eventually increase fuel loading, particularly in areas capable of producing fine flashy dry vegetation in late summer. Wild ungulates and wild horses would still be using these areas, which may also increase as available forage increases. The complete removal of livestock grazing could improve sagebrush habitat quality initially and could help to restore important wetland and adjacent riparian habitats that support GRSG.

Alternative C2

Alternative C2 would reduce the areas open to livestock grazing and limit AUMs in allotments that overlap GRSG habitats. This alternative would also reduce wild horse AUMs by 25 percent, primarily on BLM-administered lands. These policy changes would reduce the direct impacts of grazing in comparison to Alternative A, while maintaining the vegetation diversity and fuel reduction promoted by livestock grazing. Wild ungulates would still use these areas, and that may also increase as available forage increases. Structural range improvements would be avoided to decrease the potential for introduction of invasive species that would degrade GSRG habitat. In addition, no new water developments would be authorized and existing water developments that are harmful to GRSG could be dismantled.

The reduction of livestock and feral horse grazing could improve sagebrush habitat quality initially and help to restore important wetland and adjacent riparian habitats that support GRSG.

There would be few if any negative impacts on GRSG under Alternative C with respect to range resources. This is because grazing would not only be reduced to improve conditions for GRSG in PHMA, but it would discontinue grazing in all occupied habitat (Alternative C1) or substantially reduce grazing in all allotments that overlap GRSG habitat (Alternative C2). This amounts to roughly 11 percent of the total area of National Forest lands in Utah, certainly a much higher percentage of grazing suitable lands. Additionally, under Alternative C, only habitat treatments that benefit GRSG would be allowed. Therefore, Alternative C would have the fewest negative impacts and the most positive impacts on GRSG.

7.1.7 Alternative D

Recreation/Travel Management

Under this alternative, travel would be limited to existing or designated routes within all PHMA. PHMAs that currently do not have designated routes would be designated in a travel management plan as limited to existing routes. In those areas managed as limited to existing routes, impacts on travel and transportation management under Alternative D would be the same as Alternative B. Impacts from recreational permits would be the same as those described for Alternative B because recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. Impacts from other types of recreation, including recreation at developed

recreation sites and dispersed recreation would be the same as those described under Alternative A.

Fire

Under Alternative D, impacts would be similar to Alternative B. In addition, fuel breaks would be constructed to protect large blocks of sagebrush habitat. Fuels management programs would consider GRSG habitat needs, and grazing management would be considered as a tool to reduce fuel loading. These policies would reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, they would protect GRSG habitat from fire more than Alternative A.

Under Alternative D, PHMA would be managed as an avoidance area; however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PHMA if the project would not adversely affect GRSG populations. This alternative would be more protective of GRSG than Alternative A but less protective than Alternatives B and C.

Invasive Plants

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. In addition, as under Alternative C, Alternative D would develop methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A. However, the actual change in invasive weed establishment would depend on the resources available to devote to control.

Conifer Encroachment

Under Alternative D, vegetation management programs would treat PHMA facing conifer encroachment in order to meet GRSG habitat objectives. Because this alternative has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering pinyon-juniper spread than Alternative A.

Minerals and Energy Development

Under Alternative D, lands in PHMA would be closed to nonenergy leasable mineral new leasing and mineral material sales, including not permitting existing mines to expand. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. In GHMA, new leases would be allowed with stipulations to protect lek and breeding habitat. Coal leases in PHMA would be allowed, after review by the BLM and the State of Utah to determine that no essential areas are affected.

Similarly, areas not presently petitioned for withdrawal from locatable mineral entry would remain open, but conservation measures for GRSG would be applied to claimants.

Unleased areas in PHMA and GHMA would be open to fluid mineral leasing, but all acres would require NSO or controlled surface use (CSU) stipulations, whereas under Alternative A over 1 million acres have no stipulations. Conservation measures, including NSO stipulations, would be applied to existing lease areas. These proposed policies set only 22,900 PHMA acres aside as unsuitable for coal leasing (similar to Alternative A) and propose more than 3 million additional acres for locatable mineral withdrawal leasing than under Alternatives B or C (Forest Service- and BLM-administered lands combined). However, Alternative D is more similar to Alternative

B regarding energy development using stipulations to protect GRSG, compared to Alternative A; as a result, impacts on GRSG from energy development as described under Alternative A would be reduced.

Under Alternative D, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks, similar to Alternative B. However with some mineral development, this alternative would allow up to 5 percent disturbance in any Utah Management Zone. Impacts would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance were increased from 3 percent to 5 percent. However the potential for this difference to have negative impacts on GRSG is minimal. Therefore impacts would be most similar to those described under Alternative B.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. Under Alternative D, PHMA within 4 miles of an occupied lek would be exclusion for most types of new ROWs. GHMA and PHMA, more than 4 miles from a lek would be ROW avoidance areas. The acreage limiting motorized travel to existing routes would be increased over Alternative A, and the acres open to ORVs would be greatly decreased.

These proposed policies would protect PHMA from ROW and road construction more than Alternative A by limiting road and ROW construction in habitat areas. Alternative D would provide less protection to PHMA from ROW construction; however, it would restrict development more than Alternative A, while allowing for increased management flexibility to improve the effectiveness of protection measures.

Alternative D is generally the same as Alternative B except that the potential for direct habitat loss and indirect impacts would be greater under this alternative compared to both Alternatives B and C. This is due largely to the 5 percent disturbance cap and allowance for development to occur in PHMA (open for development). As such, Alternative D would provide fewer protective measures to GRSG where range or habitats are coincident with PHMA. This is fewer than Alternatives B and C, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce the area open to livestock or feral horse grazing, nor would it reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D, the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments in PHMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals, habitat quality would improve over the long-term.

Alternative D would be similar to Alternative B but would be slightly more restrictive because GRSG habitat objectives in grazing allotments would be applied to GHMA and not just PHMA. With regard to wild horses and burros, Alternative D would be similar to Alternatives B and C, but it would consider all resource values in conjunction with GRSG for wild horses and burros management.

In summary, when it comes to grazing, Alternative D would have much fewer negative impacts than Alternative A, would be similar to Alternative B, and would not go as far to generally benefit GRSG as Alternative C in respect to potential impacts posed by livestock grazing and feral horses.

7.1.8 Alternative E

(Alternative E2—the Wyoming Governor's Executive Order—applies to those Ashley National Forest lands in Wyoming. It is discussed in seven resource areas below.)

Recreation/ Travel Management

Under this alternative, impacts to nesting and winter habitats would be decreased because routes would be limited in these areas. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Management under Alternative E would include permanent, seasonal, and time-of-day limitations on activities within 1 mile of occupied leks if the activity disrupts GRSG nesting and brood rearing. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Outside of these areas, dispersed recreation and developed recreation sites would have impacts similar to Alternative A.

Fire

Under Alternative E, a statewide fire agency agreement would be created to eliminate jurisdictional boundaries and to allow for immediate response to natural fire in SGMA or core areas. It would allow the use of fire-retardant vegetation to buffer areas of high quality GRSG habitat from catastrophic fire. Prescribed burns would be used with caution in sagebrush habitat. These policies would be more likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatments, compared to Alternative A.

Invasive Plants

Under Alternative E, interagency focus groups would respond to new infestations to control invasive species. Additionally, known infestations in or near sagebrush habitats would be a high priority for containment for all land management agencies. Alternative E's actions would focus invasive species control on GRSG habitat more than Alternative A, but the actual change in the probability of invasive weed establishment would depend on the resources available.

Conifer Encroachment

Under Alternative E, vegetation management programs would include aggressive treatment to remove encroaching conifers and other plant species to expand GRSG habitat or increase the carrying capacity and effectiveness of habitat areas. Because this alternative has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering the probability of pinyon-juniper spread than Alternative A.

Minerals and Energy Development

Selecting alternative E would place a 1-mile NSO restriction around occupied leks for fluid mineral development. This would reduce the likelihood of disturbance from oil and gas development on nesting habitat close to the lek. However, exceptions to this NSO would be granted if the development can be placed out of the line-of-sight of GRSG in the lek.

Generally, Alternative E would not close any lands to mineral material sales or nonenergy mineral leasing; however, it would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and best management practices (BMPs) to minimize disturbance of GRSG.

In areas outside SGMA and in non-core areas, no specific management actions would be taken. Coal leases in SGMA or core areas would be allowed, provided special conditions, conservation measures, and pre-project mitigation requirements were met. Similarly, areas not presently petitioned for withdrawal from locatable mineral entry would remain open, but conservation measures would be applied to claimants. Unleased SGMA and core areas would remain open to oil and gas leasing under NSO buffers (1 mile from leks in SGMA and 0.6 mile in core areas) and CSU and timing stipulations. Existing lease areas would remain under current management.

These policies would reduce the acreage open to energy development without stipulations, compared to Alternative A. However, the changes compared to existing policy are minor; thus, Alternative E would not be likely to substantially reduce the threat of energy development on GRSG in the planning area.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. Under Alternative E1, SGMA would be avoidance areas for new ROWs, and under Alternative E2 new ROWs would be excluded in core areas. No specific management actions are provided for areas outside SGMA, though non-core areas would be avoidance. The acreage limited to existing routes would be greatly increased over Alternative A, and the acres open to ORVs would decrease compared to Alternative A. These policies would provide limited measures to protect habitat in SGMA and core areas from ROW and road construction and would reduce impacts compared to Alternative A.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs. Existing grazing operations would use rangeland BMPs to increase the necessary vegetation to improve nesting success and population recruitment. To limit impacts on nesting and lekking areas, the intensity and timing of grazing in sagebrush habitats would be controlled. Alternative E makes limited provisions for reducing impacts of livestock grazing on GRSG; however, does not provide a mechanism to reduce grazing intensity in AMPs to achieve proper use grazing, relative to increasing GRSG habitat effectiveness.

7.1.9 The Proposed Plan

Recreation/Travel Management

Under The Proposed Plan, the impacts of most suggested management actions would be similar to Alternative B and D in relation to recreational activities. In PHMA, only allow special recreation permits (SRPs) that have neutral or beneficial effects to GRSG and their habitat. Existing SRPs would be evaluated for adverse effects to GRSG and their habitat, and subsequently modied or cancelled as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival). In PHMA, discrete anthropogenic disturbances, whether temporary or permanent, would be managed so they cover less than 3 percent of Biologically

Significant Units and proposed project analysis areas. The 3 percent disturbance cap would apply to new roads constructed to access existing ROWs. Routes would be evaluated for seasonal closure to reduce habitat loss and degradation. The overall travel network would be managed to minimize impacts on GRSG. These actions would reduce potential habitat impacts at levels similar to Alternative B and greater than Alternative D.

Fire

Under The Proposed Plan, impacts would be similar to Alternatives B and D; however, The Proposed Plan includes quantifiable treatment objectives designed to meet vegetation objectives; that is, 70 percent of lands capable of producing sagebrush have 10 to 30 percent sagebrush canopy cover. Annual grass and conifer treatment under the Proposed Plan would further reduce the extent of fire. In addition, In PHMA, fuel treatments would be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat. These policies would be likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, they would protect GRSG habitat from fire more than Alternative A.

Invasive Weeds

The Proposed Plan would follow an approach similar to Alternatives C, D, and E, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. This alternativeis similar to Alternatives C, D, and E in that an additional provision would develop and implement methods to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA not found under Alternatives A or B.

Conifer Encroachment

Under the Proposed Plan, vegetation management programs would include treating PHMA facing conifer encroachment. This would be to meet GRSG habitat objectives to reduce conifer encroachment in PHMA. This alternative has decadal targets, based on Vegetation Dynamics Development Tool modeling, for reducing conifer encroachment to protect GRSG habitat. Because of this, it would likely be more effective in lowering pinyon-juniper spread than Alternative A.

Minerals and Energy Development

Under the Proposed Plan, lands in PHMA would be closed to nonenergy leasable mineral new leasing and mineral material sales, similar to Alternative B. New leases next to existing operations would be allowed, but they would be subject to the 3 percent disturbance cap, lek buffers, and Best Management Practices, similar to those under Alternative B. All federal mineral estate in PHMA would be open to oil and gas leasing, subject to NSO stipulations; whereas, under Alternative A, a large amount of acreage would have no stipulations. Conservation measures, including NSO stipulations, would be applied to existing lease areas. Proposed policies set aside only a minor amount of acreage as unsuitable for coal leasing (similar to Alternatives A and D). The Proposed Plan proposes more acres for locatable mineral withdrawal leasing than under Alternatives B or C. However, The Proposed Plan is more similar to Alternative B regarding energy development using stipulations to protect GRSG.

Infrastructure

Under this alternative, ROW development would be managed based on the type of ROW (e.g., major or minor, linear or site) and the ROW locations in the planning area. New major ROWs, leases, and permits (except for roads) would be allowed in PHMA only under the following conditions:

- Where the proposal could demonstrate a net conservation gain to GRSG habitat and application of RDFs
- Where there are other GRSG conservation strategies (e.g., tall structure limitations and buffering from leks) intended to reduce impacts on GRSG habitat

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. Under the Proposed Plan, PHMA within a range of 1.2 to 5 miles of an occupied lek would be exclusion for new elevated infrastructure. Buffer distances would be based on best available science (Manier et al. 2014) and would be calculated in accordance with the Buffer Appendix in the FEIS in the EIS. Buffer distances under Alternative D also would vary by infrastructure type and would range from 1 to 4 miles from occupied leks.

In PHMA, new structural range improvements would be designed to have a neutral impact or would conserve, enhance, or restore GRSG habitat through an improved grazing management system. Policies proposed under the Proposed Plan would protect PHMA from ROW, structures, and road construction, more than Alternative A, by limiting road and ROW construction as well as range management structures in habitat areas. The Proposed Plan is generally the same as Alternative B and would limit the potential for direct habitat loss due to infrastructure better than Alternative D. This is due largely to the 3 percent disturbance cap in PHMA.

Livestock Grazing and Feral Horses

The Proposed Plan would not reduce the number of acres open to livestock or feral horse grazing, nor reduce AUMs. Its impacts would be similar to Alternative D by incorporating GRSG habitat objectives and management considerations into grazing allotments in PHMA. However, incorporating GRSG management considerations for allotments in GRSG habitat would be expedited under this alternative because the agency would prioritize the following:

- The review of grazing permits and leases, in particular to determine if modification is necessary before renewal
- The processing of grazing permits and leases in SFA first, followed by PHMA outside the SFA

Similar to Alternative D, GRSG habitat objectives in grazing allotments would be applied to both GHMA and PHMA. With regard to wild horses and burros, herd management areas (HMAs) in GRSG habitat would be managed in established appropriate management level (AML) ranges to achieve and maintain GRSG habitat objectives. In addition, herd management plans would be amended to incorporate GRSG habitat objectives and management considerations for all HMAs in GRSG habitat, with an emphasis on PHMA.

The Proposed Plan would be similar to Alternatives B and C but would consider all resource values in conjunction with GRSG when managing wild horses and burros (similar to Alternative D). Generally speaking, if GRSG habitat is taken into consideration before applying the management action, then GRSG would likely benefit from that protection or management action. In summary, relative to grazing, this alternative would have much fewer negative impacts than Alternative A, would be similar to Alternatives B and D, and would not go as far to generally benefit GRSG as Alternative C.

Specific Protections for the Anthros Mountain Population

Habitats for the Anthros Mountain population on the Ashley National Forest are considered important in providing connectivity for sage-groue in the northeastern portion of the state. Specific guidance follows to provide conservation guidance to ensure the persistence (viability of this population on the Ashley NF.

GRSG-M-FMUL-ST-076-Standard – Do not consent to new fluid mineral leases in Anthro Mountain.

GRSG-M-FML-ST-082-Standard - Apply the following conditions of approval on existing fluid mineral leases in Anthro Mountain, consistent with valid existing rights.

- Use a phased approach for development in greater sage-grouse habitat.
- No well pads or permanent structures will be permitted within a 0.6 mile buffer of an occupied lek.
- Project-related activities and vehicle access will not be allowed in or through the 0.6 mile lek buffer.
- No project-related vehicles or activities (including routine maintenance, production vehicles, or work-over rigs) will be allowed, from 1 hour before sunset to 2 hours after sunrise within mapped sage-grouse habitat from March 1 to May 31.
- No surface disturbing activities (including construction, drilling, and well-flaring) will be allowed for wells located within mapped greater sage-grouse habitat from March 1 through June 30.
- No well pad construction, road construction, drilling, or work-over rigs will be allowed on ridge tops from November 1 to March 1 within 4 miles of a lek.
- Within mapped greater sage-grouse habitat, disturbance will be limited to an average of one disturbance per square mile (640 acres). Disturbance should be clustered in areas of habitat most distal from leks or areas of habitat least important to sage-grouse.
- Disturbance within the mapped greater sage-grouse habitat on Anthro Mountain will be no more than 3%.
- Within 4 miles of a lek, well pads and roads should avoid openings in the pinyon/juniper tracts. If avoidance of an opening is not possible, then well pads and roads should be located as close to the edge of the opening as possible.
- Noise levels at leks must be limited to no more than 10dB above ambient (not to exceed 20-24 dB), measured at the perimeter of a lek, during the breeding season (March 1 to May 31).

- Low profile tanks will be required for all well pads within mapped greater sage-grouse habitat.
- Raptor perch avoidance devices will be installed on any required tank batteries in greater sage-grouse habitat.
- Closed-loop drilling will be used for wells within greater sage-grouse habitat.
- If a new lek is discovered outside of mapped habitat, contiguous greater sage-grouse habitat within 4 miles of the lek will be mapped. Apply the same protections to the new mapped habitat and the new lek.

Summary

Impacts on GRSG and their habitats from any of the action alternatives would result in an improvement of habitat conditions for sage-grouse and there habitats on NFS lands in Utah. This would be due to a reduction of anthropogenic influences on sagebrush habitats. Overall, the Alternative A (current management) has the highest potential for adverse impacts. Currently Alternative A does not provide adequate regulatory mechanisms or assurances to protect, conserve, or enhance GRSG habitats sufficiently to assure viability of the species on NFS lands. Under Alternative A, the No Action Alternative, incremental, small-scale negative impacts are likely. Conversely, there would likely be beneficial impacts on GRSG by implementing any of the action alternatives.

Although Alternative C takes a more aggressive conservation approach to GRSG-occupied habitat, especially by eliminating grazing (Alternative C1), Alternatives B, D, and the Proposed Plan would also provide greater protections to these habitats. Though Alternative E has protective measures for GRSG, these measures are generally less conservative in terms of the number of acres protected than the other action alternatives. Differences in negative impacts between action alternatives would be negligible, and differences in positive impacts would be difficult to discern at this scale. Alternatives D and and the Proposed Plan provide a more measured approach to impacts by qualifying any potential management action by ensuring it improves conditions for GRSG and their habitats. Additional protections in the proposed plan were also added to mitigate the effects of anthropogenic impacts on the Anthros Mountain population on the Ashley National Forest. This population is deemed important in retaining the connectivity of sage-grouse and there habitats across the landscapes of northeastern Utah.

7.1.10 Cumulative Effects for Greater Sage-grouse

The cumulative effects analysis study area extends beyond the planning area boundary and consists of WAFWA MZs II, III, IV, and VII. The timeframe for this analysis is 10 years. Detailed discussion of cumulative effects methodology, analysis, and conclusions for GRSG by alternative are provided in Chapter 5 of the FEIS, herein incorporated by reference (USDI Bureau of Land Management and USDA Forest Service. 2015. Utah Greater Sage-Grouse, Final Land Use Plan Amendment and Environmental Impact Statement). Conclusions presented in the FEIS are summarized below.

Cumulative Effects Conclusion Summary

Regardless of alternative, amelioration of the major threats in WAFWA MZs II, III, and IV can be greatly enhanced by regulations enforced on state, local, and private lands. Because 51 percent of all designated GRSG habitat in MZ II and 82 percent in MZ III is comprised of BLM

administered and National Forest System lands, the relative ability of BLM and Forest Service actions to reduce the major threats—in terms of acres affected—is equal to or greater than that of tribal, state, and local governments, and private landowners.

Under Alternative A, current management would continue, and there would be less amelioration of major threats in MZs II, III, and IV than under other alternatives.

Implementation of the action alternatives would reduce major threats faced by GRSG in MZs II, III, and IV to varying degrees. Under any alternative, despite BLM, Forest Service, state, and local actions, overall trends toward habitat loss are likely to continue from human disturbance leading to spread of weeds and wildfires, and from ongoing infrastructure, energy, and residential development pressures in GRSG habitat. These threats may lead to continuing decline of GRSG, particularly in smaller and more isolated population areas.

7.2 SAGEBRUSH-ASSOCIATED SPECIES—MAMMALS, BIRDS, AND AMPHIBIANS

Greater Sage-Grouse as an Umbrella Species

GRSG populations require large landscapes and specific habitat conditions at broad scales to meet their seasonal life requisite requirements. Rowland et al. (2006) and Hanser and Knick (2011) provide evidence that GRSG habitats at broad scales have substantial overlap with habitats of other species similarly associated with sagebrush and sagebrush-steppe communities.

The plan amendment is specially designed to provide protections for GRSG and their habitats. Although individual species have specific habitat requirements at finer scales that differentiate their use of habitats, habitat protections for GRSG will benefit other species similarly dependent on these habitats. The structure of this biological evaluation reviews the efficacy for conservation and management actions for GRSG, and then evaluates the adequacy of these protections for other sensitive species, including those associated with sage-brush habitats

Because of the focus on GRSG and their habitats in the EIS, they were singled out and discussed separately above. Pygmy rabbit, Columbian sharp-tailed grouse, boreal toad, and Columbia spotted frog were grouped together for this analysis as they can occupy sagebrush habitats or habitats in broader sagebrush communities, such as aquatic systems. Though each of the species may not be completely dependent on sagebrush for every life history stage, for the sake of this analysis, they are grouped in this category and are called SAS. The reason for this was based on the potential impacts, the programmatic nature of the conservation measures, and landscape scale that is being analyzed. In addition, because the project is meant to amend forest plans to include regulatory mechanisms and conservation measures to protect sagebrush habitats for GRSG, the impacts would generally be similar for these species where habitat overlaps.

Pygmy rabbit (*Brachylagus idahoensis*)

Distribution—Pygmy rabbits occur in sagebrush systems in the primarily northwestern United States. The pygmy rabbit's historical range is portions of Washington, Oregon, Idaho, Montana, Wyoming, California, Nevada, and Utah. The species can be found in northern, western, and central Utah, where it prefers areas with tall dense sagebrush and loose soils (Green and Flinders 1980).

Habitat associations and threats—Pygmy rabbits are typically found in areas that include tall, dense stands of sagebrush (*Artemisia* spp.), and are highly dependent on sagebrush to provide both food and shelter throughout the year. During the winter the rabbits' diet consists of up to 99

percent sagebrush. In the summer and spring, their diet becomes more varied, including more grass and new foliage. The pygmy rabbit digs its own burrows, which are typically found in deep, loose soils. However, pygmy rabbits occasionally use burrows abandoned by other species and, as a result, may occur in areas of shallower or more compact soils that support sufficient shrub cover. Pygmy rabbits are active throughout the year and are most often aboveground near dawn and dusk. Inactive periods are spent in underground burrows. The species breeds during the spring and early summer, and females may produce a litter of approximately six young about thirty days after mating. Pygmy rabbits primarily eat sagebrush but also consume other vegetation. As its name implies, the pygmy rabbit is the smallest of all rabbits in in North America (Green and Flinders 1980). Loss of sagebrush that pygmy rabbits depend on for food and shelter is the main reason for the decline of its populations. Much sagebrush has been burned or converted to agriculture, and sagebrush is often cleared from large areas and replaced with exotic bunch grasses to improve livestock forage. Wildfires and invasive plants also threaten the rabbits' habitat (Larrucea 2007).

For the sagebrush associated species analysis, the pygmy rabbit has some of the most strict habitat associations and therefore acts as an umbrella species for the other species in this analysis. Affects to this species would be common to all.

Columbia sharp-tailed grouse (*Tympanuchus phasianus columbianus*)

Distribution—This subspecies presently occurs in British Columbia, Washington, Idaho, Montana, Utah, Wyoming, and Colorado; it has been extirpated from Oregon, California, and Nevada (Giesen and Connelly 1993). In Utah, sharp-tailed grouse ranged through central Utah to Piute County historically, but they are now limited to a remnant population in eastern Box Elder, Cache, and Morgan Counties (UDWR 2015).

Habitat associations and threats—Vegetative communities associated with historical and current distributions of Columbian sharp-tailed grouse are sagebrush steppe, mountain mahogany-oak scrub, fescue-wheatgrass, and wheatgrass-bluegrass, as well as riparian and mountain shrub communities containing deciduous shrubs, particularly serviceberry, snowberry, common chokecherry, and Gambel oak (Giesen and Connelly 1993).

Primary factors implicated in the decline of Columbian sharp-tailed grouse are the conversion of native rangelands to cropland, excessive livestock grazing, herbicide treatments, tree removal in riparian zones, conifer invasion, and urban development. Increasing human activities in the species' historic range is likely to continue habitat loss through additional excessive grazing, rangeland conversion to cropland, mineral exploitation, and residential development expansion and its associated recreation areas (summarized in Giesen and Connelly 1993).

Boreal toad (*Anaxyrus boreas boreas*)

Distribution—Boreal toads inhabit western Canada and much of the western (especially northwestern) United States. It is known to occur on National Forest System lands throughout most of Utah and is suspected to occur in additional areas. The overall range of the toad has contracted slightly, but its distribution in that range has been greatly reduced in the Intermountain Region, geographically isolating some populations, thereby causing them to be more susceptible to local extirpation (Rodriguez 2012).

Habitat associations and threats—The western toad, which is inactive during the winter, may either dig its own burrow in loose soil or use the burrows of other small animals. Adults feed on numerous types of small invertebrates, such as ants, beetles, and grasshoppers, whereas tadpoles

filter algae from the water or feed on detritus. Adults are dusky gray or greenish, with considerable dark blotching on the back and belly, and can usually be identified by a light-colored stripe along the back. The breeding season of the western boreal toad varies, depending on geographic location. Boreal toads are associated with a variety of habitats, including wetlands, forests, woodlands, sagebrush, meadows, and floodplains in the mountains and valleys. Usually they inhabit wetlands near ponds, lakes, reservoirs, rivers and streams. They require three main habitat components: shallow wetlands for breeding, terrestrial habitats with vegetative cover for foraging, and burrows for winter hibernation (Loeffler 2001). Boreal toads have a low reproductive output.

Threats to boreal toads chytrid fungus *(Batrachochytrium dendrobatidis)*, wetlands acidification, ozone layer thinning, timber harvesting that causes sedimentation, livestock grazing in and around riparian areas, pesticides and herbicides, and introduced species that prey on toads, create competition for resources, and are vectors for pathogens. Any activity that alters mountain wetland habitats can affect boreal toad populations.

Columbia spotted frog (*Rana luteiventris*)

Distribution—The Columbia spotted frog ranges from southeast Alaska through Alberta, Canada, and into Washington, Idaho, Wyoming, Montana, and disjunct areas of Nevada and Utah. In Utah, isolated Columbia spotted frog populations exist in the West Desert and along the Wasatch Front. Unfortunately, habitat degradation and loss have led to declines in many of these populations, especially those along the Wasatch Front, precipitating the inclusion of the species on the Utah Sensitive Species List. With a goal of recovering the Columbia spotted frog, several government agencies are cooperating under a conservation agreement to eliminate or significantly reduce the threats facing the species (Biotics Database 2005).

Habitat associations and threats—The Columbia spotted frog breeds as early in the spring as winter thaw allows, with eggs hatching in 3 to 21 days, depending on temperature. The species seems to prefer isolated springs and seeps that have a permanent water source, although individuals are known to move overland in spring and summer after breeding. During winter, spotted frogs burrow in the mud and become inactive. Adult frogs eat a wide variety of food items, ranging from insects to snails, whereas tadpoles eat algae, plants, and small aquatic organisms. The dorsal (back) coloration of the spotted frog ranges from light brown to gray, with varying degrees of spotting. Ventral (belly) coloration ranges from red to yellow (Biotics Database 2005). Threats are habitat loss and fragmentation, fish stocking in fishless ponds that are critical to frog reproduction, diseases transmitted by humans, livestock, and wildlife, and water quality degradation from pesticides, acid rain, fertilizers, and other chemicals (Smith and Keinath 2007).

7.2.1 Alternative A—No Action

Recreation/Travel Management

Alternative A would maintain current land management, and few Forests have specific conservation parameters in their land use plans for SAS. Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the Forests relative to sagebrush. This alternative has the highest potential to impact SAS due to the lack of restrictions on activities that cause these impacts; therefore, all direct and indirect impacts on the species and their habitats would likely cause current trends to continue.

Fire

Sagebrush is killed by wildfires and recovery requires many years, especially in the case of large fires. Contiguous old-growth sagebrush sites are at high fire risk, as are large contiguous blocks of dead sagebrush. Pygmy rabbits prefer sagebrush sites with high cover, around 21 percent to 36 percent (Lee et al. 2010). Before recovery, these sites are of limited use to SAS, except along the edges and in unburned islands. As a result of this loss of habitat, fire has been identified as a primary factor associated with SAS population declines. Depending on the species and the size of a burn, a return to a full pre-burn community cover can take 13 to 100 years (Connelly et al. 2004).

Cheatgrass readily invades sagebrush communities, especially in drier, lower elevation areas, and disturbed sites after wildfire (Balch et al. 2013). Cheatgrass changes historical fire patterns by providing an abundant, continuous, and easily ignitable fuel source that facilitates rapid fire spread. While most sagebrush subspecies are killed by fire and are slow to reestablish, cheatgrass recovers within one to two years of a fire via seed in the soil.

Forest Service management to prevent or control wildfires can also affect SAS and habitat. Increased human activity and noise associated with fire suppression and prescribed fire in areas occupied by SAS could affect reproduction, hiding, or foraging behavior. Important habitats could be altered because of the use of heavy equipment, hand tools, and noise. In addition, suppression may initially result in higher rates of pinyon-juniper encroachment in some areas; in the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory.

Existing forest plans typically do not include specific management decisions for fuels treatments in sagebrush habitat. In general, both prescribed fire and non-fire fuels treatments are allowed, and fire suppression is prioritized to protect human life and specific resource values at risk. These policies would not avoid the use of prescribed fire in sagebrush habitat nor prioritize protection of sagebrush; thus, loss of habitat to wildfire and prescribed fire would continue.

Alternative A would have the fewest restrictions for fuels management actions and has a high potential for vegetation disturbance. As this alternative does not prioritize fire operations beyond what has already been determined in the fire management plans for the area, potential impacts are removing or degrading habitat, disrupting reproduction, changing species movement patterns due to areas devoid of vegetation, ultimately reducing habitat quality and quantity and negatively impacting SAS populations.

Invasive Weeds

Invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology and may cause declines in native plant populations, including sagebrush habitat, through such mechanisms as competitive exclusion and niche displacement. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that SAS use for food and cover. Invasive plant communities do not provide suitable SAS habitat, since the species in some way depend on sagebrush and a variety of native forbs and very often the insects associated with them. Pygmy rabbits depend on sagebrush, which they eat year-round and use nearly exclusively throughout the winter for food and cover (Keinath and McGee 2004).

Along with competitively excluding vegetation essential to SAS, invasive plants fragment SAS habitat or reduce habitat quality. Under current management (Alternative A), the Forest Service uses mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. Under Alternative A, the Forest Service would

continue to control noxious weeds and invasive species using integrated weed management actions, in cooperation with state and federal agencies, affected counties, and adjoining private landowners. There are no specific objectives in forest plans to focus these efforts on cheatgrass or sagebrush communities. These actions would benefit SAS habitat and other vegetation types but would not specifically prioritize management of these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach onto sagebrush ecosystems, which reduces and may eventually virtually eliminate SAS occupancy in these areas. Pinyon-juniper invasion continually reduces shrub cover and shortens the season of available succulent forbs by depleting soil moisture (Crawford et al. 2004, p. 8). In higher elevation areas, Douglas-fir may also encroach onto mountain big sagebrush communities. The Forest Service manages pinyon-juniper encroachment, especially in previously treated areas, using mechanical and chemical control, hand-cutting, and prescribed burning, to reduce conifer encroachment onto sagebrush ecosystems.

Alternative A does not take any specific actions to prevent conifer encroachment, but many forest plans contain objectives for maintaining, improving, or restoring sagebrush plant communities often for big game winter range and livestock grazing. These approaches do not specifically address the threat of conifer encroachment to benefit SAS and thus would likely have limited effectiveness in limiting its spread.

Minerals and Energy Development

Energy development can result in direct habitat loss or degradation of important habitats by roads, pipelines, and power lines, and increase noise and direct human disturbance. The impacts of energy development often add to the impacts from other human development and may result in SAS population declines.

Nonrenewable (oil and gas) energy development impacts SAS and sagebrush habitats directly through disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors; it impacts SAS and their habitat indirectly from noise, gaseous emissions, changes in water availability and quality, and human presence. The interaction and intensity of impacts could cumulatively or individually lead to habitat loss and fragmentation in the long term (Connelly et al. 2004, 19 p. 41; Holloran and Anderson 2005, pp. 57-60). Recent work from developed natural gas fields in Wyoming (Gilbert and Chalfoun 2011) documents 10 to 20 percent declines in the abundance of the sagebrush obligates, sage sparrow and Brewer‘s sparrow.

Renewable energy facilities, including solar and wind power, typically require many of the same features for construction and operation as do nonrenewable energy resources. Therefore, impacts from direct habitat loss and habitat fragmentation through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development (USFWS 2010, pp. 13951-2).

Surface and subsurface mining for such mineral resources as coal, uranium, copper, and phosphate results in direct loss of habitat if it occurs in sagebrush habitats. Surface mining usually has a greater impact than subsurface activity. Habitat loss from mining can be exacerbated by storing overburden in undisturbed habitat. If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, railroad tracks, and power lines. SAS could be directly affected by trampling or vehicle collision and indirectly from an increase in

human disturbance, ground shock, noise, dust, reduced air and water quality, and changes in vegetation and topography (Wilson 2010, Lee et al. 2010).

Industrial activity associated with surface mine and infrastructure development could result in noise and human activity that disrupt the habitat and life cycle of SAS. Under this alternative, a small percentage of PHMA would be closed to nonenergy leasable mineral leasing, with almost all designated habitats open to leasing (including new lease expansion) with no cap. As such, Alternative A would cause the greatest amount of direct and indirect habitat loss or degradation, for SAS. There would likely also be greater negative impacts from noise, increased presence of roads and humans, and anthropogenic structures in an otherwise open landscape. Impacts from energy development on water quality and availability are especially important to sensitive amphibians, and some negative impacts are expected from Alternative A.

Infrastructure

Human disturbance is increased over the short term during infrastructure construction; in the long term, increased threats from predators perching on infrastructure may cause declines in SAS. Power lines are linear and often extend for many miles. Thus, ground disturbance associated with power line construction, as well as vehicle and human presence during maintenance, may introduce or spread invasive weeds over large areas, thereby degrading habitat.

Cellular and other communications towers could destroy SAS by inducing them to move away to avoid tall structures or electromagnetic radiation, or by providing perches for corvids and raptors (Connelly et al. 2004, p. 7). Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats.

Other impacts are facilitating predator movements, spreading invasive plants, and increasing human disturbance from noise and traffic (Forman and Alexander 1998, pp. 207-231). Closing and reclaiming unused, minimally used, and unnecessary roads in and around sagebrush habitats during seasonal use by SAS may reduce habitat loss (NTT 2011, p. 11).

Railroads have the same potential impacts on SAS as roads because they create linear corridors in sagebrush habitats, promoting habitat degradation and other disturbance. In addition, fence poles create predator perch sites and, potentially, predator corridors along fences (particularly if a road is nearby). Fences and their associated roads may allow for invasive weeds to invade or spread along the fencing corridor. Furthermore, fences may effectively fragment habitat, as SAS may avoid habitat around the fences to escape predation (Braun 1998, p.145).

Cross-country motorized recreation, even in winter, is very disturbing and destructive to SAS and would continue under Alternative A. Also, there would be no changes to the current approach to exchange, acquire, or dispose of lands or to permit ROWs on Forest Service-administered lands; all these lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation, which may result in SAS habitat lossor degradation. Indirect impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most project proponents would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on SAS.

Livestock Grazing and Feral Horses

Livestock grazing may have both beneficial and detrimental impacts on sagebrush habitats, depending on site-specific management (USFWS 2010, p. 13998). Rangelands meeting forest plan standards may also provide effective wildlife habitat. However, grazing at inappropriate intensity, season, or location may degrade sagebrush ecosystems over the long term. It could change plant communities and soils, leading to loss of vegetative cover and plant litter, increased erosion, decreased water quality, and reduced overall habitat quality for wildlife, especially SAS (Knick and Hanser 2011; Connelly et al. 2004). The reduction of grass heights from grazing could reduce the suitability of cover and habitat availability by increasing exposure to predators. Livestock may also occasionally trample SAS (Coates 2007, pp. 28, 33) or disturb reproduction.

At the planning level, the Forest Service can decide whether areas would be open or closed to livestock grazing. Future impacts would be eliminated in areas closed to grazing, but past impacts would likely persist, and closing grazing may result in other harmful impacts, such as fuel buildup. At the implementation level, the Forest Service can consider changing grazing practices or systems, which could reduce grazing intensity or change the season of use, for example. In addition, changes in grazing management in riparian and wet meadows can reduce impacts in these important seasonal habitats and benefit sensitive amphibians.

Under Alternative A, the Forest Service would continue to make GRSG habitat available for livestock grazing. Active AUMs for livestock grazing would be 329,521 on BLM-administered lands and 265,373 on Forest Service-administered lands, though the number of AUMs on a permit may be adjusted during permit renewals, AMP development, or other appropriate administrative activity. Wild horse and burro AUMs would also remain at current levels.

These policies may degrade SAS habitat if current grazing practices are not meeting forest plan proper use parameters. Under Alternative A, there would be no change in the numbers, timing, or method of livestock grazing in the Forest. Other potential impacts on SAS habitat could be overgrazing; cover, structure, and diversity of vegetation reduction due to consumption; and meadow/wetland/spring/stream degradation; these habitats are crucial for amphibians.

7.2.2 Alternative B

Recreation/Travel Management

Under Alternative B there would be limited opportunities for road construction in PHMA, with minimum standards applied and no current roads upgraded. In addition, recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG and no cross-country travel would be permitted in PHMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influences to sagebrush habitats and SAS by minimizing human use and road construction and upgrading. There would be negative impacts on SAS by displacing development and activities outside of PHMA by GHMA to other areas in the sagebrush ecosystem occupied by pygmy rabbits and sensitive amphibians.

Fire

Fire is among the greatest threats to sagebrush in Utah, especially to old growth sagebrush. Under Alternative B, fuels treatments in PHMA would be designed and implemented to emphasize protection of sagebrush ecosystems. Fuels management programs would consider GRSG habitat needs, and fire suppression would prioritize habitat protection after life and property. These policies would likely reduce the acres of sagebrush burned in wildfires or lost during fuels

treatment programs. As such, Alternative B's policies would protect SAS and habitat more than Alternative A. Sagebrush communities outside of GRSG habitat would likely not see the protection afforded to PHMA and GHMA and impacts on it would negatively impact pygmy rabbits and amphibians.

Invasive Weeds

Alternative B would likely protect more acres of sagebrush from invasive weeds because of the greater emphasis placed on sagebrush reestablishment than Alternative A, but focusing again only on GRSG habitat. However, the actual change in the probability of invasive weed establishment would depend on the resources available. Controlling noxious and invasive plants would benefit SAS in general.

Conifer Encroachment

Under Alternative B, invasive vegetation would be monitored and controlled in fuels treatment areas and in relation to PHMA. More emphasis on conserving sagebrush ecosystems than those described under Alternative A would generally benefit SAS.

Minerals and Energy Development

Under Alternative B, lands in PHMA would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting existing mine expansion. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A; also, the policies would reduce the acreage affected by energy development in the planning area compared to Alternative A, by limiting the impacts of energy development, including disturbance and habitat degradation. This alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass many acres of SAS habitat. Though this alternative may push energy and mineral development to less desirable sagebrush or non-GRSG habitat, there may be negative impacts of not protecting all SAS habitat.

Infrastructure

Under Alternative B, PHMA would be exclusion areas for new ROWs, and the acreage excluded from ROW construction would be greatly increased over Alternative A. These policies would protect PHMA from ROW and road construction more than Alternative A. PHMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new ROW projects. This benefits SAS where habitat with GRSG overlaps, but it may increase negative impacts outside of GRSG habitat in other sagebrush communities suitable for or occupied by SAS.

Livestock Grazing and Feral Horses

Alternative B would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs per se; however, in PHMA, the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments through AMPs or permit renewals. Alternative B would adjust grazing direction in GRSG PHMA. This accounts for less than 10 percent of the land cover of the National Forests in Utah. The potential impacts due to livestock grazing, vegetation disturbance, and range improvements would be the same under Alternative B as it would be under Alternative A, except that it would provide a few more restrictions to protect some SAS habitat. Though this would occur at a very small scale, some impacts on local

populations would likely prove beneficial, especially where water quality and springs and wetlands were improved for amphibians.

7.2.3 Alternative C

Recreation/Travel Management

Impacts would be similar to those described under B except in PHMA camping and other non-motorized recreation would be prohibited during certain seasons within 4 miles of a lek. In addition, there would be no new route construction within 4 miles of a lek, thereby reducing disturbance to SAS within these areas in comparison to alternatives A and B.

Fire

Alternative C would follow the same policies as Alternative B, with the additional provision that livestock would be excluded from habitat areas post-fire to allow for recovery. As with Alternative B, these policies would prioritize sagebrush preservation more than current management under Alternative A and thus would conserve more SAS habitat. Alternative C would have the most protective measures for SAS.

Invasive Weeds

Alternative C would follow the same approach as Alternative A and B, using integrated vegetation management to control, suppress, and eradicate noxious and invasive plants. As under Alternative B, vegetation management would prioritize sagebrush reestablishment and noxious weed control. In addition, Alternative C would develop methods for prioritizing and restoring sagebrush steppe invaded or even once reseeded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A and would be generally beneficial to SAS.

Conifer Encroachment

Impacts from conifer encroachment under Alternative C would be the same as those described under Alternative B, but with emphasis on a wider range of GRSG habitats focusing on sagebrush communities in general and benefiting SAS, more than Alternative A and more similar to Alternative D.

Minerals and Energy Development

Under Alternative C, lands in all GRSG-occupied habitat would be closed to nonenergy leasable mineral leasing and to mineral material sales, including not permitting mine expansion. This action would greatly reduce the acreage open to mineral leasing. Under Alternative C, proposed policy changes would be the same as those described for Alternative B; however, they would have greater impacts because they would be applied to all occupied habitat. Lands in PH and GH would also be defined as unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Unleased areas would be closed to fluid mineral leasing, greatly increasing the extent of habitat protected from energy development. Conservation measures, including NSO stipulations, would be applied to existing lease areas. These policies would substantially reduce the available acreage for energy development, which would limit impacts, such as disturbance and habitat degradation. Under Alternative C, impacts would be similar to those described under Alternative B, except they would be more restrictive, increasing

habitat effectiveness for SAS, except outside GRSG habitat where impacts are the same as Alternative A.

Infrastructure

Under Alternative C, all occupied GRSG habitat would be exclusion areas for new ROWs; the acreage excluded from ROW construction would be greatly increased over Alternative A. These policies would protect SAS habitat from ROW and road construction more than Alternatives A, B, D, or E. Limiting infrastructure construction would reduce the risks posed by roads and transmission lines as well as degradation of habitat.

Livestock Grazing and Feral Horses

Alternative C1

Under Alternative C1, livestock grazing would be closed in GRSG habitat. This change would avoid direct impacts of grazing, such as herbaceous cover loss, erosion, and diminished water quality. However, removing livestock grazing may eventually lead to increased fuel loading in the way of fine flashy dry vegetation in late summer. Wild ungulates and wild horses would still be using these areas and their use may also increase as available forage increases. Completely removing livestock grazing could improve sagebrush habitat quality initially and help to restore important wetland and adjacent riparian habitats that support SAS, especially amphibians.

Alternative C2

Alternative C2 would reduce acres open to livestock grazing and limit AUMs in allotments that overlap GRSG habitats. This alternative would also reduce wild horse AUMs by 25 percent. These policy changes would reduce the direct impacts of grazing from Alternative A, while maintaining the vegetation diversity and fuels reduction promoted by livestock grazing. Not exceeding proper use grazing levels, according to forest plan standards, would be more easily attainable if proposed grazing reductions were followed. Wild ungulates would still be using these areas, which could also increase as available forage increases. The reduction of livestock and feral horse grazing could improve sagebrush habitat quality and help to restore important wetland and adjacent riparian habitats that support SAS. There would be few if any negative impacts on SAS under Alternative C with respect to range resources. Additionally, under this alternative, only those habitat treatments would be allowed that benefit GRSG. Therefore, Alternative C would have the fewest negative impacts and the most positive impacts on SAS.

7.2.4 Alternative D

Recreation/Travel Management

Under Alternative D, the impacts of most suggested management actions would be similar to Alternative B; the exception would be more flexibility or discretion given to the land management agency for site-specific analysis. This would allow for example, route construction in PHMA, road improvements, and special use permits issued if it is determined that these actions would not adversely affect GRSG. Under this alternative if populations and habitats are healthy or improving, it could permit disturbance above the 5 percent cap of disturbance for the Utah management zone. Impacts of this alternative include continued disturbance of some SAS habitat that does not overlap GRSG and some disruption of normal life history behaviors if disturbance were permitted in PHMA/GHMA.

Fire

Alternative D's impacts would be similar to Alternative B. In addition, fuel breaks would be constructed to protect large blocks of sagebrush habitat. Fuels management programs would include GRSG habitat needs, and grazing management would be considered as a tool to reduce fuel loading. These policies would be likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs. As such, they would protect GRSG habitat from fire more than Alternative A. This alternative would be more protective than Alternative A but less protective than Alternatives B and C for SAS.

Invasive Weeds

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. In addition, as under Alternative C, Alternative D would develop methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. These policies would place greater emphasis on sagebrush reestablishment than Alternative A.

Conifer Encroachment

Under Alternative D, vegetation management programs would include treating PHMA facing conifer encroachment in order to meet GRSG habitat objectives to reduce conifer encroachment in PHMA. Because this alternative has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering pinyon-juniper spread than Alternative A and would likely generally benefit SAS.

Minerals and Energy Development

Under Alternative D, lands in PHMA would be closed to nonenergy leasable mineral new leasing and mineral material sales, including not permitting mines to expand. This action would greatly reduce the acreage open to mineral leasing, compared to Alternative A. Unleased areas in PHMA and GHMA would be open to fluid mineral leasing, but all acres would require NSO or CSU stipulations, where, under Alternative A, over 1 million acres have no stipulations. Conservation measures, including NSO stipulations, would be applied to existing lease areas. However, Alternative D is more similar to Alternative B regarding energy development, using stipulations to protect GRSG compared to Alternative A; as a result, impacts on GRSG from energy development as described under Alternative A would be reduced. Under this alternative, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks similar to Alternative B. However with some mineral development, this alternative would allow up to 5 percent disturbance in any Utah management zone. Impacts would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance is increased from 3 percent to 5 percent. However the potential for this difference to have negative impacts on SAS is minimal. Therefore impacts would be most similar to those described under Alternative B, including displacing energy and minerals development to SAS habitats that do not overlap GRSG.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation and habitat degradation. Under Alternative D, PHMA within 4 miles of an occupied lek would be exclusion for most types of new ROWs. These proposed policies would protect PHMA from ROW and road construction more than Alternative A by limiting it in

habitat areas. Although Alternative D would provide less protection to PHMA from ROW construction, it would restrict development more than Alternative A, while allowing for increased management flexibility to improve the effectiveness of protection measures. Alternative D is generally the same as Alternative B, except that the potential for direct habitat loss and indirect impacts would be greater compared with both Alternatives B and C. This is due largely to the 5 percent disturbance cap and allowance for development to occur in PHMA (open for development). As such, Alternative D would provide fewer protective measures than Alternatives B and C to SAS where range and habitats are coincident with PHMA, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D the Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments in PHMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals, habitat quality would improve over the long term. Alternative D would be similar to Alternative B but would be slightly more restrictive; this is because GRSG habitat objectives in grazing allotments would be applied to occupied habitat not just PHMA. This alternative would have much fewer negative impacts than Alternative A but slightly more than Alternative C on SAS. Generally speaking, if GRSG habitat were taken into consideration before the management action, then SAS would likely benefit from that protection or management action, though some additional SAS habitat is still at risk because it is outside of GRSG habitat.

7.2.5 Alternative E

Alternative E2—the Wyoming Governor's Executive Order. Where noted, E2 applies to those Ashley National Forest lands in Wyoming and is discussed in seven resource areas below.

Recreation/Travel Management

Under this alternative, impacts to SAS within GRSG nesting and winter habitats would be decreased because routes would be limited in these areas. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Management under Alternative E would include permanent, seasonal, and time-of-day limitations on activities within 1 mile of occupied leks if the activity disrupts GRSG nesting and brood rearing. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access in those areas, but would occur across a smaller area than under Alternatives B or D. Outside of these areas, dispersed recreation and developed recreation sites would have impacts to SAS similar to Alternative A.

Fire

Under Alternative E, a statewide fire agency agreement would be created to eliminate jurisdictional boundaries and allow for immediate response to natural fire in SGMA and core areas. It would allow the use of fire-retardant vegetation to buffer areas of high quality GRSG

habitat from catastrophic fire. Prescribed burns would be used with caution in sagebrush habitat. These policies would be more likely to reduce the acres of sagebrush burned in wildfires or lost during fuels treatment programs, compared to Alternative A, and generally would benefit SAS.

Invasive Weeds

Under Alternative E, interagency focus groups—likely according to respective GRSG population areas—would respond to new infestations to control invasive species. Additionally, containment of known infestations in or near sagebrush habitats would be a high priority for all land management agencies. These actions would focus invasive species control on GRSG habitat more than Alternative A, and impacts would be generally positive for SAS.

Conifer Encroachment

Under Alternative E, vegetation management programs would include aggressive treatment to remove encroaching conifers and other plant species. This would expand GRSG habitat or increase the carrying capacity and effectiveness of habitat areas. Because Alternative E has a specific goal of reducing conifer encroachment to protect GRSG habitat, it would likely be more effective in lowering the probability of pinyon-juniper spread than Alternative A and generally would be beneficial to SAS.

Minerals and Energy Development

Selection of Alternative E would place a 1-mile NSO restriction around occupied GRSG leks for fluid mineral development. This would reduce disturbance from oil and gas development on nesting habitat close to the lek. However, exceptions to this NSO would be granted if the developments can be placed out of the line-of-sight of GRSG in the lek. Alternative E would not close any lands to mineral material sales or nonenergy mineral leasing; however, it would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and BMPs to minimize disturbing GRSG.

In habitat outside SGMA no specific management actions would be taken. Coal leases in SGMA would be allowed, provided special conditions, conservation measures, and pre-project mitigation requirements were met. Similarly, areas not presently petitioned for withdrawal from locatable mineral entry would remain open, but conservation measures would be applied to claimants. Unleased areas in SGMA and core areas would remain open to oil and gas leasing under NSO buffers (1 mile from leks in SGMA and 0.6 mile in core areas) and stipulations for CSU and timing. Existing lease areas would remain under current management. These policies would reduce the acreage open to energy development without stipulations compared to Alternative A. Alternative E would provide some protection to SAS where the species are coincident with GRSG, but impacts would be similar to Alternative A overall.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as predation, collision, and habitat degradation. Under Alternative E1, SGMA would be avoidance for new ROWs; under Alternative E2 new ROWs would be excluded in core areas. No specific management actions are provided for areas outside SGMA, though non-core areas would be avoidance areas. These proposed policies provide limited measures to protect habitat in SGMA and core areas from ROW and road construction. They would reduce impacts compared to Alternative A on SAS only where the species are coincident with SGMA.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor would it reduce AUMs. Rangeland BMPs would be used on existing grazing operations to increase the necessary vegetation to improve nesting success and population recruitment for GRSG. To limit impacts on nesting and lekking areas, the intensity and timing of grazing in sagebrush habitats would be controlled. Alternative E may improve SAS habitat quality on grazing lands over the long-term through use of BMPs, but it does not go as far to protect and enhance habitat for SAS as the other action alternatives.

7.2.6 The Proposed Plan

Recreation/Travel Management

Under The Proposed Plan, the impacts to SAS of most suggested management actions would be similar to Alternative B and D in relation to recreational activities. In PHMA, only allow special recreation permits (SRPs) that have neutral or beneficial effects to GRSG and their habitat. Existing SRPs would be evaluated for adverse effects to GRSG and their habitat, and subsequently modied or cancelled as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival). In PHMA, discrete anthropogenic disturbances, whether temporary or permanent, would be managed so they cover less than 3 percent of Biologically Significant Units and proposed project analysis areas. The 3 percent disturbance cap would apply to new roads constructed to access existing ROWs. Routes would be evaluated for seasonal closure to reduce habitat loss and degradation. The overall travel network would be managed to minimize impacts on GRSG. The impacts of this alternative are continued disturbance of some SAS habitat that does not overlap GRSG, along with some disruption of normal life history behaviors if disturbance were permitted in PHMA or GHMA.

Fire

The Proposed Plan is similar to Alternative B, but design criteria for fire and fuels activities would apply to GHMA in addition to PHMA. Due to the greater area of applicability, benefits would be greater overall to SAS, where populations and habitats overlap with GRSG habitats. Implementing the criteria would reduce but not eliminate direct and indirect impacts on SAS habitats, other fire-prone vegetation communities, or areas targeted for fuel treatments. Impacts would likely be less than Alternatives A and B because of fewer acres burned.

For Columbian sharp-tailed grouse, fewer acres burned would have mixed outcomes because fire has been reported to both improve and to damage sharp-tailed grouse habitat. Some vegetation components, such as deciduous shrubs, can recover quickly when burned, while sagebrush takes much longer. Sharp-tailed grouse will use cleared areas surrounded by dense brush, while other burned areas may receive less use. Sharp-tailed grouse may benefit from using burned areas that were previously thick stands of sagebrush, whereas fire in lek sites may cause them to be abandoned, or the grouse may return to previously abandoned sites (summarized in Greer 2010). Pertaining to fire, management actions and related impacts under The Proposed Plan would be similar to those described under Alternative B and D, but it has the addition of more specific objectives for GRSG habitat and refined protocols for developing site-specific management.

Invasive Weeds

The Proposed Plan would follow a similar approach as Alternatives C, D, and E, using integrated vegetation management and prioritizing sagebrush reestablishment and noxious and invasive weed control. The Proposed Plan is similar to Alternatives C, D, and E in that an additional provision would be developed and methods implemented to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA, not found under Alternatives A or B.

Conifer Encroachment

Unlike Alternatives A, B, and C but similar to Alternative D, the Proposed Plan includes provisions that would specify the extent of conifer encroachment to maintain and expand GRSG habitat by decade. The long-term impact is likely beneficial where SAS habitats overlap with GRSG habitats, due to increased grass, forb, and shrub availability.

Minerals and Energy Development

Under The Proposed Plan, lands in PHMA would be closed to new leasing of mineral material sales. New coal and fluid mineral leases would be allowed, but a NSO stipulation would apply in PHMA. Conservation measures to reduce or mitigate impacts on GRSG habitat in PHMA would apply to existing leases. This would considerably reduce new ground disturbances associated with surface mining and other surface mineral extractions, compared to Alternative A. Ground disturbances under this alternative would be less but would not eliminate direct and indirect impacts on SAS because of past and ongoing disturbances. The 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts, as compared to Alternatives A and D.

Similar to Alternative D, the Proposed Plan incorporates specific conservation measures or stipulations to minerals and energy extraction to mitigate impacts and protect habitat in both PHMA and GHMA. Under the Proposed Plan, impacts on SAS would be similar to, but more protective than, those described for Alternative A.

Infrastructure

As described above for GRSG, PHMA would be managed as avoidance areas for new ROWs, unless the proposal could demonstrate a net conservation gain to GRSG habitat and includes application of RDFs and other GRSG conservation strategies (e.g., tall structure limitations and lek buffers) to reduce impacts on GRSG habitat. Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision, and habitat degradation. This would provide long-term benefits to Columbian sharp-tailed grouse and pygmy rabbit where their habitats overlap with GRSG habitat. Under the Proposed Plan, PHMA within a range of 1.2 to 5 miles of an occupied lek would be exclusion for new elevated infrastructure, with buffers varying by infrastructure type. Buffer distances are based on best available science (Manier et al. 2014) and would be calculated in accordance with the Buffer Appencix in the FEIS. Buffer distances under Alternative D also vary by infrastructure type and range from 1 to 4 miles from occupied leks.

The Proposed Plan would reduce impacts of infrastructure on SAS in buffered areas, but it may shift those impacts to habitats outside buffered areas. In PHMA, new structural range improvements would be designed to have a neutral impact or to conserve, enhance, or restore GRSG habitat through an improved grazing management system. Policies proposed under this

alternative would protect PHMA from ROWs, structures, and road construction more than Alternative A, by limiting road and ROW construction and range management structures in habitat areas. The Proposed Plan is generally the same as Alternative B. It would limit the potential for direct habitat loss due to infrastructure better than Alternative D. This would be largely due to the 3 percent disturbance cap in PHMA, thereby reducing impacts on SAS where habitats overlap with GRSG habitats.

Livestock Grazing and Feral Horses

Similar to Alternatives A, B, D, and E, the Proposed Plan would maintain AUMs under current management; however, it would provide direction to modify grazing management in order to meet PHMA objectives and would maintain, enhance, or improve desired GRSG habitat. Units would be modified through the permit renewal process or other appropriate actions. The Proposed Plan would also make SFA a priority for evaluating permit renewals. In addition, this alternative includes restrictions on new permanent livestock facilities, fences, sheep bedding and camps within 1.2 miles of active/occupied leks.

In PHMA, impacts on SAS under the Proposed Plan would be similar to Alternatives B and D. By comparison, this would likely reduce the impacts of grazing on SAS that would occur under Alternative A. This is because of the provisions designed to protect or enhance GRSG habitat. However, the Proposed Plan does not reduce impacts of grazing to the extent provided under Alternative C, which proposes to substantially reduce livestock grazing in GRSG habitat.

Under this alternative, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A, except when the plants are in proximity to occupied leks. Here, additional restrictions or mitigations would apply for new permanent livestock facilities, fences, sheep bedding, and camps within 1.2 miles of any occupied leks.

Summary

Impacts on SAS and their habitats due to any of the action alternatives would be generally beneficial due to reduced anthropogenic influences on sagebrush habitats that overlap GRSG. Overall, the highest potential for negative impacts would be from Alternative A; however, the riparian protection measures in the various forest plans should provide adequate protection for those species that depend on aquatic/riparian habitats. That said, Alternative A does not have the regulatory mechanisms or assurances specific to GRSG habitats to the extent desired. Under the No Action Alternative (A), incremental, small-scale negative impacts are more likely. Conversely, there would likely be beneficial impacts on SAS as a result of implementing any of the action alternatives, but only in areas classified as GRSG habitat. Although Alternative C takes a more aggressive blanket approach to GRSG occupied habitat, especially by eliminating grazing, Alternatives B and D would also provide greater protections to SAS habitats than would Alternative A. Though Alternative E has protective measures for GRSG, they are generally less conservative in terms of acres protected than other action alternatives. There would be negative impacts on SAS from the action alternatives as anthropogenic activities are displaced from GRSG habitat onto other areas of the Forest, especially other areas of the sagebrush ecosystem. Strategies that maintain large contiguous stands of old growth sagebrush with 24 to 36 percent canopy cover would benefit pygmy rabbits the most; strategies that maintain high water quality and protect wetlands, streams, and springs from impacts would benefit amphibians the most. Differences in negative impacts between action alternatives would be negligible, and likewise, differences in positive impacts would be difficult to discern at this scale.

7.2.7 Cumulative Effects for Sagebrush-Associated Species

Detailed discussion of cumulative effects methodology, analysis, and conclusions for species other than GRSG, including *Other Special Status Species* and *Fish and Wildlife* in general are provided in Chapter 5 of the FEIS, herein incorporated by reference (USDI Bureau of Land Management and USDA Forest Service. 2015. Utah Greater Sage-Grouse, Final Land Use Plan Amendment and Environmental Impact Statement). Conclusions presented in the FEIS are summarized below.

Cumulative Effects Conclusion Summary

Many past and present actions and conditions within the cumulative impact analysis area have affected and will likely continue to affect other species. Reasonably foreseeable future actions that may affect other special status species include noxious weed treatments, conifer encroachment control efforts, and sagebrush habitat restoration projects. State and local efforts to protect GRSG include habitat improvement projects on state and private lands. These improvement efforts would expand the extent and increase the quality of habitat for many fish and wildlife species that inhabit sagebrush ecosystems; however, these gains would be supplanted, at least in part, by impacts resulting from energy development, especially oil and gas development in the Uintah and Carbon population areas. Additionally, future actions including transmission line construction and mineral development are expected to reduce available habitat for fish and wildlife species.

Management under Alternative A would have the greatest cumulative impacts on other species. Management under the action alternatives would include limitations on surface disturbing activities, such as ROW and mineral development, therefore reducing the potential for long-term cumulative impacts on species' habitats. Such activities would likely be pushed to nonfederal lands or to federal lands outside of mapped occupied GRSG habitat, which would incur some level of disturbance and loss of other special status species' habitat in those areas.

7.3 PLANTS

Aquarius paintbrush *(Castilleja aquariensis)*

Aquarius paintbrush is a perennial herb that occurs in dry open meadows, silver and high-elevation sagebrush/forb communities, interspersed with spruce/aspen forests. Elevations for the species range between 9,150 and 11,300 feet. Aquarius paintbrush is endemic to the upper elevations of the Aquarius Plateau and Boulder Mountain of south-central Utah, with known populations in Garfield and Wayne Counties.

The number of occurrences is unknown but is believed to be less than 40, with a total population estimated at about 45,000 individual plants. Most populations of the species are found on Forest Service-administered lands. The population trend typically fluctuates but appears to be stable to downward. Aquarius paintbrush is ranked imperiled in Utah (G2S2). Grazing livestock, especially sheep, is the most imminent threat to the species. Where cattle graze, Aquarius paintbrush populations have also shown decline. Other threats or cumulative actions are site-specific disturbance from road construction and maintenance, ORV use, noxious weed invasion, and insect infestations.

Logan buckwheat *(Eriogonum loganum)*

Logan buckwheat is a perennial herb that occurs in sagebrush/bunchgrass and rocky outcrop communities of northern Utah (Cache, Morgan, Rich Counties) and extreme southern Idaho (Franklin County). It is found at elevations ranging from roughly 4,800 to 6,700 feet. The plant is endemic to Utah and Idaho. The number of occurrences, population size, and trend are unknown. The species is ranked as imperiled in Utah (G2S2). Threats or other cumulative actions are noxious weeds and possible highway expansion in a known population site (NatureServe 2013).

Stemless beardtongue *(Penstemon acaulis)*

Stemless beardtongue is a diminutive, mat-forming, long-lived perennial herb. It occurs in mixed desert shrub, black and Wyoming big sagebrush (rarely in well-developed communities of Wyoming big sagebrush), and pinyon-juniper. The plant is found in greater abundance and vigor in disturbed areas, such as seldom used roadways, abandoned gravel quarries, and road cuts, and is less common in native shrub communities. Elevations for the plant range between 5,500 and 8,200 feet; it is endemic to Utah and Wyoming but most occurrences and populations are found in Utah. Population trend is relatively unknown but appears stable.

About 25 occurrences of stemless beardtongue are documented. The species is ranked imperiled (G2), and is considered critically imperiled in Utah and Wyoming (S1). Total population is estimated in the hundreds of thousands of individuals (Jouseau 2012). Threats or other cumulative actions are gravel quarrying; road construction, maintenance, and use; recreation in and around Flaming Gorge Reservoir; buildings; ORVs; collections for horticulture, and livestock trampling. Due to its diminutive form, domestic and wild ungulate foraging is not considered a threat (Goodrich 2007; Jouseau 2012).

Little penstemon (P. parvus*)*

Little penstemon is a perennial herb that occurs in dry open meadows, silver and high-elevation black sagebrush communities on tertiary volcanic gravels or rocks. Elevations for the species range between 8,200 and 11,500 feet. Little penstemon is endemic to south-central Utah with known populations in Garfield, Piute, Sevier, and Wayne Counties.

Between 6 and 20 occurrences of the species are known, with populations often described as frequent to common. Little penstemon is ranked imperiled in Utah (G2S2), and the Population estimates and trend are unknown. Threats or other cumulative actions are excessive livestock grazing, roads, recreation, and potential reclamation projects that have not been specified.

Arizona willow (Salix arizonica*)*

Arizona willow is a shrub that typically grows in wet sub-alpine meadows, along low gradient stream banks, and in wet areas of seeps and springs. The shrub is typically associated with a sub-alpine coniferous forest matrix but may grow in wet areas next to high elevation sagebrush communities. Elevations for the species range between 8,300 and 11,600 feet. It is known to occur in on the high plateaus of south-central Utah but also in New Mexico, Arizona, and Colorado.

Arizona willow is ranked globally imperiled (G2). It is ranked imperiled in Utah and Arizona (S2) and is ranked critically imperiled in New Mexico and Colorado (S1). Between 60 and 100 occurrences of the willow have been documented in four states, with most on Forest Service-administered lands. Total population size is estimated between 22,000 and 55,000 individuals,

with the largest populations occurring in Utah. The larger Utah populations are considered stable, though many smaller populations in Utah and other states show decline. The primary threats are browsing by wild and domestic ungulates (primarily elk and cattle) and hydrologic changes (diversions and impoundments; Decker 2006; Maschinski 2001). Other threats or cumulative actions are timber harvesting, road construction, recreation, disease, and possibly climate change.

Uinta greenthread *(Thelesperma pubescens)*

Uinta greenthread is a perennial herb that occurs on sparsely vegetated ridge crests consisting of grasses, cushion plants, and scattered sagebrush. Its habitat is often situated above communities of mountain mahogany and sagebrush. It grows in shallow gravelly or cobbled soils of the Bishop Conglomerate Formation. Elevations for the species range between 8,000 and 9,000 feet. It is a narrow endemic in the vicinity of Hickey Mountain, near the toe of the north slope of the Uinta Mountains. The species occurs in Wyoming and possibly in Utah.

There are four known occurrences of Uinta greenthread in Wyoming and none in Utah. The estimated population of the species is around 200,000 plants, and the population trend is stable. Uinta greenthread is ranked globally imperiled (G2) and is critically imperiled in Wyoming and Utah (S1). Threats or other cumulative actions are road construction or expansion, oil and gas exploration, timber harvest, all-terrain vehicle use, noxious weeds, and expansion of an existing radio tower.

7.3.1 Alternative A—No Action

Under Alternative A, current management actions in both PHMA and GHMA would remain constant; conditions and trends for sensitive plants and their habitat would remain unchanged. Direct impacts on sensitive plants are grazing and trampling; indirect impacts are ground disturbances in all forms and origins and the spread of invasive species (these impacts are listed in the species information paragraphs above). The direct, indirect, and cumulative effects for Alternative A are further discussed under the seven disturbance headings below.

Recreation/Travel Management

Alternative A would maintain current land management; however, few Forests have specific conservation parameters in land use plans for sagebrush habitats.

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the Forest relative to sensitive plants associated with sagebrush habitats. There would be minimal seasonal restrictions on casual use, and some of the areas in GRSG habitat would remain open to cross country travel, especially in winter. Aquarius paintbrush, little penstemon and Arizona willow occur in high elevation habitats, but only Arizona willow may be damaged from over-snow vehicle use because its branches may be exposed above the snow or close enough to the snow surface to be susceptible to breakage by snowmobiles.

The sensitive plant species in this analysis are endemics with relatively small populations and limited distributions. Under Alternative A, some current and foreseeable actions may lead to undesirable impacts at a smaller scale for some sensitive species. For example, stemless beardtongue populations and habitat were lost during the filling of Flaming Gorge Reservoir, and possible threats include gravel quarrying and recreation facility construction or expansion (Jouseau 2012). Uinta greenthread has a very small distribution but may be impacted by road construction and all-terrain vehicle use. Road construction or maintenance and recreation

activities are also identified as threats to Aquarius paintbrush, Logan buckwheat, little penstemon and Arizona willow. Indirectly, roads and recreational activities are often correlated with the spread of noxious weed species and other nonnative invasive plants, and all of these sensitive plants could be negatively impacted increased weed infestations. This alternative has the highest potential to impact sensitive plants due to the lack of restrictions on activities that cause these effects.

Direct and indirect effects to all six sensitive plants from travel management and recreational uses would result in continued trends, which are currently unknown, stable, or declining.

Fire

Under Alternative A, national forests would continue to implement policies and guidelines that manage both wild and prescribed fires. Prescribed fire, and in some cases, wildland fire have been specifically used to manipulate or alter selected habitat or vegetation communities for various reasons, but land use plans neither specify the use of fire to enhance nor the suppression of fire to protect sensitive species habitat.

Impacts of fire vary by plant species and its habitat. Habitats for stemless beardtongue and Uinta greenthread rarely carry fire and have fire intervals that span decades. On the other hand, fire is relatively common in montane or high-elevation sagebrush. Fire intervals for these communities typically range between 20 and 45 years. Most perennial forbs in higher elevation sagebrush communities demonstrate at least a temporary benefit following fire because they grow in a fire-dependent system.

Little penstemon, Aquarius paintbrush, and Logan buckwheat grow in montane or high-elevation sagebrush. Tait (2013)[3] reported little penstemon growing in burned habitat following fire, but no data exists to determine decline or increase in populations following that event. Decker (2006) predicted that small populations of Arizona willow may be affected by a catastrophic fire. She reasoned that since willow habitat is found in spruce/fir forests that have increased fuel loading due to historic fire suppression, a catastrophic fire, although rare, could increase erosion and sedimentation that would affect the hydrology of Arizona willow habitat. The impact of fire on Arizona willow is unknown since no events have been observed or documented.

In conclusion, the direct and indirect impacts of fire on sensitive plants and their habitat would likely cause current trends to remain constant. However, since the impacts of fire on sensitive plants under evaluation are not well understood, except for assumptions made on known fire interval ranges in known plant habitats, fire is not fully evaluated as a cumulative effect.

Spread of Weeds

The establishment and spread of invasive plant species on Forest Service-administered lands in Utah is ongoing. Noxious weed data from National Forests indicate that most new infestations are located along roads and trails and at campsites and sites for recreation, energy exploration, and mineral extraction. These sites are accessible by motor vehicles and are most frequented by

[3]D. Tait, Botanist, Fishlake National Forest. Richfield, Utah. Personal communication. Bruce Davidson, USFS Botanist, Enterprise TEAMS Unit. April 10, 2013.

humans. In some cases, fire and other land disturbances may facilitate the establishment and spread of noxious weeds.

The number and magnitude of these cumulative effects correlate closely with the establishment and spread of noxious weeds. Invasive species are capable of altering vegetation composition, structure, and productivity; fire frequency; and hydrologic function. National Forest land use plans provide an integrated approach with other public and private entities in treating and controlling noxious weeds on Forest Service-administered lands.

Under Alternative A, the rate of occurrences and spread of noxious weeds and the level and intensity of noxious weed treatment and control would not change. Integrated weed programs focus on treatment, control, and if possible, eradication of new and existing weed sites. Although these actions are not specific in protecting sensitive plant habitat, they may indiscriminately benefit sensitive plant species.

Three sensitive plant species under evaluation may be affected by the establishment and spread of invasive weeds. Uinta greenthread habitat is susceptible to cheatgrass invasion, especially populations along road ROWs (Heidel 2004). Heidel also noted the potential establishment of other invasive plants in its habitat from ground disturbances of ancillary developments associated with oil and gas exploration, such as pipelines and well pads.

Although not documented or specified, noxious weed invasion is listed as a potential threat for Logan buckwheat and Aquarius paintbrush (NatureServe 2013). Under Alternative A, cheatgrass invasion may impact populations of Uinta greenthread. New road construction and energy development in its habitat may lead to additional weed invasions. This may impact individual plants and populations, but it would not likely result in a loss of viability nor cause a trend toward federal listing. Other sensitive species under evaluation are not impacted by invasive weeds, and population trends would likely remain stable under this alternative.

Conifer Encroachment

Conifer encroachment into sagebrush ecosystems is common and widespread in the Intermountain West. Pinyon and juniper trees are known to encroach on sagebrush types in their thermal zones. Common sagebrush types are Wyoming sagebrush, black sagebrush, and occasionally mountain big sagebrush. Douglas-fir trees are known to encroach into high elevation sagebrush types. Unchecked by fire, conifers are capable of displacing shrubs and associated forbs and graminoids. Conifer encroachment in sagebrush and other shrub types could likely lead to the loss of individuals or populations of sensitive plants found in these affected shrub types.

National Forests have implemented and continue to implement vegetation treatments that curtail conifer encroachment into vegetation communities, including sagebrush. Treatments include prescribed fire, lop-and-scatter, and mechanical methods. These actions often coincide with Forest Service land use plans, which contain objectives to maintain, restore, or improve sagebrush and other valued plant communities. However, land use plans do not contain specific direction to control or limit conifer encroachment in sensitive plant habitat associated with sagebrush or other vulnerable vegetation communities. Under Alternative A, sensitive plant species and their habitat would not likely benefit from actions that curtail conifer encroachment, except from coincidental indiscriminate actions. There are no known impacts of conifer encroachment into habitat of sensitive plants under evaluation; therefore, conifer encroachment is not considered a cumulative effect.

Minerals and Energy

Ground disturbances from mineral and energy development, in all its forms, can result in loss and fragmentation of sensitive plant species habitat. Under Alternative A, most acres identified in the analysis areas are open to fluid mineral and nonenergy solid minerals leasing and development; however, approximately 138,500 acres are closed to fluid mineral leasing and nonenergy solid leasable minerals, 22,900 acres are classified as unsuitable for surface mining, 73,500 acres are closed to mineral materials disposal, and 498,700 acres are proposed for withdrawal from locatable mineral entry. Sensitive plants found in mineral and energy closure areas would not be affected under this alternative. Sensitive plant individuals and populations in open, leased, or unleased areas may be affected under Alternative A.

Two sensitive plant species under evaluation have mineral and energy extraction and exploration as a threat. Populations of Uinta greenthread are threatened by land disturbances associated with oil and gas exploration (Heidel 2004). Jouseau (2012) identified gravel quarrying as a threat to some populations of stemless beardtongue, but Goodrich (2013) documented the high capability of the plant to colonize in great abundance in old gravel quarries, in two-track roads, and on road cuts. Expansion of oil and gas exploration in Uinta greenthread habitat, coupled with potential new road construction, potential timber harvesting, and cheatgrass establishment and spread may impact individual plants and possibly populations. Mineral and energy extraction are not considered threats to the other sensitive species under evaluation. Population trends of these species would likely remain stable under this alternative.

Infrastructure

Roads, power lines, and other utility corridors and fences, buildings, and other man-made structures can contribute to the loss of individuals and populations and may fragment sensitive plant habitat. Under Alternative A, relatively few acres (approximately 94,800) in the analysis areas are excluded from new ROWs or are identified as avoidance areas. Sensitive plants found in ROW exclusion or avoidance areas would not likely be affected under this alternative. Sensitive plant individuals and populations in areas open to new ROWs may be affected under Alternative A. Roads are listed as a threat to all sensitive species under evaluation and may lead to a loss of individual plants. But this would not likely result in a loss of viability nor cause a trend toward federal listing. Other types of infrastructure may impact individuals or populations under evaluation and are found to be cumulative; these are the construction or expansion of communication towers, pipelines, and recreation buildings.

Livestock Grazing and Feral Horses

Livestock grazing under Alternative A would continue, with no expected change in AUMs, season of use, or other terms, conditions, or directives delineated in grazing permits or AMPs; however, administrative actions may occur on a case-by-case basis to attain desired rangeland conditions. These are usually incorporated into most land use plans, which also contain standards and guidelines designed to maintain healthy, sustainable rangeland resources and to restore degraded rangelands.

Impacts of livestock grazing on sensitive plants under evaluation are trampling and herbivory. These impacts can physically damage individuals, populations, and the habitat where they grow. Trampling and grazing can reduce plant growth, development, and sexual reproduction and can destroy individual plants. Impacts may lead to population decline of some sensitive plants.

The impacts of grazing and trampling on individuals, populations, and habitat quality depend on the palatability of the species, grazing and trampling tolerance, grazing intensity, and ungulate forage preferences.

Arizona willow is a palatable shrub and grows in meadows preferred and frequented by large ungulates. Maschinski (2001) found that wild and domestic browsing "significantly reduced above-ground biomass, height, survival, and sexual reproduction" of Arizona willow in Arizona, Utah, and New Mexico. Decker (2006) stated that with increasing elk numbers, coupled with sustained livestock use, overall grazing by ungulates may impact individuals and populations of Arizona willow. In areas where elk concentration is high, willow plants were found to be shorter and to have less in canopy cover. Decker concluded that the combined impact of domestic livestock and wildlife grazing on Arizona willow may be "beyond [the species] presumed tolerance."

The primary threat to Aquarius paintbrush is livestock grazing. Sheep and cattle grazing are known to extensively impact individuals and populations of the plant. On sheep allotments where Aquarius paintbrush is found and is browsed, it has been virtually eliminated (NatureServe 2013).

Heidel (2004) found that although intensive livestock grazing was originally identified as a threat to Uinta greenthread, it was inconclusive whether livestock or wildlife actually use the plant. Goodrich (2006) reported no evidence of grazing by sheep or cattle on Uinta greenthread. Little penstemon is known to grow in areas that have a history of intensive grazing. The impacts of grazing may likely impact individuals and populations of the plant, but population trend data is not known for this species. The impacts of grazing on Logan buckwheat is unknown and has not been listed as a threat.

Trampling is recognized as a threat to individuals and populations of some sensitive species. Although stemless beardtongue shows no evidence of being grazed by ungulates, negative impacts from trampling was observed, especially where cattle congregate (Jouseau 2012). Decker (2006) noted that trampling by large ungulates negatively impacted individual shrubs by inhibiting their growth and reproduction.

Under Alternative A, the impacts of grazing on Arizona willow, Aquarius paintbrush, little penstemon, and stemless beardtongue are considered cumulative. Grazing and trampling may continue to impact individual plants and populations of sensitive plants, especially Arizona willow and Aquarius paintbrush. Trends of sensitive plant populations under evaluation are expected to remain unchanged under this alternative.

Since there are no wild horse or burro management areas in PHMA on Forest Service-administered lands, Alternatives A, B, C, D, E, and F would not apply to feral horses.

7.3.2 Alternative B

Alternative B would place a 3 percent threshold on anthropogenic disturbance in PHMA, which would include all past, present, and future disturbances. The 3 percent threshold would reduce but not eliminate the potential for direct and indirect impacts described under Alternative A. Cumulative effects for Alternative B would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A because of the 3 percent threshold in PHMA. In GHMA, activities would continue under current management. Sensitive plants in GHMA would likely experience direct, indirect, and cumulative effects similar to those described for Alternative A. Direct, indirect, and cumulative effects for Alternative B are further discussed under the seven headings below.

Recreation/Travel Management
Under this alternative there would be limited opportunities for road construction and improvement in PHMA, with minimum standards applied and no upgrading of current roads. GHMA would be designated as per the travel management plan in the current planning document. The habitat disturbance limitation of 3 percent would apply for new roads associated with valid existing rights. Routes would be evaluated for seasonal closure to reduce functional loss of sagebrush habitat and habitat degradation from routes in important habitats. In addition, recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. No cross-country vehicle use would be permitted in PHMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influences on sagebrush habitats by minimizing human use and road construction and upgrading.

The 3 percent threshold on anthropogenic disturbance found under Alternative B would reduce but not eliminate the potential direct and indirect impacts from travel management and recreational uses described under Alternative A. Conservation actions associated with this alternative could lessen impacts on sensitive plant individuals and populations that occur in PHMA. In GHMA, direct, indirect, and cumulative effects on sensitive plants would be similar under Alternatives A and B.

Fire

Under Alternative B, fuel treatments would use design criteria that would best protect existing sagebrush ecosystems found in PHMA. Fewer fuel treatments would occur or less GRSG habitat would be burned under Alternative B than Alternative A because of the new criteria. None of the design criteria are specific to sensitive plant species. Implementing the criteria would likely reduce but not eliminate direct and indirect effects on sensitive plants growing in sagebrush and other vegetation communities prone to burning or targeted for fuel treatments; however, impacts would likely be less than under Alternative A because of fewer acres burned.

Direct and indirect impacts on sensitive plant species found in GHMA would be similar to those described under Alternative A. In PHMA and GHMA, cumulative effects under Alternative B would be similar to those under Alternative A because fire and fuel treatments are not identified as anthropogenic disturbances and are not subject to the 3 percent threshold.

Spread of Weeds

The establishment and spread of invasive weeds would likely be reduced because of the 3 percent disturbance threshold described under Alternative B; however, the direct, indirect, and cumulative effects on sensitive plants would likely be similar to those described under Alternatives A because of existing anthropogenic disturbance and weed establishment. Also, integrated weed management actions to control noxious weeds described under Alternative A are the same for Alternative B.

Conifer Encroachment

The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar under Alternatives A and B.

Minerals and Energy

In PHMA, lands not leased for either fluid minerals or nonenergy solid minerals would be closed from leasing under Alternative B. The number of acres found unsuitable for surface mining

would be significantly higher under Alternative B than under Alternative A. Also, locatable mineral recommended for withdrawal would be about 86 percent more under Alternative B than under Alternative A. Overall, these actions would considerably increase the number of acres closed to mineral lease and extraction not found under Alternative A. Ground disturbances associated with mineral extraction would be reduced, which would likely lessen but not eliminate direct, indirect, and cumulative effects on sensitive plant species found in PHMA. The 3 percent threshold on anthropogenic disturbance would likely further reduce potential impacts compared to Alternative A. Disturbance restrictions in this alternative could also benefit sensitive plant individuals and populations.

Under Alternative B, direct, indirect, and cumulative effects on sensitive plants in GHMA would be similar to those described for Alternative A.

Infrastructure

Compared to Alternative A, Alternative B considerably limits infrastructure construction in PHMA. Acres open to new ROWs decreased from 3,219,000 acres under Alternative A to 529,600 acres under Alternative B, an 84 percent reduction. Fewer disturbances associated with new roads and other infrastructure construction would likely reduce but not eliminate impacts on sensitive plants. The 3 percent threshold under Alternative B would further reduce impacts compared to Alternative A. The direct, indirect, and cumulative effects on sensitive plants would likely be less under Alternative B than under Alternative A.

Under Alternative B, direct, indirect, and cumulative effects on sensitive plants in GHMA would be similar to those described for Alternative A.

Livestock Grazing and Feral Horses

Alternative B would be similar to Alternative A in that there would be no change in the number of acres open to livestock grazing or reduction in AUMs. Alternative B; however, would incorporate GRSG habitat objectives and management considerations through permit renewals, AMPs, or annual operating instructions where current grazing management is not meeting GRSG habitat requirements in PHMA. Actions would be developed with specific objectives to conserve, enhance, or restore GRSG habitat and move rangelands in PHMA toward desired condition. Alternative B would likely reduce the direct and indirect impacts of grazing on sensitive plants in PHMA, especially those species that are grazed by livestock, such as Arizona willow or Aquarius paintbrush.

Under Alternative B, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A. Cumulative effects in PHMA and GHMA would likely be similar to Alternatives A.

7.3.3 Alternative C

Under Alternative C, all GRSG habitats would be managed as PHMA. This alternative is similar to Alternative B in that it would place a 3 percent threshold on anthropogenic disturbance in PHMA, which would include existing and all new disturbance to the landscape. Alternative C is different in that it limits surface disturbance to one instance per section and expands the definition of anthropogenic disturbances, which includes livestock grazing. Direct and indirect impacts on sensitive plants would likely be less under Alternative C than under Alternatives A and B due to its expanded definition of disturbance and its more restrictive components. Cumulative effects for Alternative C would be similar to those described for Alternatives A and B, but the magnitude of

cumulative effects would likely be less than the other alternatives because all GRSG habitat is managed as PHMA. Direct, indirect, and cumulative effects for Alternative C are further discussed under the seven headings below.

Recreation/Travel Management

Impacts to sensitive plants would be similar to those described under alternative B except in PHMA camping and other non-motorized recreation would be prohibited during certain seasons within 4 miles of a lek. In addition, there would be no new route construction within 4 miles of a lek. If any populations or habitats for sensitive plants are within 4 miles of a lek, there could be fewer impacts to the plants in comparison to alternatives A and B.

Fire

The fire policies and design criteria described under Alternative B would also be implemented under Alternative C, with an additional provision that would exclude livestock grazing in PHMA burned areas until they recover. Direct and indirect impacts on sensitive species growing in sagebrush and other vegetation communities prone to burning or targeted for fuel treatments would be similar to those described under Alternative B. Cumulative effects would be similar to those described under Alternative A.

Spread of Weeds

The establishment and spread of invasive weeds would likely be reduced because of the 3 percent disturbance threshold that would be applicable in all GRSG potential habitat. On the other hand, the direct, indirect, and cumulative effects on sensitive plants would be similar; however, the impact would be less under Alternatives A, B, and C because of existing anthropogenic disturbance and weed establishment. The integrated vegetation management protocol to control noxious weeds described under Alternative A is the same for Alternative C, with an additional provision that would develop and implement methods to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants.

Conifer Encroachment

The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar under Alternatives A, B, and C.

Minerals and Energy

The policy provisions regarding mineral leasing and extraction under Alternative B would be the same for Alternative C, except the policies are applicable to all GRSG habitat, which would be managed as PHMA under Alternative C. Overall, these actions would considerably increase the number of acres closed to mineral lease and extraction not found under Alternatives A and B. Ground disturbances under this alternative would be less, but would not fully eliminate direct, indirect, and cumulative effects on sensitive plant species because of past disturbances. The 3 percent threshold on new anthropogenic disturbance would contribute to the reduction of potential impacts because it would also include designated GHMA not covered under the disturbance threshold under Alternative B. Disturbance restrictions in this alternative would likely benefit sensitive plant individuals and populations found in GRSG habitat.

Infrastructure

The policy changes regarding ROWs and new infrastructure construction under Alternative B are similar for Alternative C. The exception is the policies are applicable to all GRSG habitat, which is managed as PHMA under Alternative C. Under this alternative, all GRSG habitat would be excluded from new ROWs. Ground disturbances under Alternative C would be less but would not fully eliminate direct, indirect, and cumulative effects on sensitive plant species because of past and ongoing disturbances. The 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found under Alternative A, but it also would expand to designated GHMA recognized but not covered under Alternative B. Disturbance restrictions under this alternative would likely benefit sensitive plant individuals and populations found in GRSG habitat.

Livestock Grazing and Feral Horses

Alternative C was separated into two alternatives in regards to livestock grazing and feral horses. The differences between Alternatives C1 and C2 are discussed below.

Alternative C1

Alternative C1 would exclude all classes of livestock grazing in PHMA, which would result in the reduction of up to 265,373 permitted AUMs on Forest Service-administered lands. Rangelands found in unsatisfactory condition from impacts of grazing could improve under this alternative. In PHMA, all direct and indirect impacts of current and future livestock grazing on sensitive plants would be eliminated, which would likely benefit sensitive plants, especially those species, such as Arizona willow or Aquarius paintbrush, that are grazed by livestock. Alternative C1's past and current impacts are similar for Alternatives A, B, and C2 and would be considered cumulative, but the elimination of livestock grazing would remove it as a future cumulative effect on sensitive plants.

Alternative C2

Under Alternative C2, AUMs would be reduced on livestock grazing allotments in PHMA. This would follow reviews at the Forest level that would modify grazing management to enhance or improve GRSG habitat and accommodate GRSG life cycle requirements. Management actions under this alternative would reduce AUMs from 265,373 under Alternatives A and B to 159,224 AUMs. Alternative C2 would likely reduce but not eliminate the direct and indirect impacts of grazing on sensitive plants in PHMA, especially those, such as Arizona willow or Aquarius paintbrush, that are grazed by livestock. Cumulative effects on PHMA would likely be similar to those described under Alternatives A and B, although the magnitude of those impacts would be less.

7.3.4 Alternative D

Alternative D would place a 5 percent threshold on anthropogenic disturbance in PHMA, which would include all past, present, and future disturbances. Restrictions would be associated with new anthropogenic disturbances that would favor GRSG habitat enhancement and accommodate GRSG life cycle requirements. The 5 percent threshold would reduce but not eliminate the potential direct and indirect impacts described under Alternative A because of past and ongoing disturbances. Cumulative effects for Alternative D would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A because of the 5 percent threshold in PHMA. In GHMA, activities would continue under current

management. Sensitive plants in GHMA would likely experience direct and indirect impacts similar to those described for Alternative A. Direct, indirect, and cumulative effects for Alternative D are further discussed under the seven headings below.

Recreation/Travel Management

Impacts from recreational permits would be the same as those described for Alternative B because recreation permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. Impacts from other types of recreation, including recreation at developed recreation sites and dispersed recreation would be the same as those described under Alternative A.

Under this alternative, travel would be limited to existing or designated routes within all PHMA. PHMAs that currently do not have designated routes would be designated in a travel management plan as limited to existing routes. In those areas managed as limited to existing routes, impacts on travel and transportation management under Alternative D would be the same as Alternative B. It is possible that fewer new road constructions would be allowed due to the 5 percent threshold on anthropogenic disturbance compared to Alternative A, but perhaps not as much as Alternative B which has a 3 percent threshold. Conservation actions associated with this alternative could lessen impacts on sensitive plant individuals and populations that occur in PHMA. In GHMA, direct, indirect, and cumulative effects on sensitive plants would be similar to Alternative A.

Fire

Alternative D is similar to Alternative B, but it would also include fuel breaks to protect large areas of PHMA. It would implement fuels management policies in PHMA that would protect GRSG habitat, would accommodate GRSG life cycle needs, and would consider livestock grazing as a tool to reduce fuel loading. Because of the new criteria, fewer fuels treatments would occur in PHMA and less GRSG habitat would be burned under Alternative D than under Alternative A. None of the design criteria of this alternative are specific to sensitive plant species. The implementation of the criteria would reduce but not eliminate direct and indirect impacts on sensitive plant species growing in sagebrush or other vegetation communities prone to burning or targeted for fuel treatments. However, the impacts would likely be less than under Alternatives A and B because of fewer acres burned.

Direct and indirect impacts on sensitive plant species found in GHMA would be similar to those described under Alternatives A and B. In PHMA and GHMA, cumulative effects under Alternative D would be similar to those under Alternatives A and B because fire and fuel treatments are not identified as anthropogenic disturbances and are not subject to the 5 percent threshold.

Spread of Weeds

The direct, indirect, and cumulative effects on sensitive plants would be similar under Alternatives A, B, C, and D. The integrated vegetation management protocol to control noxious weeds described under Alternative A is the same for Alternative D. Alternative D is similar to Alternative C in that an additional provision would be developed. It would implement methods to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA not found under Alternatives A or B. The additional provision could lessen impacts on sensitive plants.

Conifer Encroachment

Unlike Alternatives A, B, and C, Alternative D includes provisions that would specifically target conifer encroachment in PHMA to maintain and expand GRSG habitat. These provisions are not specific for sensitive plants. The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar to Alternative A, except for sensitive plants that are located in PHMA that are specifically targeted with treatments that would maintain or expand GRSG habitat.

Minerals and Energy

Under Alternative D, lands in PHMA would be closed to new leasing of nonenergy leasable minerals and mineral material sales. This would considerably reduce new ground disturbances associated with surface mining and other surface mineral extractions. Coal leases, locatable mineral withdrawals, and areas not leased for fluid mineral leasing would be allowed or would remain open for leasing under this alternative; however, they would require government reviews to determine impacts on PHMA, and conservation measures or stipulations would be implemented to reduce or mitigate impacts.

Similar to Alternative A, Alternative D does not protect PHMA from potential impacts of coal leasing or locatable mineral withdrawals, but it does add restrictions to reduce or mitigate impacts and protect GRSG habitat and life cycle requirements. Under Alternative D, direct and indirect impacts on sensitive plants in PHMA where coal leasing, locatable mineral withdrawals, and fluid mineral leasing occurs would be similar to those described under Alternative A; however, impacts would likely be less due to additional conservation measures and stipulations.

Direct and indirect impacts on sensitive plants would be similar to those under Alternative B in PHMA that would be closed to nonenergy leasable minerals leasing and mineral material sales. Ground disturbances under this alternative would be less but would not eliminate direct and indirect impacts on sensitive plant species because of past and ongoing disturbances. The 5 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found under Alternative A.

Alternative D adds specific conservation measures or stipulations to minerals and energy extraction to mitigate its impacts, to protect GRSG habitat, and to accommodate GRSG life cycle requirements in GHMA. Under Alternative D, direct and indirect cumulative effects on sensitive plants in GHMA would be similar to, but more protective than, those described for Alternative A.

Cumulative effects in PHMA and GHMA would likely be similar to Alternative A.

Infrastructure

Alternative D would include new avoidance and exclusion areas for specific infrastructure types in PHMA. It would include conservation measures or stipulations to reduce or mitigate impacts of new ROWs, to protect PHMA, and to accommodate GRSG life cycle requirements. Overall, Alternative D would protect PHMA from new ROW construction more than Alternative A because the additional conservation measures or stipulations would better protect PHMA and would buffer GRSG life cycles from new ROW impacts. Ground disturbances under Alternative D would be less than Alternative A; however, Alternative D would not eliminate direct, indirect, and cumulative effects on sensitive plant species because of past and ongoing disturbances. The 5 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found under Alternative A.

Livestock Grazing and Feral Horses

Similar to Alternatives A and B, Alternative D would maintain AUMs under current management; however, it would provide direction to modify grazing management in order to meet PHMA objectives and would maintain, enhance, or improve desired GRSG habitat conditions. Modifications would occur at unit level and would be implemented through the permit renewal process or other appropriate actions.

In PHMA, the direct, indirect, and cumulative effects on sensitive plants under Alternative D would be similar to Alternative B. It would likely reduce the impacts of grazing on sensitive plants that would occur under Alternative A because of provisions designed to protect or enhance GRSG habitat.

Under Alternative D, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A. Cumulative effects in PHMA and GHMA would likely be similar to Alternative A, but the magnitude of the impacts could be less in PHMA because of provisions designed to protect or enhance GRSG habitat by improving grazing management.

7.3.5 Alternative E

Alternative E would place a 5 percent threshold on new anthropogenic disturbances in any particular State of Utah GRSG Management Area. Past and current disturbances would not count toward the 5 percent threshold. Conservation measures would be associated with new anthropogenic disturbances that would favor GRSG habitat and accommodate GRSG life cycle requirements. The 5 percent threshold would reduce but not eliminate the potential direct and indirect impacts on sensitive plants described under Alternative A. Additionally, with respect to fluid mineral development, Alternative E would not allow surface occupancy within 1 mile of an occupied lek (if visible to GRSG in the lek) in SGMA. Alternative E would be less protective than Alternatives B, C, and D.

Cumulative effects for Alternative E would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A because of the 5 percent disturbance threshold. Direct, indirect, and cumulative effects for Alternative E are further discussed under the seven headings below.

Recreation/ Travel Management

Similar to Alternative D, the 5 percent threshold on new anthropogenic disturbance could reduce new road construction in comparison with Alternative A, but not as much as Alternative B which has a 3 percent threshold. Under this alternative, impacts to nesting and winter habitats would be decreased because routes would be limited in these areas. Areas of GRSG habitat in SGMAs/core areas with nesting and winter habitat that do not have designated routes in a Travel Management Plan would be designated as limited to existing routes. This would reduce cross-country access and resulting impacts to sensitive plants in those areas, but would occur across a smaller area than under Alternatives B or D. Outside of these areas, dispersed recreation and developed recreation sites would have impacts similar to Alternative A.

Fire

Unique features for fire under Alternative E are implementing a statewide fire agency agreement that would eliminate jurisdictional boundaries, which would enhance the response to unwanted fire ignitions in SGMA and core areas. Another feature is the use of fire-retardant vegetation to

buffer high quality GRSG habitat areas from catastrophic fire. Conservation measures, practices, and oversight would be implemented to protect vulnerable and desirable sagebrush habitat. Policies associated with this alternative would likely reduce the acres of sagebrush burned with wild or prescribed fire. The direct, indirect, and cumulative effects of fire on sensitive plants would likely be less under Alternative E than under Alternative A, especially those species that grow in fire-prone habitat.

Spread of Weeds

Alternative E would implement an aggressive response to new weed infestations in order to curtail or minimize their spread and would require a high priority response to infestations near sagebrush habitats. Unlike Alternative A, the invasive weed policy of Alternative E would focus treatment, control, and eradication on weed infestations that would threaten GRSG habitat. The direct, indirect, and cumulative effects on sensitive plants would likely be similar to those described under other alternatives, although integrated weed management was not discussed under Alternative E.

Conifer Encroachment

Alternative E would implement vegetation management actions that would curtail conifer encroachment to expand, create, or increase the carrying capacity of GRSG habitat. Direct, indirect, and cumulative impacts on sensitive plants from conifer encroachment would be similar to Alternative A. Although these actions are not specific in protecting sensitive plant habitat, they may indiscriminately benefit some sensitive plants.

Minerals and Energy

Alternative E is more protective than Alternative A. This is because there is a 1-mile NSO buffer around leks in SGMA, and the remainder of habitat in SGMA would be subject to CSU and timing stipulations for fluid mineral and nonenergy solid minerals leasing. Alternative E differs from Alternative A by implementing conservation measures, stipulations, and BMPs to limit or mitigate potential impacts to protect GRSG habitat and accommodate their life cycle requirements. Direct, indirect, and cumulative impacts on sensitive plants in SGMA would likely be less than those identified under Alternative A because of the additional provisions that implement conservation measures, stipulations, and BMPs. The 5 percent threshold on new anthropogenic disturbance could contribute to the reduction of impacts on sensitive plants not found under Alternative A.

Since GRSG habitat outside SGMA would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects on sensitive plants under Alternative B would be similar to those described for Alternative A.

Infrastructure

Under Alternative E, habitat in SGMA would be designated as an avoidance area for new ROWs with the exceptions to accommodate some new infrastructure construction. This alternative would implement conservation measures, stipulations, and BMPs designed to limit or mitigate potential impacts on protect GRSG habitat and accommodate GRSG life cycle requirements. Direct, indirect, and cumulative impacts on sensitive plants in SGMA would likely be less than those identified under Alternative A because of additional provisions that implement conservation measures, stipulations, and BMPs. The 5 percent threshold on new anthropogenic disturbance would likely contribute to the reduction of potential impacts not found under Alternative A.

Since GRSG habitat outside SGMA would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects on sensitive plants under Alternative E would be similar to those described for Alternative A.

Livestock Grazing and Feral Horses

Alternative E would continue to accommodate current AUMs for livestock grazing under current management. However, it would emphasize the use of BMPs to improve GRSG habitat and would seek consideration of conservation measures and stipulations designed to enhance or improve GRSG habitat and accommodate their life cycle requirements. Alternative E, also provides a mechanism to enhance or improve GRSG habitat in SGMA impacted by grazing by managing for stable or increasing populations. Direct, indirect, and cumulative impacts on sensitive plants in SGMA may likely be less than those identified under Alternative A because of the emphasis on BMPs, with additional conservation measures and stipulations not included under Alternative A.

Since habitat outside SGMA would not be managed to conserve GRSG, the direct, indirect, and cumulative effects on sensitive plants under Alternative E would be similar to those described for Alternative A.

7.3.6 The Proposed Plan

The Proposed Plan would place a 3 percent threshold on anthropogenic disturbance in PHMA, which would be calculated at two levels—the biologically significant unit and the individual project level. The 3 percent threshold would reduce but not eliminate the potential direct and indirect impacts described under Alternative A. The Proposed Plan is most similar to Alternative B, except that several conservation measures would apply to GHMA as well as PHMA. Travel construction would be limited in PHMA and GHMA. The Forest Service would retain and seek to acquire lands in PHMA and GHMA. Fire and Fuels activities would implement measures to protect GRSG habitat in PHMA and GHMA. Cumulative effects for the Proposed Plan would be similar to those described for Alternative A, but the magnitude of cumulative effects would likely be less than Alternative A, and similar to Alternative B, because of the 3 percent threshold in PHMA. Direct, indirect, and cumulative effects for the Proposed Plan are further discussed under the seven headings below.

Recreation/ Travel Management

The 3 percent threshold on anthropogenic disturbance found under the Proposed Plan would reduce but not eliminate the potential direct and indirect impacts described under Alternative A. Travel construction would be limited in PHMA and GHMA, and would therefore reduce the potential for impacts to sensitive plants and their habitats in a larger area. Due to more conservation measures being applied in GHMA, direct, indirect, and cumulative effects on sensitive plants would be less than those described for Alternatives A and B.

Fire

The Proposed Plan is similar to Alternative B, but design criteria for fire and fuels activities would apply to GHMA in addition to PHMA. Due to the greater area of applicability, benefits to GRSG habitats translate into greater overall benefits to sensitive plant populations and habitats. Implementing the criteria would reduce but not eliminate direct and indirect impacts on sensitive plant species growing in sagebrush or other vegetation communities prone to burning or targeted for fuel treatments. The impacts would likely be less than Alternatives A and B because of fewer

acres burned. For stemless beardtongue, fewer acres burned may not be beneficial because this species seems to prefer areas with past disturbance and is rarely found in well-developed Wyoming big sagebrush communities.

Spread of Weeds

The direct, indirect, and cumulative effects on sensitive plants would be similar under all alternatives. The integrated vegetation management protocol to control noxious weeds described under Alternative A is the same for this alternative. The Proposed Plan is similar to Alternatives C, D, and E in that an additional provision would be developed and methods would be implemented to prioritize and restore sagebrush steppe in PHMA invaded by nonnative plants. This places greater emphasis on habitat restoration in PHMA not found under Alternatives A or B. The additional provision could lessen impacts on sensitive plants.

Conifer Encroachment

Unlike Alternatives A, B, and C but similar to Alternative D, the Proposed Plan includes provisions that would specifically target conifer encroachment to maintain and expand GRSG habitat. These provisions are not specific for sensitive plants. The direct, indirect, and cumulative effects on sensitive plants from conifer encroachment would be similar to Alternative A, except for sensitive plants in targeted treatment areas.

Minerals and Energy

Under the Proposed Plan, lands in PHMA would be closed to new leasing of mineral material sales. New coal and fluid mineral leases would be allowed, but an NSO stipulation would apply in PHMA. Conservation measures to reduce or mitigate impacts on GRSG habitat in PHMA would apply to existing leases. This would considerably reduce new ground disturbances associated with surface mining and other surface mineral extractions compared to Alternative A. Ground disturbances under this alternative would be less but would not eliminate direct and indirect impacts on sensitive plant species because of past and ongoing disturbances. The 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts, as compared to Alternative A.

As with Alternative D, the Proposed Plan adds specific conservation measures or stipulations to minerals and energy extraction to mitigate its impacts, to protect GRSG habitat, and to accommodate their life cycle requirements in GHMA. Under the Proposed Plan, direct and indirect cumulative effects on sensitive plants in GHMA would be similar to but more protective than those described for Alternative A. Cumulative effects on PHMA and GHMA would likely be similar to Alternative A.

Infrastructure

Under this alternative, new travel construction would be limited in PHMA and GHMA, similar to Alternative C in this regard. Alternatives B and D limit new travel construction only in PHMA. PHMA would be established as avoidance areas for linear ROWs, such as transmission lines, under the Proposed Plan. In addition, transmission lines would be excluded within 4 miles of GRSG leks; other surface ROWs would be excluded within 1 mile of GRSG leks.

Overall, ehe Proposed Plan, more than Alternative A, would protect PHMA and areas near GRSG leks from new ROW construction. This is because its additional conservation measures or stipulations would better protect these areas and buffer GRSG life cycles from new ROW

impacts. Ground disturbances under the Proposed Plan would be less than Alternative A, but it would not eliminate direct, indirect, and cumulative effects on sensitive plant species because of past and ongoing disturbances. Similar to Alternative B, the 3 percent threshold on anthropogenic disturbance would contribute to the reduction of potential impacts, as compared to Alternative A.

Livestock Grazing and Feral Horses

Similar to Alternatives A, B, and D, the Proposed Plan would maintain AUMs under current management, but would provide direction to modify grazing management in order to meet PHMA objectives and would maintain, enhance, or improve desired GRSG habitat conditions. Modifications would occur at the unit level and would be implemented through the permit renewal process or other appropriate actions. The Proposed Plan would also make SFA a priority for evaluating permit renewals. In addition, it includes restrictions of new permanent livestock facilities, fences, sheep bedding, and camps within 1.2 miles of occupied leks. In PHMA, the direct, indirect, and cumulative effects on sensitive plants under the Proposed Plan would be similar to Alternative B. It would likely reduce the impacts of grazing on sensitive plants that would occur under Alternative A because of provisions designed to protect or enhance GRSG habitat.

Under the Proposed Plan, direct and indirect impacts on sensitive plants in GHMA would be similar to those described for Alternative A, except where occupied leks are present. In these areas, additional restrictions or mitigations would apply for new permanent livestock facilities, fences, sheep bedding, and camps within 1.2 miles of any occupied leks. Cumulative effects in PHMA and GHMA would likely be similar to Alternative A. However, the magnitude of the impacts could be less in PHMA because of provisions designed to protect or enhance GRSG habitat by improving grazing management.

7.3.7 Cumulative Effects for Sagebrush-Associated Species

Additional discussion of cumulative effects analysis and conclusions for Vegetation (Including Noxious Weeds; Riparian and Wetlands) are provided in Chapter 5 of the FEIS, herein incorporated by reference (USDI Bureau of Land Management and USDA Forest Service. 2015. Utah Greater Sage-Grouse, Final Land Use Plan Amendment and Environmental Impact Statement). Conclusions presented in the FEIS are summarized below.

Cumulative Effects Conclusion Summary

Past, present and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect vegetation are vegetation and habitat management and improvement projects, noxious weed control, wildland fire management, livestock grazing management, wild horse and burro use, energy development, and travel management planning. Invasive plants can alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Travel management planning is a mechanism used to designate and close routes and proactively balance the demands for motorized recreation and access with protection of sensitive resources. By planning at the landscape scale, the BLM and Forest Service would be able to retain large expanses of sagebrush and manage impacts on vegetation from motorized vehicles through route designations and closures.

8. SUMMARY OF IMPACTS

The authors of this biological assessment addressed the potential impacts of each alternative on sensitive species and their habitats that may be present in the analysis area in terms of the following resource areas: recreation/travel management, fire, invasive weeds, conifer encroachment, minerals and energy development, infrastructure, and livestock grazing/feral horses management. The main difference between the Alternative A, the no action alternative, and all of the action alternatives is that the later would put into place regulatory authority and direction to protect and conserve GRSG habitats and reduce the negative impacts of land management in the resource areas above.

Each of the action alternatives, to various degrees, is intended to protect and conserve GRSG individuals and habitat over the no action alternative in the Utah EIS planning area. Likewise, other SAS considered in this biological assessment may experience similar positive impacts related to protecting GRSG habitat, where there is overlap in range. Conversely, some negative impacts on these other species would result from shifting anthropogenic disturbances into other sagebrush communities not associated with GRSG.

Alternative A maintains existing decisions from the land and resource management plans for all Forests in Utah and for all other current management direction, all terrestrial and aquatic wildlife species and plant species. The type and magnitude of impacts on sensitive species would remain unchanged under Alternative A, and each would be treated separately by individual NEPA actions. Since disturbance thresholds, restrictions, directives, BMPs, reductions, and other provisions were built into Alternatives B, C, D, E, and the Proposed Plan to protect GRSG and its habitat, fewer impacts on sensitive species would likely occur and the magnitude of the impacts would likely be lessened.

Table 6 summarizes determinations of effect for Forest Service sensitive species addressed in this analysis.

Table 6 Determination of Impacts Summary

Species	Biological Determination[4]	Alternative	Applicable Fores[5]t
Mammals			
Wolverine *Gulo gulo (luscus)*	No impact	All	ANF, WCNF
Pygmy rabbit *Brachylagus idahoensis*	BI (MIIH)	All action alternatives	All
	MIIH	No action	All
Bighorn sheep *Ovis canadensis*	No impact	All	ANF, FNF, MLNF, UNF, WCNF
Spotted bat *Euderma maculatum*	No impact	All	All
Townsend's western big-eared bat *Corynorhinus townsendii*	No impact	All	All
Fisher *Martes pennanti*	No impact	All	UNF
Gray wolf *Canis lupus*	No impact	All	WCNF
Birds			
Bald eagle *Haliaeetus leucocephalus*	No impact	All	All
Boreal owl *Aegolius funereus*	No impact	All	ANF, WCNF
Flammulated owl *Otus flammeolus*	No impact	All	All
Great gray owl *Strix nebulosa*	No impact	All	ANF, WCNF
Greater sage-grouse *Centrocercus urophasianus*	BI	All action alternatives	All
	MIIH	No action	All
Columbian sharp-tailed grouse *Tympanuchus phasianellus columbianus*	BI (MIIH)	All action alts	WCNF
	MIIH	No action	WCNF
Northern goshawk *Accipiter gentilis*	No impact	All	All

[4]BI = Beneficial impact; MIIH = May impact individuals or habitat, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species; (MIIH) = MIIH for areas outside of GRSG habitat

[5]ANF = Ashley National Forest; DNF = Dixie National Forest; FNF = Fishlake National Forest; MLNF = Manti-La Sal National Forest; UNF = Uinta National Forest; WCNF = Wasatch-Cache National Forest

Species	Biological Determination[4]	Alternative	Applicable Fores[5]t
Peregrine falcon *Falco peregrinus anatum*	No impact	All	All
Three-toed woodpecker *Picoides tridactylus*	No impact	All	All
Amphibians			
Columbia spotted frog *Rana luteiventris*	BI (MIIH)	Action alternatives	ANF, MLNF, UNF, WCNF
	MIIH	No action	ANF, MLNF, UNF, WCNF
Boreal Toad *Anaxyrus boreas boreas*	BI (MIIH)	Action alts	All
	MIIH	No action	All
Fish			
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	No impact	All	All
Colorado River cutthroat trout *O. c. pleuriticus*	No impact	All	All
Southern leatherside chub *Lepidomeda aliciae*	No impact	All	DNF, FNF, MLNF, UNF
Northern leatherside chub *L. copei*	No impact	All	WCNF
Plants			
Aquarius paintbrush *Castilleja aquariensis*	MIIH	All	DNF
Logan buckwheat *Eriogonum loganum*	MIIH	All	WCNF
Stemless beardtongue *Penstemon acaulis*	MIIH	All	ANF
Little penstemon *P. parvus*	MIIH	All	DNF, FNF
Arizona willow *Salix arizonica*	MIIH	All	DNF, FNF, MLNF
Uinta greenthread *Thelesperma pubescens*	MIIH	All	WCNF

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Appendix Q

Livestock Grazing Allotments in Greater Sage-Grouse Occupied Habitat

Table Q.1
BLM Allotments

Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Salt Lake	04044	AJAX	4,392	2,386	2,386	CATTLE	02/01	03/31	ACTIVE	100	160	151
Salt Lake	04001	BEAR LAKE	3,261	1,181	1,181	CATTLE	05/15	09/15	ACTIVE	100	187	188
Salt Lake	04002	BIG CREEK	32,774	21,414	20,484	CATTLE	05/15	09/15	ACTIVE	100		
Salt Lake	04002	BIG CREEK				SHEEP	06/01	07/15	ACTIVE	100		
Salt Lake	04002	BIG CREEK				SHEEP	09/01	11/30	ACTIVE	100	4,138	3,227
Salt Lake	04047	BOULTER WASH	50,853	36,509	25,764	CATTLE	11/16	05/31	ACTIVE	100	2,509	1,616
Salt Lake	04048	BROAD CANYON	11,106	9,272	163	SHEEP	04/20	05/29	ACTIVE	100		
Salt Lake	04048	BROAD CANYON				SHEEP	05/30	06/15	ACTIVE	100	995	614
Salt Lake	05046	BUCKSKIN	9,274	5,315	5,315	CATTLE	11/01	11/30	ACTIVE	100		
Salt Lake	05046	BUCKSKIN				CATTLE	04/01	04/30	ACTIVE	100	511	497
Salt Lake	05018	COTTONWOOD EAST	12,358	3,755	3,755	CATTLE	05/16	10/15	ACTIVE	100	587	496
Salt Lake	05002	COTTONWOOD WEST	10,604	3,329	3,329	CATTLE	05/15	10/15	ACTIVE	100	243	422
Salt Lake	05087	CURLEW JUNCTION	5,961	661	46	CATTLE	05/01	05/31	ACTIVE	100	23	32
Salt Lake	04017	CUTOFF CANYON	2,528	1,987	1,987	CATTLE	05/28	09/15	ACTIVE	100	434	434
Salt Lake	05051	DAIRY VALLEY	27,634	10,096	10,094	CATTLE	05/01	07/31	ACTIVE	100		
Salt Lake	05051	DAIRY VALLEY				CATTLE	04/16	10/31	ACTIVE	100	542	545
Salt Lake	05045	DEATH CREEK	13,116	4,744	4,744	CATTLE	04/16	05/15	ACTIVE	100		
Salt Lake	05045	DEATH CREEK				CATTLE	11/01	11/30	ACTIVE	100	424	411
Salt Lake	05020	DEEP CREEK	44,889	39,960	173	SHEEP	11/01	04/30	ACTIVE	100		
Salt Lake	05020	DEEP CREEK				CATTLE	11/01	04/30	ACTIVE	100	2,047	1,797
Salt Lake	04004	DESERET	49,955	15,918	15,918	CATTLE	05/10	11/25	ACTIVE	35	3,100	2,703
Salt Lake	04050	DESERET-RUSH VALLEY	24,870	13,945	13,759	SHEEP	11/21	03/23	ACTIVE	100	1,266	822
Salt Lake	05076	DOVE CREEK	65,885	44,307	33,706	CATTLE	11/01	04/30	ACTIVE	100		
Salt Lake	05076	DOVE CREEK				HORSE	12/01	04/30	ACTIVE	100	1,167	1,629
Salt Lake	04005	DRY BASIN	4,601	2,827	2,827	CATTLE	05/10	07/09	ACTIVE	100	510	363
Salt Lake	05042	DRY CANYON	13,412	7,487	7,487	HORSE	05/01	10/15	ACTIVE	100		

Table Q.1
BLM Allotments

Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Salt Lake	05042	DRY CANYON				CATTLE	05/01	10/15	ACTIVE	100	1,177	1,149
Salt Lake	04006	DUCK CREEK	22,785	12,494	12,494	CATTLE	05/10	09/07	ACTIVE	100		
Salt Lake	04006	DUCK CREEK				SHEEP	05/10	06/30	ACTIVE	100		
Salt Lake	04006	DUCK CREEK				SHEEP	09/20	12/01	ACTIVE	100		
Salt Lake	04006	DUCK CREEK				HORSE	05/10	09/07	ACTIVE	100	2,139	2,012
Salt Lake	04051	EAST ONAQUI R.C.A.	10,209	10,107	8,051	CATTLE	11/01	04/30	ACTIVE	100		
Salt Lake	04051	EAST ONAQUI R.C.A.				CATTLE	05/01	06/15	ACTIVE	100	613	468
Salt Lake	04007	EASTMAN	10,798	4,054	4,054	CATTLE	05/10	08/14	ACTIVE	100		
Salt Lake	04007	EASTMAN				CATTLE	08/15	09/30	ACTIVE	100	695	704
Salt Lake	04092	FAUST REST AREA	21	20	20	CATTLE	12/01	01/31	ACTIVE	100	4	4
Salt Lake	05084	FISHER CREEK	19,680	3,489	3,489	CATTLE	05/01	09/30	ACTIVE	100	411	407
Salt Lake	05034	GOOSE CREEK	20,160	16,281	16,274	CATTLE	04/01	05/31	ACTIVE	100		
Salt Lake	05034	GOOSE CREEK				CATTLE	06/01	07/31	ACTIVE	100		
Salt Lake	05034	GOOSE CREEK				CATTLE	08/01	12/30	ACTIVE	100		
Salt Lake	05034	GOOSE CREEK				HORSE	05/01	09/30	ACTIVE	100	2,165	1,022
Salt Lake	05001	GOVERNMENT CREEK	50,218	38,706	38,680	CATTLE	05/16	10/15	ACTIVE	100	3,756	3,405
Salt Lake	04084	GRANTSVILLE SCS	15,412	2,049	1,767	SHEEP	01/16	02/25	ACTIVE	100		
Salt Lake	04084	GRANTSVILLE SCS				CATTLE	11/15	04/15	ACTIVE	100	330	309
Salt Lake	05041	GROUSE CREEK	36,436	20,098	20,097	CATTLE	05/01	10/15	ACTIVE	100		
Salt Lake	05041	GROUSE CREEK				HORSE	05/01	10/15	ACTIVE	100	3,382	3,194
Salt Lake	05040	HARDESTY CREEK	20,014	11,744	11,728	CATTLE	05/05	11/10	ACTIVE	100	1,713	1,352
Salt Lake	04054	HILL SPRING	2,211	1,553	1,553	CATTLE	05/16	09/15	ACTIVE	100	192	136
Salt Lake	05081	HIRSCHI	646	627	627	CATTLE	10/16	12/31	ACTIVE	100	25	25
Salt Lake	05027	IBAPAH	52,254	43,669	27,418	CATTLE	10/01	02/28	ACTIVE	100		
Salt Lake	05027	IBAPAH				CATTLE	04/01	07/30	ACTIVE	100	2,888	2,381
Salt Lake	05006	INDIAN SPRINGS	27,816	24,055	7,469	CATTLE	11/15	04/10	ACTIVE	100		
Salt Lake	05006	INDIAN SPRINGS				SHEEP	11/15	04/10	ACTIVE	100	1,777	1,213
Salt Lake	05048	INGHAM	8,966	6,999	6,999	CATTLE	05/01	09/15	ACTIVE	100	802	814

Table Q.1
BLM Allotments

Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Salt Lake	05085	JAMES	542	542	542	CATTLE	05/01	05/26	ACTIVE	100		
Salt Lake	05085	JAMES				CATTLE	07/16	08/10	ACTIVE	100		
Salt Lake	05085	JAMES				CATTLE	09/16	10/15	ACTIVE	100	100	105
Salt Lake	05039	JANEYS SPRING	2,428	2,052	2,052	CATTLE	05/10/12	07/15/12	ACTIVE	100	228	210
Salt Lake	05036	JUNCTION CREEK	7,539	6,717	6,716	CATTLE	05/16	06/30	ACTIVE	100		
Salt Lake	05036	JUNCTION CREEK				CATTLE	11/01	12/03	ACTIVE	100	588	568
Salt Lake	04010	KEARL	4,487	1,181	899	CATTLE	06/10	09/30	ACTIVE	56	176	181
Salt Lake	05054	KILGORE	22,694	8,739	8,650	CATTLE	12/01	02/28	ACTIVE	100	293	290
Salt Lake	05044	KIMBALL CREEK	26,888	19,194	12,121	CATTLE	05/16	09/30	ACTIVE	100	1,256	1,208
Salt Lake	04011	LAKETOWN	7,892	3,265	3,265	CATTLE	05/25	08/31	ACTIVE	100	296	177
Salt Lake	05062	LUCIN PILOT	242,787	140,519	48,035	SHEEP	11/01	03/30	ACTIVE	100		
Salt Lake	05062	LUCIN PILOT				CATTLE	05/16	03/30	ACTIVE	100	5,465	4,019
Salt Lake	05043	LYNN	3,852	2,956	2,956	CATTLE	06/16	09/30	ACTIVE	100	625	628
Salt Lake	05071	MATLIN	43,474	30,022	14,237	SHEEP	12/16	04/15	ACTIVE	56	1,153	948
Salt Lake	04003	MEACHUM CANYON	2,859	2,003	2,003	CATTLE	07/01	09/30	ACTIVE	100	418	411
Salt Lake	04055	MERCUR CAN-W. OPHIR	42,577	21,684	8,779	CATTLE	11/16	12/15	ACTIVE	100		
Salt Lake	04055	MERCUR CAN-W. OPHIR				CATTLE	03/20	05/31	ACTIVE	100		
Salt Lake	04055	MERCUR CAN-W. OPHIR				SHEEP	11/16	05/31	ACTIVE	100	3,414	396
Salt Lake	04012	MIDDLE RIDGE	7,623	1,274	1,274	SHEEP	06/01	11/24	ACTIVE	100	112	No Data
Salt Lake	05049	MUDDY CREEK	67,528	41,048	27,260	CATTLE	05/01	06/10	ACTIVE	100		
Salt Lake	05049	MUDDY CREEK				CATTLE	08/11	10/10	ACTIVE	100		
Salt Lake	05049	MUDDY CREEK				CATTLE	06/01	08/31	ACTIVE	100		
Salt Lake	05049	MUDDY CREEK				CATTLE	08/01	09/30	ACTIVE	100		
Salt Lake	05049	MUDDY CREEK				CATTLE	11/20	12/20	ACTIVE	100		
Salt Lake	05049	MUDDY CREEK				CATTLE	12/16	02/15	ACTIVE	100		
Salt Lake	05049	MUDDY CREEK				CATTLE	04/10	04/30	ACTIVE	100	1,636	1,167
Salt Lake	05095	NAF	118	111	109	CATTLE	06/15	09/25	ACTIVE	100	7	7
Salt Lake	04013	NEW CANYON	41,085	31,071	26,375	CATTLE	05/15	09/05	ACTIVE	100		

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BLM Allotments

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Salt Lake	04013	NEW CANYON				SHEEP	05/15	06/19	ACTIVE	100		
Salt Lake	04013	NEW CANYON				SHEEP	10/27	12/27	ACTIVE	100	5,013	4,960
Salt Lake	05086	NORTH KELTON	9,648	5,877	5,498	CATTLE	12/01	03/31	ACTIVE	100	343	729
Salt Lake	05025	OCHRE	17,988	17,710	8,512	CATTLE	11/01	02/28	ACTIVE	100	1,560	1,519
Salt Lake	04056	ONAQUI MOUNTAIN EAST	35,469	24,650	3,653	CATTLE	05/16	09/30	ACTIVE	100	1,300	942
Salt Lake	04057	ONAQUI MOUNTAIN WEST	26,971	21,873	209	CATTLE	05/16	10/15	ACTIVE	100	1,146	1,147
Salt Lake	04058	OPHIR CANYON	20,667	10,611	29	SHEEP	06/01	11/15	ACTIVE	100		
Salt Lake	04058	OPHIR CANYON				CATTLE	06/01	10/05	ACTIVE	100	678	225
Salt Lake	05057	OWL SPRINGS	34,489	26,489	6,413	CATTLE	12/01	03/31	ACTIVE	100	1,591	1,485
Salt Lake	05077	PEPLIN	20,240	15,815	1,327	SHEEP	12/20	04/10	ACTIVE	48	527	438
Salt Lake	05022	PINON FLAT	18,664	15,729	6,916	SHEEP	11/01	04/30	ACTIVE	100		
Salt Lake	05022	PINON FLAT				CATTLE	11/01	01/31	ACTIVE	100		
Salt Lake	05022	PINON FLAT				HORSE	11/01	04/30	ACTIVE	100	2,150	1,375
Salt Lake	04015	RABBIT CREEK	6,211	3,557	3,557	CATTLE	05/15	09/30	ACTIVE	100	484	484
Salt Lake	05047	RED BUTTE	32,568	24,694	24,694	CATTLE	11/01	11/30	ACTIVE	100		
Salt Lake	05047	RED BUTTE				CATTLE	04/01	04/30	ACTIVE	100	1,433	1,589
Salt Lake	05072	RED DOME	34,995	19,830	11,711	SHEEP	12/16	04/15	ACTIVE	36	866	556
Salt Lake	05053	ROSEBUD	30,744	20,229	20,229	CATTLE	10/16	01/15	ACTIVE	100		
Salt Lake	05053	ROSEBUD				CATTLE	05/01	05/31	ACTIVE	100	703	669
Salt Lake	04016	SAGE CREEK	14,069	11,355	11,355	SHEEP	12/01	12/15	ACTIVE	100		
Salt Lake	04016	SAGE CREEK				CATTLE	05/10	09/15	ACTIVE	100	1,248	1,249
Salt Lake	05073	SELMAN	34,031	16,294	81	SHEEP	12/20	04/10	ACTIVE	45	924	928
Salt Lake	05088	SNOWVILLE	88,360	71,308	43,890	CATTLE	11/01	04/30	ACTIVE	100		
Salt Lake	05088	SNOWVILLE				SHEEP	12/15	01/24	ACTIVE	100	3,766	7,358
Salt Lake	04064	SOUTH CLOVER	20,733	12,551	12,070	CATTLE	04/16	05/15	ACTIVE	100		
Salt Lake	04064	SOUTH CLOVER				CATTLE	11/01	12/15	ACTIVE	100	86	200

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Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Salt Lake	04065	SOUTH DESERET	2,515	1,692	1,692	CATTLE	11/01	12/31	ACTIVE	100	166	166
Salt Lake	04018	SOUTH WOODRUFF	11,989	4,313	4,313	CATTLE	05/15	09/30	ACTIVE	100	409	404
Salt Lake	04019	STUART	1,076	1,076	1,076	CATTLE	05/16	06/03	ACTIVE	100	102	106
Salt Lake	05074	TERRACE	27,032	18,625	8,121	SHEEP	03/25	04/15	ACTIVE	100	369	473
Salt Lake	04067	TOPLIFT-VERNON HILL	55,053	37,624	29,510	SHEEP	11/01	04/30	ACTIVE	100		
Salt Lake	04067	TOPLIFT-VERNON HILL				CATTLE	11/01	04/30	ACTIVE	100	4,070	1,932
Salt Lake	04020	TWIN PEAKS	2,576	2,260	2,157	SHEEP	05/22	06/30	ACTIVE	100		
Salt Lake	04020	TWIN PEAKS				SHEEP	09/20	10/20	ACTIVE	100	273	448
Salt Lake	05058	U AND I	32,806	14,709	1,736	CATTLE	12/01	03/31	ACTIVE	100	1,146	885
Salt Lake	04068	VERNON	2,993	2,381	2,381	CATTLE	11/01	02/01	ACTIVE	50	178	166
Salt Lake	05035	VIPONT	1,296	703	703	CATTLE	07/01	08/31	ACTIVE	100	44	45
Salt Lake	04043	WEST LOOKOUT PASS	18,705	14,105	14,105	SHEEP	04/01	05/15	ACTIVE	100		
Salt Lake	04043	WEST LOOKOUT PASS				SHEEP	11/16	12/10	ACTIVE	100	1,320	655
Salt Lake	05055	WHITE LAKES	93,047	26,474	18,107	CATTLE	10/01	02/28	ACTIVE	24	3,586	1,200
Salt Lake	14022	WOODRUFF PASTURES	23,241	20,253	20,253	CATTLE	05/16	09/15	ACTIVE	100		
Salt Lake	14022	WOODRUFF PASTURES				CATTLE	07/01	09/15	ACTIVE	100		
Salt Lake	14022	WOODRUFF PASTURES				SHEEP	05/16	05/31	ACTIVE	100		
Salt Lake	14022	WOODRUFF PASTURES				SHEEP	11/01	01/25	ACTIVE	100	4,406	2,433
Salt Lake	05060	YOST ISOLATED TRACTS	565	558	558	CATTLE	06/16	10/30	ACTIVE	100		
Salt Lake	05060	YOST ISOLATED TRACTS				CATTLE	10/01	10/31	ACTIVE	100		
Salt Lake	05060	YOST ISOLATED TRACTS				CATTLE	05/11	06/15	ACTIVE	100	44	45
Salt Lake	05038	YOST PASTURE	6,779	6,623	6,622	CATTLE	11/01	12/31	ACTIVE	100		
Salt Lake	05038	YOST PASTURE				CATTLE	05/01	06/20	ACTIVE	100	1,418	1,010
Fillmore	04522	12 B	361	200	50	CATTLE	05/01	05/31	ACTIVE	13	7	7
Fillmore	04501	BOULTER	10,975	6,850	2,149	SHEEP	05/01	06/10	ACTIVE	100	715	688
Fillmore	35005	DEATH CANYON	68,188	58,958	23,542	CATTLE	11/01	04/30	ACTIVE	100		
Fillmore	35005	DEATH CANYON				CATTLE	05/05	05/15	ACTIVE	100		
Fillmore	35005	DEATH CANYON				CATTLE	10/30	11/08	ACTIVE	100	5,227	2,327

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Fillmore	25003	DESERT MOUNTAIN	42,793	34,704	17,936	CATTLE	11/16	04/30	ACTIVE	88	1,997	1,614
Fillmore	04351	DIAMOND SPRING	10,497	4,179	4,083	CATTLE	05/01	09/30	ACTIVE	46		
Fillmore	04351	DIAMOND SPRING				SHEEP	05/01	06/30	ACTIVE	46	576	360
Fillmore	04502	FERNER DOG VALLEY	15,442	13,740	13,624	CATTLE	06/01	09/25	ACTIVE	100	1,057	1,175
Fillmore	04505	GARRETT	2,022	91	39	CATTLE	10/15	04/30	ACTIVE	20	62	48
Fillmore	04506	GILSON	22,492	18,389	5,454	SHEEP	11/01	05/03	ACTIVE	91	1,212	485
Fillmore	04507	JENNY LIND	9,613	1,674	285	CATTLE	05/21/08	10/05/08	ACTIVE	100	109	118
Fillmore	04508	KIMBALL CREEK	9,093	6,806	6,806	CATTLE	06/01	08/29	ACTIVE	100	2,166	2,943
Fillmore	04511	MCINTYRE	105,634	90,225	52,837	CATTLE	02/15	05/31	ACTIVE	95		
Fillmore	04511	MCINTYRE				CATTLE	09/01	12/15	ACTIVE	95	4,545	4,916
Fillmore	25004	MEADOW CREEK	42,660	38,524	15,121	CATTLE	11/01	04/30	ACTIVE	88		
Fillmore	25004	MEADOW CREEK				CATTLE	05/01	05/04	ACTIVE	100		
Fillmore	25004	MEADOW CREEK				CATTLE	05/04	05/07	ACTIVE	100		
Fillmore	25004	MEADOW CREEK				CATTLE	11/09	11/12	ACTIVE	100	1,321	1,057
Fillmore	04350	RATTLESNAKE PEAK	6,049	2,324	2,324	CATTLE	07/01	09/30	ACTIVE	41		
Fillmore	04350	RATTLESNAKE PEAK				SHEEP	05/01	06/20	ACTIVE	60	274	142
Fillmore	04517	RILEY SPRING	5,917	4,841	4,841	SHEEP	05/01	05/30	ACTIVE	46	93	68
Fillmore	04516	ROCKY FORD	9,355	9,013	4,829	CATTLE	05/16	08/15	ACTIVE	100	1,903	1,797
Fillmore	04412	SABIE MOUNTAIN	17,089	14,320	14,320	CATTLE	05/21	10/05	ACTIVE	100	1,681	2,097
Fillmore	05730	SAGE VALLEY #17	7,632	7,307	3,924	CATTLE	11/01	03/31	ACTIVE	100	1,201	1,256
Fillmore	04519	SHEARING	18,935	18,401	12,697	SHEEP	04/15	04/30	ACTIVE	100	455	947
Fillmore	04518	SHEEP ROCK	25,113	19,082	19,082	CATTLE	05/21	10/05	ACTIVE	100	1,567	1,583
Fillmore	05702	SPRING CANYON	9,208	4,215	109	CATTLE	05/01	10/30	ACTIVE	100		
Fillmore	05702	SPRING CANYON				CATTLE	06/01	08/31	ACTIVE	50		
Fillmore	05702	SPRING CANYON				CATTLE	06/01	12/27	ACTIVE	75		
Fillmore	05702	SPRING CANYON				CATTLE	06/01	08/31	ACTIVE	50	638	415
Fillmore	05735	STONE QUARRY	4,467	3,033	1,412	SHEEP	11/01	11/15	ACTIVE	100		
Fillmore	05735	STONE QUARRY				SHEEP	05/01	05/31	ACTIVE	100	225	154

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Fillmore	04341	TINTIC JUNCTION	1,974	1,058	1,058	CATTLE	06/01	10/31	ACTIVE	61		
Fillmore	04341	TINTIC JUNCTION				HORSE	06/01	10/31	ACTIVE	61	101	101
Fillmore	04353	TREASURE HILL	1,406	207	204	SHEEP	05/01	06/20	ACTIVE	100		
Fillmore	04353	TREASURE HILL				CATTLE	05/20	07/10	ACTIVE	100	11	6
Richfield	8002	ANGLE BENCH	7,637	6,745	5,876	CATTLE	04/01	05/25	ACTIVE	100		
Richfield	8002	ANGLE BENCH				CATTLE	12/01	12/31	ACTIVE	100	351	360
Richfield	06045	ANTIMONY CREEK	3,992	3,955	3,932	CATTLE	05/01	06/15	ACTIVE	100	373	335
Richfield	06046	ANTIMONY RANCH	841	478	348	CATTLE	10/01	12/20	ACTIVE	100	18	19
Richfield	01702	APPLE SPRING	3,806	1,669	141	SHEEP	04/15	05/15	ACTIVE	25	26	26
Richfield	00201	BEAR VALLEY	6,449	2,430	944	CATTLE	05/16	10/15	ACTIVE	100	150	149
Richfield	00700	BICKNELL	1,220	1,215	288	CATTLE	11/01	01/15	ACTIVE	100	90	84
Richfield	00701	BICKNELL SPRING	45,053	27,430	27,430	CATTLE	05/16	06/30	ACTIVE	100		
Richfield	00701	BICKNELL SPRING				SHEEP	09/04	10/31	ACTIVE	41		
Richfield	00701	BICKNELL SPRING				SHEEP	05/16	06/30	ACTIVE	41	1,197	988
Richfield	00702	BICKNELL WINTER	29,531	25,445	24,884	CATTLE	09/01	03/31	ACTIVE	100		
Richfield	00702	BICKNELL WINTER				CATTLE	04/15	05/15	ACTIVE	90		
Richfield	00702	BICKNELL WINTER				SHEEP	11/01	02/28	ACTIVE	100	2,131	1,274
Richfield	00803	BOX CREEK	1,401	1,385	574	SHEEP	12/01	04/15	ACTIVE	100	29	86
Richfield	00202	BURRVILLE	2,365	1,807	1,155	CATTLE	06/01	07/31	ACTIVE	100	48	19
Richfield	00705	CEDAR GROVE	22,877	6,843	6,843	CATTLE	05/10	06/30	ACTIVE	23		
Richfield	00705	CEDAR GROVE				SHEEP	05/26	06/30	ACTIVE	23		
Richfield	00705	CEDAR GROVE				SHEEP	10/01	01/15	ACTIVE	23	540	525
Richfield	06047	CENTER CREEK	3,941	2,909	2,232	CATTLE	11/15	12/14	ACTIVE	100		
Richfield	06047	CENTER CREEK				CATTLE	05/15	06/14	ACTIVE	100	179	154
Richfield	00708	CYCLONE	19,663	5,244	5,244	SHEEP	10/01	02/22	ACTIVE	60		
Richfield	00708	CYCLONE				SHEEP	05/16	06/21	ACTIVE	19	131	1,103
Richfield	00602	DEER PEAK	10,054	8,150	176	CATTLE	03/16	05/31	ACTIVE	100		
Richfield	00602	DEER PEAK				CATTLE	10/21	10/27	ACTIVE	100	391	296

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Richfield	06048	DRY WASH	5,659	3,768	3,761	CATTLE	04/21	06/20	ACTIVE	100	216	203
Richfield	00816	EAST BENCH	16,420	15,499	15,334	CATTLE	10/01	12/31	ACTIVE	100		
Richfield	00816	EAST BENCH				CATTLE	03/01	05/31	ACTIVE	100	762	747
Richfield	00819	ELBOW	8,851	7,657	-	CATTLE	10/01	04/10	ACTIVE	100	101	121
Richfield	00220	FISHLAKE	17,287	13,128	11,697	SHEEP	06/11	07/15	ACTIVE	100		
Richfield	00220	FISHLAKE				SHEEP	10/01	11/30	ACTIVE	100	737	596
Richfield	00821	GREENWICH CREEK	587	580	46	SHEEP	03/16	04/15	ACTIVE	100		
Richfield	00821	GREENWICH CREEK				CATTLE	05/10	05/31	ACTIVE	100	33	23
Richfield	00822	HATCH CANYON	1,304	1,301	1,301	SHEEP	11/01	03/31	ACTIVE	100	46	16
Richfield	00716	HECTOR HOLLOW	1,955	1,949	1,949	CATTLE	05/01	05/31	ACTIVE	100		
Richfield	00716	HECTOR HOLLOW				SHEEP	11/16	02/12	ACTIVE	100	138	121
Richfield	00823	HODGE RANCH	15,657	12,980	3,183	SHEEP	05/16	06/30	ACTIVE	100		
Richfield	00823	HODGE RANCH				SHEEP	09/16	10/15	ACTIVE	100	484	102
Richfield	01709	HOP CREEK	2,566	640	333	CATTLE	05/01	06/30	ACTIVE	50		
Richfield	01709	HOP CREEK				CATTLE	10/01	11/30	ACTIVE	50	58	49
Richfield	00824	HUNTER SPRING	3,550	2,875	8	CATTLE	10/01	12/31	ACTIVE	100	165	170
Richfield	01711	INDIAN HOLLOW	1,774	1,103	711	SHEEP	05/01	06/15	ACTIVE	90	154	No Data
Richfield	06050	JOHNS VALLEY	5,729	5,370	2,614	CATTLE	06/21	10/20	ACTIVE	100		
Richfield	06050	JOHNS VALLEY				CATTLE	04/01	05/31	ACTIVE	100	255	175
Richfield	00221	KOOSHAREM CREEK	2,224	2,065	968	SHEEP	11/01	03/31	ACTIVE	100	46	19
Richfield	00720	LIME KILN	3,247	2,925	2,921	SHEEP	11/15	02/15	ACTIVE	100	354	105
Richfield	00721	LOA WINTER	21,213	18,133	18,133	SHEEP	11/01	02/20	ACTIVE	100		
Richfield	00721	LOA WINTER				CATTLE	11/01	12/17	ACTIVE	90	622	265
Richfield	04509	LUNT	6,095	409	33	CATTLE	04/01	06/15	ACTIVE	100	38	37
Richfield	00723	LYMAN	2,034	2,019	2,006	SHEEP	10/01	11/11	ACTIVE	100		
Richfield	00723	LYMAN				CATTLE	12/01	12/31	ACTIVE	100	125	46
Richfield	00725	NEFF RANCH	2,779	1,585	1,455	SHEEP	01/07	02/28	ACTIVE	100		
Richfield	00725	NEFF RANCH				CATTLE	04/25	05/10	ACTIVE	100	82	37

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Richfield	00211	NORTH COVE MOUNTAIN	16,157	7,725	-	SHEEP	05/25	06/15	ACTIVE	100		
Richfield	00211	NORTH COVE MOUNTAIN				CATTLE	05/06	06/20	ACTIVE	100		
Richfield	00211	NORTH COVE MOUNTAIN				CATTLE	10/01	10/25	ACTIVE	100	268	148
Richfield	00726	NORTH FREMONT	4,670	4,028	4,028	SHEEP	01/10	02/14	ACTIVE	100	230	1,467
Richfield	00832	NORTH NARROWS	16,637	13,794	10,589	CATTLE	11/01	06/30	ACTIVE	100		
Richfield	00832	NORTH NARROWS				CATTLE	07/01	10/31	ACTIVE	5		
Richfield	00832	NORTH NARROWS				SHEEP	12/01	05/31	ACTIVE	100	1,001	379
Richfield	00833	OAK SPRINGS	7,285	7,248	7,248	SHEEP	06/01	06/30	ACTIVE	100		
Richfield	00833	OAK SPRINGS				SHEEP	10/01	10/31	ACTIVE	100	296	171
Richfield	06051	PINE CREEK ANTIMONY	13,333	11,283	6,178	CATTLE	05/01	06/15	ACTIVE	100		
Richfield	06051	PINE CREEK ANTIMONY				CATTLE	11/01	12/31	ACTIVE	100	676	349
Richfield	00213	PLATEAU	7,711	4,444	4,444	SHEEP	06/10	07/15	ACTIVE	100		
Richfield	00213	PLATEAU				SHEEP	11/01	11/14	ACTIVE	100	340	276
Richfield	06052	POISON CREEK	5,222	3,993	3,993	CATTLE	05/05	06/15	ACTIVE	100	223	214
Richfield	06053	POLE CANYON	6,988	6,387	3,854	CATTLE	11/15	12/31	ACTIVE	100	380	348
Richfield	00727	POST HOLLOW	13,782	8,576	8,576	SHEEP	11/01	02/28	ACTIVE	60		
Richfield	00727	POST HOLLOW				SHEEP	05/03	05/15	ACTIVE	62	325	80
Richfield	00730	SAND WASH	677	675	642	CATTLE	01/01	01/24	ACTIVE	100	33	32
Richfield	00731	SEVEN MILE	18,635	17,338	17,338	CATTLE	05/11	05/31	ACTIVE	100	737	602
Richfield	06049	SEVIER RIVER	50	50	50	CATTLE	07/01	10/31	ACTIVE	100	80	81
Richfield	00843	SOUTH NARROWS	14,158	12,224	9,412	CATTLE	05/01	06/30	ACTIVE	100		
Richfield	00843	SOUTH NARROWS				CATTLE	10/01	12/30	ACTIVE	100		
Richfield	00843	SOUTH NARROWS				SHEEP	11/01	03/31	ACTIVE	100	670	407
Richfield	01729	UINTA	1,028	483	47	CATTLE	07/01	08/31	ACTIVE	44	56	70
Richfield	00742	WEST FREMONT	2,427	2,423	2,423	CATTLE	01/10	02/15	ACTIVE	100		

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Richfield	00742	WEST FREMONT				SHEEP	12/01	02/28	ACTIVE	100	83	No Data
Cedar City	05009	ADAMS WELL	23,417	21,427	21,427	SHEEP	10/16	04/30	ACTIVE	100		
Cedar City	05009	ADAMS WELL				CATTLE	10/16	04/30	ACTIVE	100	1,789	864
Cedar City	05155	ATCHISON CREEK	37,675	31,641	13,674	CATTLE	07/01	08/15	ACTIVE	80	267	305
Cedar City	06109	BALD HILLS	16,030	13,707	11,577	CATTLE	05/15	10/15	ACTIVE	100	1,036	396
Cedar City	15001	BEAR CREEK	5,344	4,559	2,338	CATTLE	05/15	08/31	ACTIVE	100	229	214
Cedar City	05118	BENNION SPRING	43,947	26,223	2,683	CATTLE	02/01	11/30	ACTIVE	36	1,076	1,398
Cedar City	05013	BENSON	6,940	6,009	8	SHEEP	01/11	02/20	ACTIVE	100	327	252
Cedar City	15014	BERGSTROM	2,937	2,256	2,124	CATTLE	05/01	05/31	ACTIVE	100		
Cedar City	15014	BERGSTROM				CATTLE	10/01	02/28	ACTIVE	100	432	362
Cedar City	15002	BONE HOLLOW	16,929	15,770	33	CATTLE	04/15	06/15	ACTIVE	100		
Cedar City	15002	BONE HOLLOW				CATTLE	11/15	03/15	ACTIVE	100	544	472
Cedar City	06230	BUCKHORN	34,190	30,832	13,166	CATTLE	10/15	06/20	ACTIVE	92	2,493	1,666
Cedar City	05003	BUCKSKIN MOUNTAIN	5,795	5,764	4,463	CATTLE	06/01	08/31	ACTIVE	100		
Cedar City	05003	BUCKSKIN MOUNTAIN				CATTLE	05/10	06/30	ACTIVE	100	542	285
Cedar City	15016	BULLOCH	27,134	9,130	285	CATTLE	10/01	06/15	ACTIVE	52	404	391
Cedar City	05158	BUTCHER	8,235	6,072	6,072	CATTLE	08/16	11/30	ACTIVE	79		
Cedar City	05158	BUTCHER				CATTLE	05/16	06/30	ACTIVE	79	939	621
Cedar City	05121	CHOKECHERRY CREEK	8,542	6,981	6,672	CATTLE	06/01	11/30	ACTIVE	82	345	161
Cedar City	15019	CROSSROADS	2,119	987	987	CATTLE	12/16	04/15	ACTIVE	44	53	27
Cedar City	15020	DESERT	14,958	8,489	8,248	CATTLE	03/01	02/28	ACTIVE	45	920	656
Cedar City	15025	FIDDLERS CANYON	5,448	5,013	5,013	CATTLE	10/01	06/30	ACTIVE	90	913	341
Cedar City	05004	FREMONT	88,202	67,456	33,370	CATTLE	05/01	10/31	ACTIVE	84	5,292	4,110
Cedar City	06111	GREENVILLE BENCH	14,228	12,518	12,262	CATTLE	10/16	04/30	ACTIVE	100		
Cedar City	06111	GREENVILLE BENCH				SHEEP	10/16	04/30	ACTIVE	100	908	262
Cedar City	05030	HORSE HOLLOW	6,490	4,208	658	CATTLE	05/01	11/15	ACTIVE	60		
Cedar City	05030	HORSE HOLLOW				SHEEP	12/01	03/10	ACTIVE	65	616	598
Cedar City	05132	INDIAN PEAK	81,248	71,311	16,479	SHEEP	06/15	02/28	ACTIVE	82		

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Cedar City	05132	INDIAN PEAK				CATTLE	03/01	02/28	ACTIVE	82	1,758	717
Cedar City	05033	JACKRABBIT	10,967	10,256	5,511	CATTLE	05/15	10/31	ACTIVE	100	1,196	1,318
Cedar City	05133	JACKSON WASH	12,888	11,083	1,228	CATTLE	03/01	02/28	ACTIVE	65	2,340	1,197
Cedar City	06110	LEE SPRINGS	17,303	13,095	651	CATTLE	11/01	04/30	ACTIVE	96	1,066	768
Cedar City	15041	LIZZIES HILL	8,856	8,836	8,836	SHEEP	12/01	03/26	ACTIVE	100	700	375
Cedar City	06114	LONG HOLLOW CATTLE	2,255	1,699	1,699	CATTLE	05/10	06/29	ACTIVE	85	150	182
Cedar City	15042	LONG HOLLOW SHEEP	9,356	8,027	8,027	SHEEP	05/01	06/25	ACTIVE	98		
Cedar City	15042	LONG HOLLOW SHEEP				SHEEP	01/19	03/31	ACTIVE	98	692	325
Cedar City	06113	LOWE CATTLE	3,991	2,046	2,046	CATTLE	05/15	11/30	ACTIVE	40	150	95
Cedar City	15043	LOWE JONES	4,395	3,131	3,131	CATTLE	10/16	04/30	ACTIVE	62	173	165
Cedar City	06107	MINERAL RANGE	147,754	124,831	14,671	CATTLE	05/01	10/15	ACTIVE	81	11,642	9,834
Cedar City	06101	MINERSVILLE NO. 1	46,780	36,904	28,052	CATTLE	04/16	10/15	ACTIVE	100	3,020	2,163
Cedar City	06102	MINERSVILLE NO. 2	26,660	22,037	7,452	CATTLE	05/01	10/15	ACTIVE	96	781	517
Cedar City	06103	MINERSVILLE NO. 3	26,351	22,109	22,109	CATTLE	05/01	12/31	ACTIVE	93		
Cedar City	06103	MINERSVILLE NO. 3				SHEEP	05/01	06/25	ACTIVE	100	1,936	1,525
Cedar City	06104	MINERSVILLE NO. 4	29,956	17,092	2,657	CATTLE	12/01	05/31	ACTIVE	97	1,488	1,241
Cedar City	06105	MINERSVILLE NO. 5	24,290	21,252	20,393	CATTLE	04/16	10/15	ACTIVE	93	2,301	1,885
Cedar City	06106	MINERSVILLE NO. 6	20,619	10,761	3,411	CATTLE	11/01	04/30	ACTIVE	79	1,197	1,224
Cedar City	05138	MODENA CANYON	27,186	23,603	456	CATTLE	07/01	09/30	ACTIVE	100	121	69
Cedar City	15047	MORTENSEN-HOLYOAK	18,682	15,633	15,633	CATTLE	10/15	02/28	ACTIVE	90		
Cedar City	15047	MORTENSEN-HOLYOAK				CATTLE	06/16	10/31	ACTIVE	80		
Cedar City	15047	MORTENSEN-HOLYOAK				SHEEP	11/16	03/20	ACTIVE	80	1,360	769
Cedar City	15048	NADA	42,286	16,872	11,540	CATTLE	03/01	02/28	ACTIVE	69	614	607
Cedar City	15050	NELSON	1,684	965	87	CATTLE	06/01	09/30	ACTIVE	64		
Cedar City	15050	NELSON				CATTLE	10/01	05/31	ACTIVE	64	208	189
Cedar City	15051	NORTE WELL	9,783	3,802	3,802	CATTLE	04/01	06/07	ACTIVE	61		
Cedar City	15051	NORTE WELL				CATTLE	10/15	12/25	ACTIVE	61	357	318
Cedar City	06226	NORTH PINE VALLEY	36,487	31,775	6,158	CATTLE	03/01	02/28	ACTIVE	73	5,127	2,349

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Cedar City	15052	PARAGONAH CATTLE	15,708	13,700	3,497	CATTLE	06/16	08/31	ACTIVE	100		
Cedar City	15052	PARAGONAH CATTLE				CATTLE	04/01	06/15	ACTIVE	100	543	371
Cedar City	15053	PAROWAN GAP	13,346	12,064	12,063	SHEEP	06/01	06/15	ACTIVE	90		
Cedar City	15053	PAROWAN GAP				SHEEP	10/16	04/30	ACTIVE	90	1,264	685
Cedar City	15055	PERKINS	3,865	2,664	1,604	CATTLE	03/01	02/28	ACTIVE	42	207	205
Cedar City	15056	PERRY WELL	10,653	7,828	4,871	CATTLE	11/01	05/02	ACTIVE	72	778	493
Cedar City	05142	PINE VALLEY	6,650	5,371	2,282	CATTLE	05/15	09/15	ACTIVE	82	608	339
Cedar City	05157	ROSEBUD	13,611	7,335	883	CATTLE	05/01	11/30	ACTIVE	10	83	50
Cedar City	05080	RUSH LAKE	4,594	4,576	1,067	SHEEP	03/01	06/20	ACTIVE	94		
Cedar City	05080	RUSH LAKE				CATTLE	03/01	06/30	ACTIVE	100	1,032	220
Cedar City	06225	SAND HOLLOW	3,644	3,228	828	CATTLE	12/16	03/31	ACTIVE	100	134	39
Cedar City	06116	SOUTH CREEK	8,910	6,337	5,245	CATTLE	05/15	06/10	ACTIVE	100		
Cedar City	06116	SOUTH CREEK				CATTLE	10/15	11/07	ACTIVE	100	442	326
Cedar City	06224	SOUTH PINE VALLEY	58,716	52,189	2,040	CATTLE	03/01	02/28	ACTIVE	83	5,807	2,697
Cedar City	05154	SPANISH GEORGE	11,749	9,889	6,358	CATTLE	05/16	06/30	ACTIVE	93		
Cedar City	05154	SPANISH GEORGE				CATTLE	08/16	11/30	ACTIVE	93	936	686
Cedar City	05156	STATELINE	18,256	11,553	2,635	CATTLE	07/01	09/30	ACTIVE	74	199	62
Cedar City	15081	STEER HOLLOW	2,643	2,643	2,643	SHEEP	02/14	06/30	ACTIVE	100	261	80
Cedar City	06112	STEWART	10,530	9,168	8,566	CATTLE	04/16	05/30	ACTIVE	100		
Cedar City	06112	STEWART				CATTLE	06/01	10/15	ACTIVE	100	194	76
Cedar City	06222	WATER HOLLOW	32,301	28,614	15,731	CATTLE	05/01	11/30	ACTIVE	90	1,720	1,660
Cedar City	05008	WEST SPRING	867	520	519	CATTLE	05/15	06/30	ACTIVE	80	74	81
Cedar City	06118	WHITAKER	27,134	16,960	2,368	CATTLE	11/01	05/15	ACTIVE	77	1,285	1,146
Cedar City	15076	WILLOW SPRING	2,724	2,084	1,951	SHEEP	05/01	06/30	ACTIVE	77		
Cedar City	15076	WILLOW SPRING				CATTLE	05/01	06/30	ACTIVE	77	431	207
Cedar City	06115	YARDLEY	548	548	548	CATTLE	12/01	02/28	ACTIVE	100	87	80
Kanab	24002	ALTON	407	388	388	CATTLE	06/01	10/31	ACTIVE	100	5	16
Kanab	24004	BALD KNOLL	7,392	6,807	777	CATTLE	05/16	10/11	ACTIVE	100	215	105

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Kanab	15031	BIG FLAT	6,623	6,612	6,488	CATTLE	05/01	06/15	ACTIVE	100		
Kanab	15031	BIG FLAT				CATTLE	10/16	11/15	ACTIVE	100	529	374
Kanab	24012	BUCK KNOLL	3,329	3,327	12	CATTLE	07/01	10/15	ACTIVE	100	153	154
Kanab	00809	CIRCLEVILLE CANYON	4,608	4,221	1,026	CATTLE	05/01	05/30	ACTIVE	100	88	76
Kanab	24027	COTTONWOOD SPRINGS	14,118	7,898	1,154	CATTLE	06/01	10/31	ACTIVE	100	555	553
Kanab	24029	COVE (ALTON)	165	156	156	CATTLE	06/01	10/31	ACTIVE	100	10	10
Kanab	00812	DOG VALLEY	12,560	9,746	4,476	CATTLE	05/20	09/30	ACTIVE	85	149	196
Kanab	24037	ELBOW SPRINGS	2,250	2,241	198	CATTLE	06/01	10/31	ACTIVE	100	50	50
Kanab	15005	HAWKINS WASH	9,414	7,984	7,145	CATTLE	05/31	08/28	ACTIVE	77	515	435
Kanab	25035	HILLSDALE	2,443	1,474	1,474	CATTLE	06/01	10/30	ACTIVE	100	140	140
Kanab	14062	ISOLATED TRACTS	1,813	1,128	1,056	CATTLE	05/16	10/31	ACTIVE	100	65	76
Kanab	14070	LEVANGER LAKES	862	857	356	CATTLE	06/01	11/15	ACTIVE	100	33	33
Kanab	15029	LIMEKILN CREEK	3,775	3,750	3,750	CATTLE	11/01	11/30	ACTIVE	100		
Kanab	15029	LIMEKILN CREEK				CATTLE	04/27	06/10	ACTIVE	100	64	50
Kanab	25047	LIMESTONE CANYON	1,511	1,511	1,511	CATTLE	08/01	09/30	ACTIVE	100	67	66
Kanab	04112	LOWER SINK VALLEY	4,160	3,366	2,298	CATTLE	06/01	11/15	ACTIVE	100	273	130
Kanab	25027	MARSHALL CANYON	889	889	537	CATTLE	07/01	07/31	ACTIVE	100	30	31
Kanab	00010	MILL CREEK	17,636	12,948	2,170	CATTLE	06/01	09/30	ACTIVE	100	301	92
Kanab	14099	ROBINSON CREEK	517	510	331	CATTLE	06/01	11/30	ACTIVE	100	24	24
Kanab	25046	ROCK CANYON	9,151	8,299	8,299	CATTLE	10/01	02/28	ACTIVE	100	484	275
Kanab	15030	ROLLER MILL	2,541	1,875	1,875	CATTLE	06/01	12/04	ACTIVE	80	184	108
Kanab	25045	SAGEHEN HOLLOW	7,040	5,757	5,757	CATTLE	06/15	10/31	ACTIVE	100	444	179
Kanab	25052	SANDY CREEK	9,814	8,492	6,259	CATTLE	08/01	02/28	ACTIVE	100	688	239
Kanab	25028	SANFORD BENCH	10,864	9,565	9,288	CATTLE	10/16	04/30	ACTIVE	100	1,078	212
Kanab	15006	SEVIER	1,640	668	292	CATTLE	09/21	09/28	ACTIVE	100	34	34
Kanab	25036	SEVIER RIVER	2,375	2,368	2,368	CATTLE	06/01	10/30	ACTIVE	100	340	261
Kanab	00007	SHEARING CORRAL	4,043	4,003	3,418	CATTLE	07/15	02/28	ACTIVE	100	100	No Data

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Kanab	25044	SOUTH CANYON	19,670	18,296	14,395	CATTLE	06/01	10/15	ACTIVE	100	900	336
Kanab	05007	SPRY	10,791	9,432	7,844	CATTLE	07/10	10/27	ACTIVE	100	449	350
Kanab	04103	SUNSET CLIFFS	2,141	1,989	1,953	CATTLE	06/01	12/01	ACTIVE	100	188	188
Kanab	04122	SYLER KNOLL	515	439	439	CATTLE	05/01	10/31	CUSTODIAL	100	6	6
Kanab	25053	TEBBS HOLLOW	4,011	3,971	3,971	CATTLE	06/01	01/05	ACTIVE	100	319	84
Kanab	25051	THREE MILE CREEK	2,656	2,656	771	CATTLE	11/01	12/31	ACTIVE	100		
Kanab	25051	THREE MILE CREEK				CATTLE	08/01	09/30	ACTIVE	100	200	94
Kanab	04163	UPPER SINK VALLEY	6,291	4,792	2,824	CATTLE	06/01	10/15	ACTIVE	100	311	282
Vernal	15854	ANTELOPE DRAW	55,904	51,295	10,293	SHEEP	10/01	05/10	ACTIVE	93	3,679	1,052
Vernal	04873	ARGYLE RIDGE	20,709	9,720	28	CATTLE	06/01	11/01	ACTIVE	49	339	188
Vernal	08824	ATCHEE RIDGE AMP	101,790	80,123	411	CATTLE	04/01	10/01	ACTIVE	100	2,285	1,693
Vernal	14806	BEALER BASIN	3,468	1,890	1,890	CATTLE	05/01	12/02	ACTIVE	43	275	243
Vernal	08821	BIG PACK MOUNTAIN	14,628	13,625	167	SHEEP	10/01	05/01	ACTIVE	95	1,060	780
Vernal	05881	BIG WASH	5,367	4,599	4,100	CATTLE	11/16	03/10	ACTIVE	100	500	412
Vernal	14824	BLAIR BASIN	1,405	301	301	CATTLE	06/01	10/31	ACTIVE	5	15	9
Vernal	15825	BLUE MOUNTAIN	1,799	1,160	1,135	HORSE	05/01	10/31	ACTIVE	100		
Vernal	15825	BLUE MOUNTAIN				CATTLE	05/01	10/31	ACTIVE	100	292	253
Vernal	15842	BONANZA	28,238	24,546	20,200	SHEEP	12/05	05/05	ACTIVE	100	1,939	1,126
Vernal	08828	BOOKCLIFFS PASTURE	23,059	3,973	1,090	CATTLE	07/01	10/30	ACTIVE	100	301	319
Vernal	08831	BREWER	2,807	2,800	2,677	CATTLE	11/01	04/30	ACTIVE	100	120	99
Vernal	14805	BRIDGEPORT	10,714	9,135	5,822	CATTLE	04/11	05/30	ACTIVE	100	139	112
Vernal	04858	BRUSH CREEK	16,261	13,569	7,957	CATTLE	11/01	02/28	ACTIVE	100		
Vernal	04858	BRUSH CREEK				CATTLE	05/01	06/05	ACTIVE	100	855	535
Vernal	04878	BULL CANYON	16,578	15,714	72	CATTLE	11/01	04/01	ACTIVE	100	1,000	525
Vernal	15816	CANAL	4,072	2,640	2,640	CATTLE	10/01	05/01	ACTIVE	63	224	54
Vernal	05886	CASTLE PEAK	51,872	45,127	8,064	CATTLE	11/01	04/15	ACTIVE	83	2,092	1,152
Vernal	14802	CLAY BASIN	13,490	11,169	8,630	CATTLE	06/01	06/30	ACTIVE	100		
Vernal	14802	CLAY BASIN				CATTLE	10/01	11/30	ACTIVE	100	384	337

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Vernal	14804	CLAY BASIN MEADOWS	5,405	4,404	2,839	CATTLE	05/01	06/19	ACTIVE	78	365	257
Vernal	04855	COAL MINE BASIN	6,308	4,297	2,316	CATTLE	11/15	12/29	ACTIVE	100		
Vernal	04855	COAL MINE BASIN				CATTLE	05/01	06/14	ACTIVE	100	707	423
Vernal	04835	COOPER DRAW	2,998	2,344	2,344	CATTLE	05/01	10/31	ACTIVE	100	246	131
Vernal	14817	COVE & WEST COW HOLLOW	5,643	2,099	658	HORSE	06/01	10/31	ACTIVE	18		
Vernal	14817	COVE & WEST COW HOLLOW				CATTLE	06/01	09/15	ACTIVE	18	277	251
Vernal	2945	COYOTE WASH	107,988	78,634	46,665	SHEEP	11/01	05/20	ACTIVE	100	7,762	3,411
Vernal	00014	CROUSE RESERVOIR	2,684	994	386	CATTLE	05/01	10/31	ACTIVE	40	120	110
Vernal	04877	CURRANT CANYON	6,975	5,064	1,640	CATTLE	10/01	04/01	ACTIVE	80	193	189
Vernal	02846	DAVIS DRAW	2,139	1,469	1,469	SHEEP	05/01	10/31	ACTIVE	69		
Vernal	02846	DAVIS DRAW				CATTLE	05/01	10/31	ACTIVE	51	300	273
Vernal	04884	DEEP CREEK	405	81	81	CATTLE	05/25	10/24	ACTIVE	3	8	8
Vernal	04882	DEVILS CANYON	22,351	19,147	3,881	CATTLE	11/01	04/30	ACTIVE	100	1,368	629
Vernal	04837	DIAMOND MOUNTAIN	16,382	6,437	5,902	CATTLE	05/01	06/30	ACTIVE	33		
Vernal	04837	DIAMOND MOUNTAIN				CATTLE	09/16	10/31	ACTIVE	33	788	353
Vernal	04861	DIAMOND RIM	2,552	2,547	2,547	CATTLE	10/01	12/31	ACTIVE	100	120	119
Vernal	04867	DINOSAUR PARK	2,154	1,420	173	CATTLE	11/01	12/30	ACTIVE	100		
Vernal	04867	DINOSAUR PARK				CATTLE	04/15	05/15	ACTIVE	100	103	61
Vernal	04859	DONKEY FLAT	5,893	5,071	5,071	CATTLE	11/01	02/28	ACTIVE	100		
Vernal	04859	DONKEY FLAT				CATTLE	05/01	05/31	ACTIVE	100	402	260
Vernal	04854	DRY FORK	6,055	4,223	3,432	CATTLE	05/15	11/07	ACTIVE	100	224	178
Vernal	14822	EAST COW HOLLOW	2,045	662	644	CATTLE	06/01	10/31	ACTIVE	13	50	47
Vernal	02888	EAST HUBER	19,096	16,708	16,708	CATTLE	11/01	05/15	ACTIVE	86	521	253
Vernal	04845	EAST LITTLE MOUNTAIN	3,726	2,590	2,589	CATTLE	05/15	09/15	ACTIVE	100	265	249

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Vernal	04828	EAST SERVICEBERRY SPRING	3,142	886	412	CATTLE	05/01	10/31	ACTIVE	13	69	79
Vernal	04874	FIVE MILE	15,622	11,421	204	CATTLE	10/31	04/01	ACTIVE	100	1,277	534
Vernal	04889	FLYNNS POINT	1,224	167	167	CATTLE	05/15	10/05	ACTIVE	10	22	21
Vernal	04881	GADSON	3,190	485	485	CATTLE	05/16	10/18	ACTIVE	5	26	26
Vernal	14810	GADSON DRAW	3,960	1,191	1,191	CATTLE	07/01	10/15	ACTIVE	10	88	78
Vernal	04836	GARDNER	404	121	121	CATTLE	06/01	08/25	ACTIVE	16	8	8
Vernal	14803	GOSLIN MOUNTAIN	36,247	16,871	16,375	CATTLE	05/01	09/30	ACTIVE	71	2,521	1,708
Vernal	04850	HACKING	159	159	159	CATTLE	05/10	06/10	ACTIVE	16		
Vernal	04850	HACKING				CATTLE	10/10	10/30	ACTIVE	16	14	8
Vernal	15861	HALFWAY HILL	9,010	7,677	1,946	SHEEP	11/06	05/01	ACTIVE	100	557	265
Vernal	04834	HATCH COVE	868	829	829	CATTLE	06/01	10/31	ACTIVE	92	98	187
Vernal	08805	HATCHBROOME BARTHOLOMEW	1,660	1,349	272	CATTLE	11/15	04/15	ACTIVE	42	107	90
Vernal	08819	HELLS HOLE	27,034	18,107	4,320	SHEEP	12/01	04/30	ACTIVE	82	3,554	1,443
Vernal	08825	HORSE POINT	38,016	33,417	8,581	CATTLE	11/16	04/30	ACTIVE	100	950	775
Vernal	14815	HOY MOUNTAIN	5,385	3,519	758	HORSE	05/01	10/31	ACTIVE	57		
Vernal	14815	HOY MOUNTAIN				CATTLE	05/01	10/31	ACTIVE	57	569	497
Vernal	04870	ISLAND PARK	8,619	7,424	5,963	CATTLE	11/01	04/30	ACTIVE	33	35	No Data
Vernal	14812	JACKSON-CROUSE-D.HOL	18,529	9,288	1,123	CATTLE	05/10	10/28	ACTIVE	33	946	900
Vernal	04851	JOHNSON	1,121	796	796	CATTLE	05/20	06/19	ACTIVE	100		
Vernal	04851	JOHNSON				CATTLE	11/01	11/30	ACTIVE	100	86	86
Vernal	14818	LAMBSON	705	260	1	SHEEP	05/01	10/31	ACTIVE	46	95	95
Vernal	04875	LEARS CANYON	10,708	8,991	626	CATTLE	05/15	06/15	ACTIVE	100		
Vernal	04875	LEARS CANYON				HORSE	03/01	02/28	ACTIVE	83	308	160
Vernal	04865	LITTLE BRUSH CREEK	7	7	7	HORSE	10/01	11/30	ACTIVE	100	6	6
Vernal	05880	LITTLE DESERT	49,361	43,369	7,054	CATTLE	11/05	04/23	ACTIVE	100	2,564	821

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Vernal	04830	LOG CABIN	730	615	48	CATTLE	06/01	10/31	ACTIVE	55	59	55
Vernal	14826	MAIL DRAW	1,146	773	773	CATTLE	05/01	10/31	ACTIVE	37	86	79
Vernal	04816	MAME HOLE-BEAR HOLLOW	2,875	1,438	89	CATTLE	05/10	10/26	ACTIVE	31	140	134
Vernal	08826	MCCLELLAND	55,383	14,593	9,838	CATTLE	05/01	10/30	ACTIVE	100	828	808
Vernal	05805	MCCOY FLAT	23,254	13,713	13,430	CATTLE	11/01	05/15	ACTIVE	73	674	299
Vernal	04863	MCFARLEY FLAT	7,680	7,344	4,346	CATTLE	04/08	05/08	ACTIVE	100		
Vernal	04863	MCFARLEY FLAT				CATTLE	10/25	12/23	ACTIVE	100	408	255
Vernal	15838	MINERS GULCH	4,662	4,379	2,595	CATTLE	10/01	05/01	ACTIVE	100	154	132
Vernal	04847	MOSBY	2,574	2,253	2,253	CATTLE	05/01	10/31	ACTIVE	90	216	217
Vernal	14820	NATURAL LAKE	2,818	838	50	CATTLE	06/01	10/31	ACTIVE	15	65	91
Vernal	08813	OIL SHALE	41,341	14,725	8,054	SHEEP	11/15	04/15	ACTIVE	22	1,137	378
Vernal	08816	OLSEN AMP	133,946	102,929	34,359	SHEEP	11/01	06/15	ACTIVE	100	9,268	2,597
Vernal	15802	OURAY ROAD	11,961	10,417	10,417	CATTLE	10/01	05/01	ACTIVE	87	567	458
Vernal	04860	PADDYS GAP	4,183	3,678	639	SHEEP	10/01	01/25	ACTIVE	100		
Vernal	04860	PADDYS GAP				CATTLE	04/12	04/30	ACTIVE	100	291	215
Vernal	04883	PARLEYS CANYON	16,341	14,627	851	CATTLE	03/01	04/25	ACTIVE	100	356	259
Vernal	04852	PERRY	4,351	1,405	1,405	CATTLE	05/15	10/15	ACTIVE	31	66	58
Vernal	02886	POT MOUNTAIN	2,791	2,098	2,098	CATTLE	05/16	10/15	ACTIVE	57	183	183
Vernal	15857	POWDER WASH	26,783	22,589	3,827	SHEEP	11/15	05/01	ACTIVE	100	2,100	543
Vernal	15851	RAVEN RIDGE	10,985	7,448	7,030	SHEEP	12/05	05/05	ACTIVE	81	1,112	654
Vernal	04857	RED MOUNTAIN	11,684	6,467	273	CATTLE	05/01	06/10	ACTIVE	55		
Vernal	04857	RED MOUNTAIN				CATTLE	09/01	12/25	ACTIVE	55	276	125
Vernal	14833	RUPLE CABIN	15,892	12,195	10,063	CATTLE	09/07	09/16	ACTIVE	100		
Vernal	14833	RUPLE CABIN				CATTLE	06/01	10/15	ACTIVE	74	1,763	660
Vernal	04862	S.J. HATCH	29,751	22,159	13,527	CATTLE	10/15	12/13	ACTIVE	100		
Vernal	04862	S.J. HATCH				CATTLE	05/01	06/01	ACTIVE	87	1,000	379
Vernal	08818	SAND WASH	74,352	52,037	24,939	CATTLE	11/30	04/30	ACTIVE	76	4,526	2,537

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Vernal	08806	SANTIO SIBELLO	2,217	2,187	1,940	CATTLE	11/01	02/28	ACTIVE	100	96	95
Vernal	04838	SCHOOL BUS DRAW	2,173	1,515	1,515	CATTLE	05/01	10/30	ACTIVE	100	180	149
Vernal	04849	SHINDY	3,226	2,901	21	CATTLE	05/01	05/31	ACTIVE	100	68	76
Vernal	04869	SHINER	44,498	38,545	38,406	CATTLE	11/01	04/30	ACTIVE	90	3,000	971
Vernal	04842	SHINER-UT/COLO	4,518	10	10	CATTLE	05/16	10/25	ACTIVE	16	108	63
Vernal	04848	SMELTER SPRINGS	749	387	387	CATTLE	06/01	10/01	ACTIVE	15	24	24
Vernal	15860	SNAKE JOHN	10,680	9,266	7,571	SHEEP	11/06	05/01	ACTIVE	100	1,164	586
Vernal	04856	SPRING CREEK	7,830	4,255	1,622	CATTLE	11/15	12/09	ACTIVE	50		
Vernal	04856	SPRING CREEK				CATTLE	05/01	06/01	ACTIVE	50	194	75
Vernal	15824	STUNTZ VALLEY	4,900	950	949	CATTLE	06/01	10/03	ACTIVE	87	908	501
Vernal	08814	SUNDAY SCHOOL CANYON	51,606	40,489	8,335	CATTLE	11/01	04/30	ACTIVE	100	2,843	2,139
Vernal	08822	SWEET WATER	103,265	84,290	36,087	CATTLE	05/01	10/31	ACTIVE	72	6,527	4,821
Vernal	08812	THORNE-UTE-BROOME	5,440	3,676	3,578	CATTLE	11/01	02/28	ACTIVE	100	248	249
Vernal	14800	THREE CORNERS	2,198	1,070	1,070	CATTLE	05/01	10/15	ACTIVE	50	167	172
Vernal	15813	TWELVE MILE	48,712	40,293	36,494	CATTLE	10/01	04/30	ACTIVE	93	2,784	1,121
Vernal	04891	TWIN KNOLLS	6,969	6,045	4,107	CATTLE	11/01	04/01	ACTIVE	100	596	245
Vernal	14813	WARREN DRAW NORTH	6,005	4,095	853	CATTLE	05/15	10/31	ACTIVE	100	95	90
Vernal	04876	WATER CANYON #1	5,121	2,330	51	CATTLE	06/15	10/10	ACTIVE	40	153	135
Vernal	04879	WATER CANYON #2	6,698	4,043	2	CATTLE	02/15	03/31	ACTIVE	50	102	98
Vernal	08815	WATSON-BC	23,611	8,790	1,899	SHEEP	11/15	04/30	ACTIVE	43	1,258	562
Vernal	15803	WEST HUBER	7,338	4,010	4,010	CATTLE	10/01	05/01	ACTIVE	55	402	182
Vernal	04846	WEST LITTLE MOUNTAIN	2,233	1,012	1,012	CATTLE	05/01	10/31	ACTIVE	49	121	89
Vernal	04829	WEST POT CREEK	2,872	1,389	131	HORSE	05/01	10/31	ACTIVE	17		
Vernal	04829	WEST POT CREEK				CATTLE	05/01	10/31	ACTIVE	17	107	105
Vernal	02770	WEST SERVICEBERRY SPRING	1,339	790	507	CATTLE	05/01	10/31	ACTIVE	42	43	43

Table Q.1
BLM Allotments

Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Vernal	04844	WILD MOUNTAIN-COLO	4,636	4	2	CATTLE	05/24	09/06	ACTIVE	100	392	277
Vernal	04887	WILKERSON	239	219	219	CATTLE	06/01	10/31	ACTIVE	100	15	14
Vernal	14801	WILLOW CREEK	12,194	6,248	4,127	CATTLE	05/15	09/30	ACTIVE	35	602	399
Vernal	04885	WILLOW SPRING	1,407	904	904	CATTLE	06/01	09/02	ACTIVE	55	85	74
Vernal	08827	WINTER RIDGE AMP	41,507	33,802	2,978	CATTLE	11/16	06/30	ACTIVE	100	914	1,073
Price	34007	BEAVER CREEK	13,429	1,912	1,893	CATTLE	07/01	10/31	ACTIVE	15	300	227
Price	24014	BUCKSKIN	3,544	673	513	CATTLE	06/16	09/30	ACTIVE	9	99	50
Price	34028	CONSUMERS WASH	10,723	7,605	3,662	SHEEP	10/01	06/20	ACTIVE	100	444	135
Price	34032	COW CANYON	9,990	2,178	416	CATTLE	06/01	10/15	ACTIVE	4	65	50
Price	34033	CRANDALL CANYON	7,825	2,148	45	CATTLE	05/01	10/31	ACTIVE	55	104	81
Price	34038	DRY CANYON	20,878	14,119	3,727	CATTLE	07/01	08/31	ACTIVE	36		
Price	34038	DRY CANYON				CATTLE	06/01	06/30	ACTIVE	100		
Price	34038	DRY CANYON				CATTLE	09/01	10/15	ACTIVE	100	640	336
Price	34045	FAUSETT	1,287	242	72	SHEEP	11/01	05/31	ACTIVE	5	16	15
Price	34046	FISH CREEK	4,718	513	513	CATTLE	05/16	10/15	ACTIVE	100	25	25
Price	14130	GORDON CRK WITHDRAWL	21,837	5,729	2,801	CATTLE	05/01	06/30	ACTIVE	25	50	105
Price	34049	GREEN RIVER	139,485	101,708	46,683	CATTLE	02/01	04/15	ACTIVE	95		
Price	34049	GREEN RIVER				CATTLE	04/16	10/15	ACTIVE	93	3,271	496
Price	34051	HALEY CANYON	3,249	2,798	1,287	CATTLE	05/16	10/31	ACTIVE	100	117	137
Price	24052	HIAWATHA	5,235	2,178	840	CATTLE	04/16	05/31	ACTIVE	100	54	No Data
Price	34057	IRIART	2,622	1,187	329	CATTLE	05/01	10/31	ACTIVE	43	72	70
Price	35035	JOHNSON	5,503	4,823	37	CATTLE	10/16	12/31	ACTIVE	100		
Price	14128	KYUNE I	31,254	6,706	1,121	CATTLE	06/01	10/31	ACTIVE	20	448	296
Price	24062	KYUNE II	10,428	4,660	2,574	CATTLE	06/01	10/31	ACTIVE	49	380	443
Price	35038	LINK CANYON	3,472	3,388	1	CATTLE	11/01	02/28	ACTIVE	100	288	136
Price	14135	LONG BENCH	7,572	716	367	CATTLE	05/01	10/31	ACTIVE	3	20	20
Price	24070	MARAKIS	38	33	33	SHEEP	06/01	06/15	ACTIVE	8		

Table Q.1
BLM Allotments

Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Price	24070	MARAKIS				SHEEP	10/01	10/15	ACTIVE	8	16	12
Price	24078	MUDWATER	747	531	18	CATTLE	07/15	08/31	ACTIVE	30	15	9
Price	24085	PACE CANYON	7,825	1,431	41	CATTLE	06/01	06/30	ACTIVE	100		
Price	24085	PACE CANYON				CATTLE	10/01	10/31	ACTIVE	100	80	62
Price	25064	PEACOCK	3,095	3,079	35	CATTLE	04/01	06/10	ACTIVE	40	56	41
Price	24089	PINE CANYON	4,715	848	234	CATTLE	06/01	10/31	ACTIVE	5	50	50
Price	34090	PINNACLE BENCH	2,101	981	311	SHEEP	05/01	06/30	ACTIVE	100		
Price	34090	PINNACLE BENCH				CATTLE	11/01	12/15	ACTIVE	100	119	55
Price	34092	POLE CANYON	9,286	900	594	CATTLE	05/16	10/15	ACTIVE	8	145	114
Price	34093	PORPHYRY BENCH	8,375	768	606	CATTLE	04/16	06/20	ACTIVE	100		
Price	34093	PORPHYRY BENCH				CATTLE	10/01	11/15	ACTIVE	100	64	59
Price	24086	PRICE CANYON-EAST	7,019	5,225	2,015	CATTLE	05/16	11/15	ACTIVE	54	354	271
Price	34094	PRICE CANYON-WEST	7,428	6,272	3,495	CATTLE	05/16	11/15	ACTIVE	94	523	429
Price	24097	RANGE MOUNTAIN	3,395	246	148	CATTLE	06/16	10/15	ACTIVE	10	120	50
Price	14101	ROCK CREEK	73,487	62,803	3,626	HORSE	04/16	10/31	ACTIVE	30		
Price	14101	ROCK CREEK				CATTLE	04/16	10/31	ACTIVE	30		
Price	14101	ROCK CREEK				CATTLE	11/01	04/15	ACTIVE	100		
Price	14101	ROCK CREEK				HORSE	11/01	04/15	ACTIVE	100	1,361	294
Price	14103	SHEEP CANYON	18,896	9,446	217	CATTLE	06/01	10/31	ACTIVE	20	696	302
Price	24107	SPRING CANYON	8,570	3,122	121	CATTLE	05/15	10/31	ACTIVE	25	212	203
Price	04109	STONE CABIN	30,463	23,374	9,634	CATTLE	05/01	09/30	ACTIVE	91		
Price	04109	STONE CABIN				HORSE	05/01	09/30	ACTIVE	91	1,625	1,149
Price	14112	TRAIL CANYON	5,860	2,768	105	SHEEP	06/01	10/15	ACTIVE	30		
Price	14112	TRAIL CANYON				CATTLE	05/16	10/31	ACTIVE	30	420	252
Price	14131	VAN DUESEN	3,589	444	295	CATTLE	06/15	09/30	ACTIVE	5	57	32
Price	14118	WATTIS	5,744	3,185	1,111	CATTLE	05/01	09/30	ACTIVE	45	41	No Data
Price	25093	WEST ORANGEVILLE	4,805	4,251	9	CATTLE	04/20	06/10	ACTIVE	100		
Price	25093	WEST ORANGEVILLE				CATTLE	10/16	12/31	ACTIVE	56	288	141

Table Q.1
BLM Allotments

Admin Office	Allotment Number	Allotment Name	Total Allotment Acres	BLM Acres	Acres Within Occupied GRSG Habitat	Kind of Livestock	Permit Begin Date	Permit End Date	Type Use	% Public Lands	Active AUMs	Billed Average AUMs*
Price	14122	WILLOW CREEK	15,025	6,269	149	CATTLE	05/01	10/15	ACTIVE	30	210	178
GSENM	24008	BLACK ROCK	9,350	9,310	6,435	CATTLE	06/16	10/15	ACTIVE	100	408	645
GSENM	05917	BLACK ROCK (STATE)	1,252	1,252	1,202	CATTLE	06/16	10/15	ACTIVE	100	64	55
GSENM	24041	FIRST POINT	3,015	3,015	7	CATTLE	06/01	12/31	ACTIVE	100	410	257
GSENM	24047	FORD WELL	9,088	9,088	901	CATTLE	06/10	10/09	ACTIVE	100	301	256
GSENM	04121	JOHNSON CANYON	5,441	5,403	1,011	CATTLE	06/01	11/15	ACTIVE	100	274	137
GSENM	04102	PINE POINT	9,683	8,828	608	CATTLE	06/16	10/15	ACTIVE	100	365	132
GSENM	04161	SECOND POINT	5,258	5,258	63	CATTLE	08/01	09/30	ACTIVE	100		
GSENM	04161	SECOND POINT				CATTLE	06/01	12/31	ACTIVE	100	98	33
			6,495,425	4,543,294	2,328,309							

*Average of billed use, when available, over the past ten years. For some allotments, there were years of non-use. In these instances, only those years that had billed use within the past ten were averaged.

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
Ashley	00400	ANTELOPE	23,896	23,896	9,281	9,281	747	12	1	3	23	8,162	742
Ashley	00601	ANTELOPE CAMPGROUND	253	253	206	206	0	0	0	0	0	0	0
Ashley	00401	ANTHRO MOUNTAIN	24,664	24,664	17,299	17,299	2,859	6	1	10	15	21,753	1,978
Ashley	00122	BARE TOP MOUNTAIN	15,467	15,467	6,672	6,672	0	0	0	0	0	0	0
Ashley	00201	BLACK CANYON	37,554	37,554	1,300	1,300	1,985	6	16	10	15	23,887	2,172
Ashley	00200	BRUSH CREEK	12,389	12,388	12,365	12,364	3,397	6	6	9	30	41,213	3,747
Ashley	00506	BURNT FORK C&H	19,131	19,124	906	903	0	0	0	0	0	0	0
Ashley	00403	COTTONWOOD	11,217	11,217	10,715	10,715	1,260	6	16	10	15	16,971	1,543
Ashley	00215	DAVENPORT	2,978	2,976	154	153	46	7	6	9	5	616	56
Ashley	00202	DIAMOND MTN	11,023	11,023	11,009	11,009	3,670	6	1	10	15	45,493	4,136
Ashley	00248	DRY FORK	17,927	17,927	2,587	2,587	1,399	6	21	9	20	15,000	1,364
Ashley	00300	DRY GULCH	55,379	55,379	936	936	3,709	6	20	9	25	42,038	3,822
Ashley	00404	DRY RIDGE	8,763	8,763	361	361	601	6	21	9	21	7,569	688
Ashley	00606	DUTCH JOHN	18,753	15,854	6,420	4,260	0	0	0	0	0	0	0
Ashley	00607	DUTCH JOHN GAP HWY EXCLOSURE	60	60	59	59	0	0	0	0	0	0	0
Ashley	00301	FARM CREEK/BUCK RIDGE	38,804	38,798	3,259	3,253	2,298	6	11	9	10	21,778	1,980
Ashley	00104	GOSLIN MT (BLM ADMIN)	13,564	13,564	11,934	11,934	1,195	5	1	9	30	13,145	1,195
Ashley	00221	GRIZZLY RIDGE	7,385	7,384	832	832	0	0	0	0	0	819	74
Ashley	00106	HICKERSON PARK	18,310	18,309	419	419	1,145	6	22	9	17	12,663	1,151
Ashley	00222	IRON SPRINGS	4,336	4,336	302	302	0	0	0	0	0	2,824	257
Ashley	00233	JACKSON DRAW	443	443	40	40	13	7	16	9	15	142	13
Ashley	00302	LAKE FORK	30,542	30,539	193	192	688	6	21	9	21	4,401	400
Ashley	00249	LAKE MOUNTAIN	7,976	7,976	3,544	3,544	1,222	6	21	9	30	15,245	1,386
Ashley	00406	LEFT FORK INDIAN CANYON	7,447	7,447	1,050	1,050	521	6	16	10	15	5,819	529
Ashley	00205	LENA PEAK	9,950	9,949	3,939	3,939	1,437	7	1	9	30	15,735	1,430
Ashley	00108	LITTLE DAVENPORT	2,337	2,336	1	1	24	8	15	10	15	630	57
Ashley	00257	LONESOME PARK	41,857	41,856	307	307	1,276	6	20	9	25	18,853	1,714
Ashley	00208	MOSBY MOUNTAIN	21,753	21,747	3,966	3,966	1,953	6	11	9	30	21,611	1,965
Ashley	00330	MULE CREEK	280	278	220	218	122	6	1	10	15	594	54

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
Ashley	00312	PETTY MOUNTAIN	33,906	33,905	54	54	1,060	6	21	9	8	6,075	552
Ashley	00412	PIGEON WATER	3,399	3,399	887	887	635	6	16	9	30	8,397	763
Ashley	00303	POLE CREEK	8,754	8,754	458	458	313	7	6	8	22	1,812	165
Ashley	00227	POT CREEK	5,741	5,740	797	796	199	6	1	10	31	2,189	199
Ashley	00612	REEVES & GLADES	768	768	57	57	0	0	0	0	0	0	0
Ashley	00109	SHEEP CREEK PARK	26,162	26,162	948	948	1,171	6	15	9	20	12,811	1,165
Ashley	00416	SOWERS CANYON	20,710	20,710	2,972	2,972	1,741	6	1	10	15	20,658	1,878
Ashley	00130	SPRING CREEK (BLM ADMIN)	44,296	0	23	0	157	5	16	10	30	2,007	182
Ashley	00260	TAYLOR MTN-OAKS PARK	61,335	61,331	14,082	14,078	5,407	6	1	9	30	59,809	5,437
Ashley	00292	VERNAL MUNICIPAL WATERSHED	6,689	6,627	242	242	0	0	0	0	0	0	0
Ashley	00256	WEST WHITEROCKS ON/OFF	223	223	138	138	0	0	0	0	0	0	0
Ashley	00304	YELLOWSTONE	16,667	16,665	929	928	1,079	6	16	9	30	12,320	1,120
Dixie	00224	Black Mountain Ikes Valley	40,734	0	4	0	1,144	6	15	10	8	6,406	582
Dixie	00301	Blue Fly C&H	20,496	20,469	6,802	6,774	1,021	6	11	10	10	10,886	990
Dixie	00203	Butler Creek	9,846	8,829	7,231	6,281	465	6	16	9	30	5,389	490
Dixie	00402	Cameron Wash	14,220	14,059	9,465	9,303	1,414	6	11	10	10	10,408	946
Dixie	00303	Clark Mountain C&H	29,439	29,439	2,070	2,070	533	6	1	10	10	5,817	529
Dixie	00404	Coyote Hollow	74,766	74,367	34,238	33,839	6,501	6	16	10	15	45,732	4,157
Dixie	00501	Dark Valley Common Use	81,197	80,916	52,339	52,219	0	0	0	0	0	0	0
Dixie	00325	Deer Creek S&G	58,045	58,045	3,620	3,620	1,077	6	6	9	30	11,786	1,071
Dixie	00204	Dry Lake-Bunker-Hatch Mtn	16,432	14,233	1,512	1,512	603	6	16	9	30	7,007	637
Dixie	00306	East Fork/Crawford	45,138	43,304	7,720	5,888	2,153	6	16	10	5	22,982	2,089
Dixie	00307	East Pines C&H	19,670	19,478	17,780	17,589	1,525	6	1	10	10	13,386	1,217
Dixie	00308	Hatch C&H	9,832	9,606	1,076	855	180	6	16	9	15	1,832	167
Dixie	00234	Haycock Creek	11,829	11,439	6,834	6,620	1,203	6	11	10	10	11,643	1,058
Dixie	00235	Haycock Mtn-Brian Head	12,078	11,531	6,707	6,394	845	6	11	10	15	9,040	822
Dixie	00310	Hillsdale C&H	5,994	5,715	2,782	2,504	0	0	0	0	0	0	0
Dixie	00405	Horse Creek	24,340	24,149	274	242	1,180	6	16	9	30	8,310	755

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
Dixie	00326	Hunt Creek/Cottonwood S&G	50,837	50,837	767	767	1,073	6	6	9	30	11,513	1,047
Dixie	00312	Jones Corral C&H	15,263	15,263	2,151	2,151	1,192	6	1	10	10	19,443	1,768
Dixie	00208	Little Valleys	25,582	24,953	8,989	8,527	1,801	6	1	10	15	19,596	1,781
Dixie	00314	Lower Robinson C&H	4,828	4,828	5	5	181	7	1	10	15	2,043	186
Dixie	00212	Panguitch Lake	11,383	10,897	6,706	6,402	688	6	16	10	15	10,702	973
Dixie	00407	Pine Creek	50,086	49,984	7,949	7,949	3,004	6	16	9	30	22,092	2,008
Dixie	00408	Pine Lake	13,996	13,687	1,933	1,624	286	6	11	10	10	2,091	190
Dixie	00317	Pines C&H	28,267	27,775	19,673	19,181	2,658	6	1	10	10	28,319	2,574
Dixie	00318	Pole Canyon C&H	5,112	4,475	261	261	0	0	0	0	0	0	0
Dixie	00328	Red Canyon	9,533	9,533	847	847	0	0	0	0	0	0	0
Dixie	00213	Red Creek	54,791	53,130	8,974	7,432	3,682	6	16	10	15	41,194	3,745
Dixie	00238	Sage Valley-Horse Valley	5,822	4,870	1,291	699	1,425	6	26	10	10	14,544	1,322
Dixie	00327	Smith Canyon C&H	13,662	13,607	95	40	0	0	0	0	0	0	0
Dixie	00409	Sweetwater/Griffin Top	12,981	12,851	1,532	1,531	1,015	6	6	9	30	8,524	775
Dixie	00222	Three Creeks	6,952	6,952	2,572	2,572	268	6	1	8	31	3,046	277
Dixie	00322	Widtsoe C&H	13,020	12,691	11,268	10,938	1,942	6	1	10	10	19,170	1,743
Dixie	00329	Willow Spring C&H	20,860	20,860	9,659	9,659	928	6	1	10	10	4,290	390
Dixie			4,072	0	10	0							0
Dixie			6,945	4,799	3	3							0
Dixie			11,808	11,808	227	227							0
Dixie			151	28	151	28							0
Dixie			232	232	232	232							0
Fishlake	04101	Beaver Dams Allotment	7,563	7,562	26	26	552	6	1	10	5	6,072	552
Fishlake	04001	Browns Hole Allotment	49,803	47,877	41	35	7,388	5	1	10	15	81,082	7,371
Fishlake	03001	Circleville Allotment	37,568	36,959	249	248	1,213	6	1	10	15	23,365	2,124
Fishlake	02101	Daniels Allotment	13,911	13,899	184	184	1,233	7	1	9	30	17,203	1,564
Fishlake	05001	Dark Valley Common Use	81,985	81,590	53,088	52,846	5,814	6	16	10	15	65,333	5,939
Fishlake	04104	Flat Top Allotment	7,574	7,562	27	26	1,497	5	25	11	15	14,610	1,328
Fishlake	04105	Forshea Allotment	13,014	13,003	3,728	3,725	460	6	6	10	15	2,675	243
Fishlake	02102	Hancock Allotment	21,744	21,731	1,869	1,860	1,193	7	15	10	15	12,725	1,157
Fishlake	05007	King Pasture	91	79	12	11	8	10	15	4	15	70	6
Fishlake	04003	Kingston Allotment	10,747	10,653	7,919	7,874	1,614	6	6	10	15	23,415	2,129
Fishlake	04004	Koosharem Allotment	41,942	39,091	17	13	5,376	6	1	10	15	48,417	4,402

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
Fishlake	02001	Last Chance Allotment	34,827	33,325	30,895	29,399	2,977	6	1	10	20	32,289	2,935
Fishlake	04005	Lost Creek Allotment	36,095	33,489	3,917	3,812	6,477	6	12	10	11	73,777	6,707
Fishlake	04007	Meadow Gulch Allotment	16,693	14,402	1	1	1,672	6	1	11	30	18,466	1,679
Fishlake	04111	Monument-Glenwood Allotment	14,097	10,968	188	183	726	7	1	9	30	4,981	453
Fishlake	04110	Moroni Peak Allotment	8,512	8,313	577	378	2,085	6	6	10	5	22,237	2,022
Fishlake	04016	Niotche Creek Allotment	9,723	9,073	1,332	1,332	2,925	6	25	10	10	32,739	2,976
Fishlake	04116	Red Creek Allotment	13,138	13,137	5,986	5,986	850	6	1	10	15	7,904	719
Fishlake	02002	Seven Mile Allotment	34,690	31,924	12,746	12,599	6,760	6	1	10	16	73,356	6,669
Fishlake	02003	Solomon Allotment	32,806	32,389	11,151	11,098	2,709	6	1	10	31	26,089	2,372
Fishlake	03007	South Beaver Allotment	45,088	43,005	4,976	4,972	3,092	6	1	10	15	31,879	2,898
Fishlake	04120	South Water Hollow Allotment	20,986	16,422	3	2	1,308	6	6	10	5	15,435	1,403
Fishlake	02004	Thousand Lake Allotment	66,589	66,555	1,155	1,139	2,446	6	1	10	15	23,058	2,096
Fishlake	02005	Tidwell Allotment	19,808	19,689	17,515	17,421	4,450	6	1	10	31	48,304	4,391
Fishlake	02202	UM Allotment	43,069	41,225	26,703	25,205	4,882	6	1	10	16	53,616	4,874
MantiLaSal	00109	BEAVER DAMS/BOULGER	8,817	4,808	1,132	157	1,100	7	6	10	5	11,738	1,067
MantiLaSal	00308	BOB WRIGHT	5,316	5,305	20	20	2,768	7	1	9	30	9,632	876
MantiLaSal	00309	BOOTH CANYON	2,673	2,673	1,340	1,340	545	7	1	9	30	6,238	567
MantiLaSal	00352	C CANYON S & G	5,570	5,569	1,396	1,396	988	6	29	9	30	11,698	1,063
MantiLaSal	00314	CABIN HOLLOW	2,691	2,040	908	402	710	7	1	9	30	8,129	739
MantiLaSal	00315	CANDLAND	6,855	6,849	1	1	0	0	0	0	0	962	87
MantiLaSal	00301	CASTLE VALLEY RIDGE	10,275	10,260	2,190	2,184	465	6	21	9	30	7,401	673
MantiLaSal	00354	CEDAR KNOLLS S & G	5,722	5,718	44	43	144	6	1	6	30	1,590	145
MantiLaSal	00211	CLAY BANKS	7,782	7,782	570	570	2,246	8	21	9	25	8,196	745
MantiLaSal	00212	COVE MOUNTAIN S & G	4,190	4,190	8	8	772	7	6	9	30	9,163	833
MantiLaSal	00318	CRANDALL CANYON	7,794	6,160	317	317	344	7	6	9	25	5,658	514
MantiLaSal	00323	EAST GOOSEBERRY	3,731	1,681	1,348	890	271	7	1	10	10	6,853	623
MantiLaSal	00201	EAST MOUNTAIN	18,293	11,071	4,521	2,380	1,630	6	21	9	14	22,220	2,020
MantiLaSal	00202	EMERY	45,898	45,888	18,807	18,806	6,463	6	16	9	30	74,512	6,774
MantiLaSal	00102	FAIRVIEW C & H	9,215	7,930	1,129	922	1,377	7	1	9	30	20,903	1,900

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
MantiLaSal	00203	FERRON	69,265	68,404	3,400	3,400	7,158	6	21	10	5	81,184	7,380
MantiLaSal	00214	FLY-BULGER S&G	6,868	6,868	581	581	644	7	1	9	25	6,051	550
MantiLaSal	00302	GENTRY	34,634	30,477	2,045	2,041	6,081	6	27	9	30	64,128	5,830
MantiLaSal	00215	GEORGES FORK	6,215	6,215	3	3	1,046	7	1	9	30	14,112	1,283
MantiLaSal	00114	GOOSEBERRY-COTTONWOO	4,672	4,277	731	727	772	7	6	9	30	7,547	686
MantiLaSal	00204	HORN MT	70,041	69,231	43,083	42,493	3,595	6	6	9	30	44,925	4,084
MantiLaSal	00327	HORSE CREEK	4,536	4,534	941	940	604	7	1	9	30	5,922	538
MantiLaSal	00220	JOES VALLEY	8,198	8,186	7,378	7,372	1,482	6	6	9	30	12,445	1,131
MantiLaSal	00119	JONES RIDGE S & G	8,577	8,537	15	1	1,145	6	15	9	30	13,138	1,194
MantiLaSal	00103	LASSON C & H	11,900	11,828	541	473	1,118	7	1	9	30	11,608	1,055
MantiLaSal	00205	LOWERY WATER	891	890	773	772	144	6	20	8	30	1,560	142
MantiLaSal	00333	MANSION	1,948	1,339	1,014	602	569	7	1	10	10	6,939	631
MantiLaSal	00221	OLSEN BENCH	7,340	7,340	438	438	1,138	6	21	9	30	15,845	1,440
MantiLaSal	00224	POTTER CANYON	3,349	3,349	836	836	726	7	1	9	30	7,844	713
MantiLaSal	00303	PRIVATE LAND	1,600	32	172	2	0	0	0	0	0	0	0
MantiLaSal	00226	REEDER RIDGE	7,283	7,282	307	306	836	6	26	9	30	8,114	738
MantiLaSal	00343	South Skyline S & G	11,693	11,678	1,342	1,340	1,021	7	7	9	30	11,408	1,037
MantiLaSal	00344	SWENS CANYON	4,641	2,165	2,084	554	870	7	1	9	30	8,725	793
MantiLaSal	00206	TRAIL MT	24,647	23,766	3,773	3,371	3,613	6	21	9	20	40,381	3,671
MantiLaSal	00142	WALES C & H	349	307	12	2	3,176	6	10	9	10	36,901	3,355
Sawtooth	10003	BARNES CANYON C&H	2,838	1,917	2,838	1,917	1,470	7	11	9	25	8,397	763
Sawtooth	10006	CEDAR CREEK C&H	635	635	635	635	32	7	1	8	30	352	32
Sawtooth	10032	CLARKS BASIN S&G	8,490	7,859	8,490	7,859	1,774	5	16	10	10	17,676	1,607
Sawtooth	10033	CLEAR CREEK C&H	10,223	7,624	10,223	7,624	632	6	16	9	25	8,510	774
Sawtooth	10009	EAST END C&H	7,765	7,443	7,765	7,443	1,555	6	16	9	15	16,715	1,520
Sawtooth	10010	EAST PARK VALLEY C&H	1,623	1,272	1,623	1,272	450	7	10	9	5	10,759	978
Sawtooth	10019	ONE MILE - YOST C&H	9,141	9,123	9,141	9,123	1,025	6	16	9	30	20,863	1,897
Sawtooth	10023	ROSETTE C&H	11,489	11,489	11,489	11,489	994	6	16	9	18	16,753	1,523
Sawtooth	10027	WEST END C&H	21,430	20,802	21,430	20,802	3,725	6	21	9	20	41,705	3,791
Sawtooth	10028	WEST PARK VALLEY C&H	3,937	3,638	3,937	3,638	691	7	11	9	20	11,291	1,026
Uinta		ADMINISTRATION SITE	62	62	58	58	0	0	0	0	0	0	0

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
Uinta	00818	AULT	1,552	1,547	1,552	1,547	202	5	1	11	10	2,170	197
Uinta	00817	AULT-BLM	398	397	398	397	42	5	1	11	10	328	30
Uinta	00302	BEAR HOLE	5,588	5,549	1,254	1,244	1,345	6	11	10	15	17,013	1,547
Uinta	00821	BENMORE	14,019	13,835	14,019	13,835	2,830	5	1	11	10	30,357	2,760
Uinta	00822	BENNION	9,441	9,286	9,441	9,286	281	10	1	11	14	8,685	790
Uinta		BENNION RANCH	2,116	8	2,116	8	0	0	0	0	0	0	0
Wasatch-Cache	00720	BLACKSMITH FORK	551	540	551	540	0	0	0	0	0	0	0
Wasatch-Cache	00704	BOULDER MOUNTAIN	6,666	6,592	1,472	1,472	822	7	1	9	30	9,827	893
Uinta	00307	BROAD HOLLOW/PETE'S KNOLL	5,165	5,160	36	36	1,302	6	16	9	30	14,548	1,323
Uinta	00312	BRYANTS FORK	3,497	3,497	538	538	1,004	6	26	9	30	9,951	905
Wasatch-Cache	00627	BUCK SPRINGS	7,088	5,816	158	158	818	7	5	9	25	8,794	799
Wasatch-Cache	00601	BUG LAKE	7,733	5,374	2,220	1,288	1,269	6	6	9	30	15,416	1,401
Wasatch-Cache	00506	BURNT FK	18,013	17,996	906	903	327	6	26	9	25	7,864	715
Uinta	00309	CAMP HOLLOW	4,164	4,155	176	175	722	7	11	9	25	7,868	715
Wasatch-Cache	00603	CAUSEY CREEK	2,856	113	60	56	177	9	28	10	15	8,158	742
Uinta	00311	CHIPMAN	4,606	4,606	820	820	1,203	6	16	10	15	10,131	921
Wasatch-Cache	00620	CRAWFORD-FRAZIER	6,892	125	115	75	812	8	1	9	30	7,561	687
Wasatch-Cache	00614	DRY CREEK	163	159	163	159	0	0	0	0	0	72	7
Uinta	00829	EAST COTTONWOOD	10,162	6,156	10,162	6,156	305	5	16	10	15	2,402	218
Uinta	00364	EAST DANIELS	23,007	22,992	321	321	4,139	6	21	9	30	48,473	4,407
Uinta		HORSE PASTURE	172	172	172	172	0	0	0	0	0	0	0
Uinta	00365	LITTLE SOUTH FORK	20,855	4,155	176	175	940	6	15	10	11	11,966	1,088
Uinta	00823	LITTLE VALLEY-VERNON	9,365	9,025	9,365	9,025	108	6	6	10	15	16,653	1,514
Uinta	00366	MUD CREEK CATTLE	5,757	5,757	2,052	2,052	2,450	6	16	10	5	29,598	2,691
Uinta	00336	MUD CREEK SHEEP	3,558	3,558	42	42	1,056	6	21	9	30	10,418	947
Wasatch-Cache	00631	NORTH RANDOLPH	8,959	7,386	1	1	971	6	21	9	5	15,646	1,422
Uinta	00824	ONAQUI	12,339	12,160	12,339	12,160	1,397	5	26	10	15	12,766	1,161
Wasatch-Cache	00609	PETES HOLLOW	3,155	3,050	1,520	1,513	277	6	20	10	15	1,144	104
Uinta		PRIVATE	3,917	6	767	6	0	0	0	0	0	0	0
Uinta	00343	RED LEDGE	7,991	7,991	24	24	1,089	7	1	9	30	13,479	1,225
Wasatch-Cache	00602	RED WELLS-ROCK CREEK	12,449	9,826	3,415	3,304	1,089	7	1	9	30	12,077	1,098

Table Q.2
Forest Service Allotments

National Forest	Unit No.	Range Management Unit (RMU) Name	Total RMU Acres	Forest Service Acres in RMU	Acres in RMU in GRSG Habitat	Forest Service Acres in RMU in GRSG Habitat	Permitted AUMs	Season of Use				10-Year Total AUMs	10-Year Avg AUMs
								From Month	From Day	To Month	To Day		
Uinta	00819	SABIE MOUNTAIN	8,155	7,532	8,155	7,532	1,217	5	6	10	15	11,507	1,046
Uinta	00846	SHARPES VALLEY	2,059	2,021	2,059	2,021	256	5	1	10	31	2,638	240
Wasatch-Cache	00730	SOUTH CACHE	19,269	18,035	2,013	1,975	2,570	6	1	9	10	28,665	2,606
Uinta	00348	SQUAW CREEK	3,145	3,145	1,148	1,148	1,089	7	1	9	30	11,802	1,073
Wasatch-Cache	00731	STRAWBERRY VALLEY	1,153	1,150	602	600	992	6	1	10	15	20,315	1,847
Uinta	00350	STREEPER CREEK NORTH	4,259	4,259	682	682	1,207	6	21	9	30	14,360	1,305
Uinta	00351	STREEPER CREEK SOUTH	3,243	3,243	3	3	1,184	6	23	9	30	12,955	1,178
Uinta	00353	TRAIL HOLLOW	2,689	2,689	60	60	1,203	6	16	10	15	11,439	1,040
Uinta	00354	TROUT CREEK	2,833	2,833	5	5	737	7	1	8	15	10,479	953
Uinta	00840	VERNON	21,537	20,240	21,537	20,240	3,309	5	1	11	10	28,661	2,606
Uinta	00843	WEST COTTONWOOD	10,121	6,651	10,121	6,651	867	5	15	10	15	13,633	1,239
Uinta	00367	WEST DANIELS	14,487	14,485	453	453	2,833	6	16	10	15	27,999	2,545
							265,373						**263,985**

Appendix R

Oil and Gas Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Occupied Habitat in Utah Sub-Region

APPENDIX R
OIL AND GAS REASONABLY FORESEEABLE DEVELOPMENT SCENARIO FOR GREATER SAGE-GROUSE OCCUPIED HABITAT IN UTAH SUB-REGION

INTRODUCTION

This Reasonably Foreseeable Development (RFD) scenario is a required component of the Utah Greater Sage-Grouse Land Use Plan Amendment (LUPA)/Environmental Impact Statement (EIS) and addresses potential oil and gas exploration and development over the next 15 years, and its resulting potential impact on leasing and development of federal and nonfederal lands and/or mineral rights within occupied Greater Sage-Grouse (GRSG) habitat in Utah. Within Utah, GRSG habitat is located in 13 large scattered areas, identified as population areas, and is concentrated in a north-northeast trending line from eastern Iron County in the south to Daggett County in the north. Each area contains lands managed by a variety of agencies, including the US Department of the Interior, Bureau of Land Management (BLM), US Department of Agriculture, Forest Service (Forest Service), State of Utah, and the Ute Tribe, as well as fee lands. This RFD scenario applies primarily to BLM-administered and National Forest System lands and split-estate underlain by federal minerals, although it takes into consideration nonfederal development in the cumulative impact analysis.

This Reasonably Foreseeable Development Scenario generally follows the procedures outlined in BLM Instruction Memorandum 2004-089, Policy for Reasonably Foreseeable Development Scenarios for Oil and Gas. It is a rational estimate of development based under the assumption that all potential productive areas are open for oil and gas leasing and developed under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation, or executive order. The effect of the alternatives on potential development is also included in this scenario. An RFD scenario is not a decision and does not authorize, approve, or limit any development.

Oil and gas occurrence potential (as shown on **Map 3.21-2**, Oil and Gas Occurrence Potential; **Appendix A**) is one of several criteria used to project future oil and gas activity in GRSG occupied habitat. For the Utah Greater Sage-Grouse LUPA/EIS, including this RFD scenario, the BLM used a modified version of the oil and gas potential map contained in the US Geological Survey (USGS) publication *Summary of Science, Activities, Programs, and Policies That Influence the Rangewide Conservation of Greater Sage-Grouse (Centrocerceus urophasianus)*, also known as the Baseline Environmental Report (BER). This map was originally included in a peer reviewed document titled *Mapping Oil and Gas Development Potential in the US Intermountain West and Estimating the Impacts to Species* (Copeland et al). During development of the LUPA/EIS, the baseline map was reviewed and modified by qualified mineral specialists in the BLM Utah State Office including the BLM's petroleum engineers and geologists. Numerous changes were made to more accurately reflect oil and gas potential in the planning area. For example, approximately 3,339,234 acres of additional moderate potential, and 265,278 acres of additional high potential were identified in the planning area. This modified version of the map developed by Copeland et al was used for this EIS because it estimates oil and gas potential for all GRSG habitats in the planning area. Oil and gas potential maps were developed and included in the mineral reports completed by the BLM or the Utah Geological Survey for the Cedar City, Price, Vernal, Richfield, and Kanab resource management plans (RMPs); these maps were not used because the combination of these maps does not provide information on oil and gas potential covering all GRSG habitat located in the Utah planning area. In addition, these mineral potential reports, which were completed for individual planning units were not edge-matched, meaning when the layers were placed side-by-side there inconsistencies; finally these maps (Cedar City excepted) were created between approximately 2000 and 2005 and therefore, also do not include up-to-date information given new information and technologies.

In addition to the above-mentioned map, RFD estimates are based on other criteria including past and present oil and gas exploration and development activity within and near GRSG occupied habitat, existing oil and gas leases, expressions of interest submitted by industry, exploration and development trends, locations of seismic surveys, existing infrastructure, and commodity prices. GRSG occupied habitat within each population area is addressed below generally from the lowest oil and gas potential to the highest. Information detailing the proposed oil and gas development wells for alternatives are detailed in **Table R.1**, Predicted Number of Wells Drilled by Alternative in Each Population Area and County, and **Table R.2**, Predicted Number of Producing Wells by Alternative in Each Population Area by County, at the end of this appendix.

In order to assess potential oil and gas development, a Microsoft Excel spreadsheet was compiled with existing oil and gas data from the Utah Department of Oil, Gas, and Mining. The Utah Department of Oil, Gas, and Mining data were then intersected with the GRSG occupied habitat shape file. This resultant data set was exported into Microsoft Excel and queried first by population area and then by county to determine potential impacts at the county level. Data partitioned by county includes percentage of population area acreage within each county, number of federal and nonfederal producing oil and gas wells, federal and nonfederal number of shut-in oil and gas wells, mineral ownership, applications for permit to drill (APD), plugged and abandoned wells, and plugged and abandoned dry holes. These data were then analyzed spatially

in ArcMap 10.0 Geographic Information System (GIS) for proximity to oil and gas fields and federal units to estimate well locations by county.

This Microsoft Excel and GIS data were then analyzed with respect to the number of wells in the RFD scenario to determine the likelihood of success, location, and federal or nonfederal mineral interest, and whether a well is anticipated to be drilled on existing or new leases.

Using this analysis, little or no impact is anticipated in the Bald Hills, Box Elder, Hamlin Valley, Ibapah, Lucerne, Panguitch, Parker Mountain, Sheeprocks, Wyoming-Blacks Fork, and Wyoming-Uinta Population Areas due to low oil and gas potential and/or lack of existing oil or gas production. Only two of the population areas are anticipated to have significant development on federal minerals: Carbon and Uintah. Predicted development for individual population areas is described below.

BASELINE REASONABLY FORESEEABLE DEVELOPMENT SCENARIO BY POPULATION AREA

Ibapah

The Ibapah Population Area is located in the west-central portion of the state bordering Nevada, approximately 17 percent of which is located in Juab County and 83 percent of which is in Tooele County. The majority of mineral interest in Tooele County is federal, while 100 percent of the mineral interest in GRSG mapped occupied habitat in Juab County is nonfederal (95 percent tribal and 5 percent fee). There are no existing leases, producing wells, or plugged and abandoned wells in occupied habitat or this population area. Therefore, there is little prospect for development in the near future, and no wells are projected.

Box Elder

Most parts of the Box Elder Population Area are underlain at depth by rocks that have been metamorphosed to some degree. Shallower units contain a high percentage of volcanic material, and the occurrence potential map reflects this basic geology by rating the area as having a low potential for oil and gas occurrence. A few past seismic surveys have been run, and six federal oil and gas leases are located in the southeastern part of the habitat area. Four wells have been drilled in the extreme northwestern part of the occupied habitat area. Five other dry holes are in the northeastern end of the occupied habitat. The geology of the area and past activity indicate that little exploration is expected in the next 15 years; therefore, no wells are projected.

Lucerne

The Lucerne Population Area borders Wyoming in the northeast portion of Utah, with approximately 36 percent of the acreage in Summit County and 64 percent in Daggett County. The majority of mineral interest in this population area is nonfederal (fee and state), with federal mineral interest at approximately 30 percent, of which 14 percent is located within two existing leases. There are no producing wells. There are seven plugged and abandoned wells inside occupied habitat of this population area, but outside existing federal leases. Although there are numerous wells just north of the Utah state line in Wyoming, none are producing in the vicinity of mapped occupied habitat; therefore, no wells are projected for this population area.

Wyoming-Blacks Fork

The entire Wyoming-Blacks Fork Population Area is within occupied habitat. Only the northeast corner of the population area is under federal lease (WYW 146527). Four wells have been drilled in this population area and all wells have resulted in dry holes that were plugged and abandoned. The majority of the Wyoming-Blacks Fork population area includes the Flaming Gorge National Recreation Area. Recreation is the focal activity within the region. Past activity indicates little future exploration is expected in the next 15 years; therefore no wells are projected for this population area.

Hamlin Valley

The Hamlin Valley Population Area is located in southwest Beaver County and northwest Iron County along the Nevada state line. It is composed of federal lands with scattered State of Utah sections. No leases have been issued, and no oil and gas wells have been drilled in GRSG occupied habitat or within the population areas, but several dry holes are located north of this population area. Seismic surveys have been run north, east, and south of the area, and a couple of lines extended for short distances inside the occupied habitat. A cluster of active oil and gas leases is located 50 miles to the southeast. The mineral occurrence potential map indicates a low potential for oil and gas occurrence.

Predicting future exploration or development in lightly explored areas, such as Hamlin Valley, is difficult. Experience has shown that it is usually better to err on the high side than on the low side to be prepared for any activity that might occur, however unlikely it may be. For this reason, only one exploration well is projected in the occupied habitat in the Hamlin Valley population area during the next 15 years, which from surrounding historical drilling data may result in a dry hole. The minimal surface disturbance resulting from one well should be reclaimed within five years after abandonment.

Bald Hills

The Bald Hills Population Area is located approximately 150 miles due east of the Hamlin Valley population area. It includes BLM-administered lands, scattered State of Utah lands, and a small amount of fee lands. Several miles of seismic lines cover the northern portion of the population area, and a few were run in the south. The lease cluster described above covers the southeast one-third of the Bald Hills Population Area. There are four dry holes in the population area, three on federal lands and one on fee lands. There are no wells in occupied habitat. The oil and gas occurrence potential map shows the southeastern 90 percent of the occupied habitat as having moderate potential for oil and gas occurrence, although no data are given to support this classification.

Approximately 78 percent of the occupied habitat is underlain by federal minerals, of which 50 percent is leased. This large cluster of active oil and gas leases indicates a successful attempt to secure the right to explore and possibly develop this area sometime in the future. For the above reasons, two exploration wells are projected to be drilled in occupied habitat during the next 15 years. The wells would result in little surface disturbance, and if dry holes result as projected, they could be rehabilitated within approximately five years after abandonment.

Panguitch

The Panguitch Population Area shares a common boundary with the east side of the Bald Hills Population Area and extends approximately 35 miles to the south. It includes BLM-administered, National Forest System, fee, and State of Utah lands. Approximately 72 percent of occupied habitat is federal mineral estate. A cluster of federal leases at the extreme northern end of the area covers approximately 12,150 acres. Two other leases, 36 miles to the south, include 3,500 acres. Seismic survey lines are sparsely scattered throughout the occupied habitat in this population area, but an area of closely spaced lines is present on mostly fee lands in the northeastern part of the unit.

Two plugged and abandoned wells are inside the occupied habitat area, and five other plugged and abandoned wells are within the population area. With the exception of a small moderate potential area at the northwestern tip, the occupied habitat in the Panguitch population area is rated as having a low potential for oil and gas occurrence.

It is projected that two exploration wells would be drilled in GRSG occupied habitat during the next 15 years that may result in dry holes. This is based on the relatively large size of the area, the existence of seismic lines and active leases, and the seven plugged and abandoned wells. The nearest producing oil or gas wells are approximately 30 miles to the east. As in the previous discussions, the limited surface disturbance should be reclaimed within five years after the wells are plugged and abandoned.

Parker Mountain

Numerous seismic surveys have been run at the southern end of the Parker Mountain Population Area, along the northwestern corner of Bryce Canyon National Park. Another area of dense coverage is located on a large block of State of Utah lands near the center-east of the unit. Although there is 70 percent federal mineral ownership, less than 2 percent is leased within occupied habitat. The handful of federal leases has no obvious spatial pattern. A total of 28 plugged and abandoned wells are located within this population area, with 21 (2 fee, 3 state, and 16 federal) within GRSG occupied habitat, and 7 outside of occupied habitat (4 federal and 3 fee). The producing Upper Valley Oil Field is approximately 75 miles to the southeast, and known occurrences of carbon dioxide gas are in an area about 140 miles to the east. The oil and gas occurrence potential map shows the area as having a low potential for oil and gas occurrence, except for a very small area at the unit's extreme northwestern tip.

Only one exploration well is projected to be drilled in occupied habitat within the Parker Mountain population area during the next 15 years because of the low occurrence potential rating, the current limited interest in the area, the absence of infrastructure, and the 21 plugged and abandoned wells. It is also possible that carbon dioxide gas, produced by magmatic activity north of the occupied habitat, has flushed hydrocarbons from the area. Surface disturbance by the single well should be reclaimed within five years after it is plugged and abandoned.

Sheeprocks

The Sheeprocks Population Area consists of BLM-administered, National Forest System, fee, US Department of Defense, and scattered State of Utah lands. Several seismic survey lines cross the area, especially in the northern part of the GRSG occupied habitat area and along the eastern

boundary farther to the south. Clusters of oil and gas leases are present in the northeastern, southwestern, and southern portions of the GRSG occupied habitat, and these areas are classified as having moderate potential for the occurrence of oil and gas.

Six plugged and abandoned wells (two BLM, three fee, and one US Department of Defense) are inside occupied habitat, with relatively few located in the surrounding area. There has been only minor interest in exploring this area in the past. Based on this history and the absence of current activity, relatively minor activity is predicted for the life of this RFD scenario. The occurrence potential map shows two separate moderate potential areas in the Sheeprocks occupied habitat, and two new wells are projected, one in each of the moderate potential areas, during the next 15 years. The nearest major oil and gas production (not related to small structures such as the Covenant Field) is approximately 50 miles to the east.

Wyoming-Uinta

Development within occupied habitat has occurred only along the eastern portion on federal leases. Sixteen wells have been drilled in this population area, of which five are shut in (two gas and three oil). Four wells have been plugged and abandoned. Currently there are two producing gas wells and five producing oil wells on federal leases. Past and current activity indicates minimal future development is expected in this population area over the next 15 years, with four wells being projected, all on federal minerals.

Rich

The Rich Population Area includes one of the most productive areas in Utah's recent oil and gas history, the Wyoming Overthrust Belt. Oil and gas were first discovered at the Pineview Field in Wyoming in the 1970s, but three oil fields and three gas fields have been developed in Utah. Some of the fields are still producing small amounts of oil and gas, but little new drilling has occurred.

Numerous seismic surveys have been run, especially in the southern part of the area, and most of the available federal lands are under lease. Past drilling is also concentrated in the southern part of the area, but several wells have been drilled farther to the northwest with some shows and small amounts of production. The occurrence potential map indicates that most of the area is rated as high.

The RFD scenario completed in 2012 projected 35 new wells in the next 15 years. Federal mineral ownership within GRSG occupied habitat is approximately 25 percent, of which 16 percent is leased.

Emery

The Emery Population Area is directly north of the Parker Mountain population area along the eastern side of the Wasatch Plateau and is almost entirely on National Forest System lands. Less than half of this population area is occupied habitat. Approximately 89 percent of GRSG occupied habitat is federal mineral estate, of which 18 percent is leased. A cluster of federal oil and gas leases covers the northwest prong of the GRSG occupied habitat, and there are three federal oil and gas exploratory units including, from west to east, Skyline II, Middle Mountain, and the productive East Mountain Unit. A few other federal leases are scattered throughout the GRSG occupied habitat. The Clear Creek Unit is a short distance to the north and has been

actively producing natural gas for over 50 years. Relatively few seismic surveys have been run in the Emery Population Area, possibly because of the rugged topography on the east flank of the Wasatch Plateau. A total of 29 plugged and abandoned wells are located within this population area, with 24 (4 fee; 1 state; and 19 federal, of which 10 are BLM and 9 are Forest Service) within GRSG occupied habitat and 5 outside of occupied habitat (2 Forest Service and 3 fee). There are seven producing gas wells (two BLM, three Forest Service, and two state) and three shut-in gas wells (one BLM and two Forest Service) outside of GRSG occupied habitat near the eastern boundary of the population area. Numerous natural gas wells are located just outside the eastern boundary and comprise the Drunkards Wash Coal Bed Methane Gas Field on the north, the Buzzard Bench Field in the center, and the Ferron Field to the south. These wells are about equally split between BLM and State of Utah lands with a very small number on National Forest System lands.

The occurrence potential map shows most of the Emery Population Area as moderate or low potential with a very small amount of high potential. Although much of the population area has moderate potential for natural gas occurrence, the development potential is considerably less because much of the area includes the steep, rugged eastern slope of the Wasatch Plateau. The western portion of the area is atop the plateau, where topography is less rugged, but still difficult to access. Also, the hydrocarbon reservoirs that are producing to the east are much deeper under the Wasatch Plateau, which increases well drilling costs. These factors would limit the number of wells drilled in the GRSG occupied habitat to the extreme eastern portion of the plateau, with the possibility of a few more wells on top. It is possible that directional or horizontal drilling technology would be used to test under the eastern slope of the plateau, especially if the price of natural gas increases.

It appears the area is being developed on 160-acre spacing with numerous undrilled areas, but most of these are outside the GRSG occupied habitat areas. Very few wells are on National Forest System lands, but some of the areas have producing wells to the north and south, indicating that the coal beds are continuous and underlie the easternmost National Forest System lands. Some of the areas should be accessible for drilling rigs. Based on the existing well spacing, the topography, and access, a conservative projection is 35 new pads during the next 15 years, with one well per pad for a total of 35 wells. Some roads and pipelines are already present.

Strawberry

The western portion of the GRSG occupied habitat in the Strawberry Population Area covers National Forest System lands, whereas the eastern portion is mostly fee and State of Utah lands. National Forest System lands immediately west of the GRSG occupied habitat are crossed by seismic survey lines and covered by federal leases, both of which extend into the western and southwestern portions of the population area. Thirteen plugged and abandoned wells are scattered throughout the area, and four state-approved APDs are in the southeast corner of the GRSG occupied habitat on fee lands. The APDs are an extension of active development to the east, and drilling will likely continue to move west and southwest. Oil and gas occurrence potential is rated as high in the east and as moderate in most other areas.

The west-southwest advancement of drilling could move across the southern half of the GRSG occupied habitat in the Strawberry population area, assuming that geological conditions remain similar. If the southern part of the area is fully developed as spaced (2 wells per section), approximately 290 wells would be drilled. If one quarter of these wells is drilled in the next 15 years, the total would be approximately 75 new wells. If only the GRSG occupied habitat is considered, a reasonable projection is 60 wells drilled during the next 15 years. The first wells would likely be completed on fee lands in the eastern portion of the area where several applications for permit to drill have already been approved by the state.

The Forest Service signed the Record of Decision for Oil and Gas Leasing on the Uinta National Forest in October 2011. Approximately 736,070 acres were made available for leasing; however, the majority of that acreage has an no surface occupancy (NSO) stipulation. The RFD scenario for this Final Supplemental EIS predicted that 12 wells would be drilled. Prior to this Final Supplemental EIS, 67 authorized federal leases were suspended as a result of litigation. The Record of Decision states that, "Any decision by the BLM to lift the suspensions on these leases will be consistent with the Forest Service Letter of Consent after the Forest Service has ensured that the leases are in accordance with the terms and conditions for leasing identified in the decision described Uinta National Forest Final Supplemental EIS and Record of Decision," which includes complying with the new stipulations in Appendix G of that Final Supplemental EIS. Due to the constraints to leasing and development mentioned above, little activity is expected on National Forest System lands.

Carbon

The Carbon Population Area consists of roughly equal amounts of fee and BLM-administered lands, several townships of National Forest System lands, and scattered State of Utah lands. Fee lands are concentrated in the central and western portions, and the eastern part is largely BLM-administered land. A significant portion of the population area is not GRSG occupied habitat.

The western end of the GRSG occupied habitat area is sparsely covered by seismic survey lines, but no federal leases are present. Scattered federal leases, some on split-estate lands, are in the central part of the area, and most of the large block of federal lands in the east is under lease. There are several federal oil and gas exploratory units in the east, including the Prickly Pear and most of the Peter's Point Units. These are mentioned because they have been locations of very active drilling programs in the recent past.

Most of the production has been from BLM-administered lands included in federal units near the eastern edge of the habitat area, but approximately 50 coalbed methane gas wells have been drilled in the Castlegate Field near the habitat's center. The large Helper and Drunkards Wash coalbed methane gas fields are a short distance to the south where the latter occupies a small area of GRSG occupied habitat.

Future drilling levels are difficult to predict. Well spacing in the coalbed methane gas areas is typically 160 acres per well, but spacing of the sandstone reservoirs in the Prickly Pear and Peter's Point Units has been as dense as 10 acres per bottom hole location. These two units are approaching full development, but Bill Barrett Corporation has proposed a new federal unit immediately north of Prickly Pear. A major infill drilling program is possible in the coalbed

methane gas fields, which could extend activity in them. Other areas where drilling could occur during the next 15 years are in the extreme northern part where development on Ute tribal lands may spread into the occupied habitat, and on the Wasatch Plateau in or near existing units.

Two EISs cover the eastern end of the Carbon population area. Gasco's EIS (BLM 2012a) and Bill Barrett Corporation's West Tavaputs Plateau EIS (BLM 2010) propose development in the northeast and east-central portions of the population area. The combined proposed federal actions include a total of 1,063 well pads.

There are 575 proposed well pads (1,298 wells) in the Gasco EIS (BLM 2012a) area, of which 24 percent are within GRSG occupied habitat. All are located in Duchesne County, resulting in approximately 140 well pads (391 wells). In the West Tavaputs Plateau EIS (BLM 2010), there are 120 proposed and existing well pads (626 wells), located in Carbon County, 100 percent of which is within GRSG occupied habitat.

Two other areas in the Carbon Population Area are being developed. One is along the northern boundary where development in the Brundage Canyon Field is moving south and west into the population area. Projecting this pattern into the future indicates that approximately 256 well pads (1 well per pad) would impact GRSG occupied habitat. A large number of wells have been drilled inside the population area along its southern border by the development of the Drunkards Wash and Gordon Creek Fields. At least one township of occupied habitat would be impacted by 144 wells and associated activity. A total of 1,417 wells are predicted to be drilled from 660 pads within the GRSG occupied habitat of this population area.

Uintah

The Uintah Population Area consists of three discreet areas: a Southern Lobe in southern Uintah County and northern Grand County, which includes mostly BLM-administered and tribal lands; a smaller lobe on the Utah-Colorado border (Eastern Lobe) in central Uintah County, including BLM-administered and State of Utah lands; and a large east-west area extending from central Duchesne County to the northeastern corner of Utah (Northern Lobe). The latter area includes tribal, fee, BLM-administered, state, and National Forest System lands.

The Southern Lobe contains relatively few seismic lines. The northern portion of this lobe has significant gas production in the Natural Buttes, Hill Creek, Love, and Bitter Creek Fields, primarily within the Natural Buttes, Love, and Little Canyon Units. The eastern portion of this Southern Lobe is largely leased; however, there is little production. The remaining majority of producing gas wells is located in the west-central portion of this Southern Lobe, primarily in two gas fields, Flat Rock and Naval Reserve Fields, in the Hill Creek Extension of the Uintah-Ouray Reservation, which are all tribal minerals. There is very little development in the westernmost portion of this lobe. However, just east of the Flat Rock Field is the Tumbleweed Unit (federal minerals).

The small lobe along the Utah-Colorado border (Eastern Lobe) has moderate seismic coverage and oil and gas leases in the western half. Producing gas wells cover the southwestern part of the area (Natural Buttes, Big Valley, and Devil's Playground Fields), and producing oil and gas wells are in the northwestern part, primarily in the Red Wash Field. These two areas will likely experience the largest increased development.

The Northern Lobe has the largest area of GRSG occupied habitat, from Duchesne County to Daggett County, has fairly dense seismic coverage in the southeast corner, and moderate to sparse coverage in other parts. The area east of the Uinta Mountains has the least coverage. Federal leases exist in the northeast corner of Utah along the Wyoming border, northwest of Dinosaur National Monument, and directly north of the Natural Buttes Fields. Farther to the west, on the Uintah-Ouray Reservation, tribal leases are abundant near the west end of GRSG occupied habitat. Oil wells are present in the central lobe of the Northern Lobe in Duchesne County, and widespread APDs indicate that drilling will continue. Numerous oil wells cover the southern and western ends and drilling will continue in these areas, but little drilling is anticipated to occur in the northeastern corner during the next 15 years. The occurrence potential map paints a similar picture of the area.

Several recent recently approved for ongoing EISs in the area propose to construct a total of 5,000 well pads, 1,020 miles of roads, and 2,000 miles of pipeline. Three of the largest project areas (Monument Butte, Greater Natural Buttes (BLM 2012b), and North Chapita Wells) include little or no GRSG occupied habitat. When these projects are removed, the number of pads is reduced to 1,075, the miles of roads to 225, and the miles of pipeline to 440. There are 53 recently approved APDs in the western part of the GRSG occupied habitat in Duchesne County on predominantly tribal and fee lands, which indicates activity in this area will continue to cause surface disturbance. However, none of these applications for permit to drill are on federal mineral interest, which is less than two percent of the GRSG occupied habitat in this area and does not influence this RFD scenario analysis. A conservative projection is 570 pads for a total of 1,635 wells in GRSG occupied habitat.

Reasonably Foreseeable Development Scenario by Alternative

Restrictions on oil and gas development that are being considered under Alternatives B, C, D, and E, and the Proposed Plan in the Utah Greater Sage-Grouse LUPA/EIS, have the potential to reduce the number of wells that could be drilled under each alternative. **Tables R.1** and **R.2** at the end of this appendix include information on the number of wells expected in occupied GRSG habitat under each alternative.

Development from Existing Leases

When calculating how the RFD scenario would vary under each alternative, the BLM evaluated the potential impacts of management actions being considered under all alternatives on development of existing and new leases.

With respect to the development of existing leases, Alternatives B, C, and to a lesser extent D, include management decisions (i.e. management actions MA-MIN-21 through MA-MIN-31 in Table 2.1 of the Utah Greater Sage-Grouse Draft LUPA/EIS) that would be applied to new development on existing leases. The Proposed LUPA/Final EIS recognizes that all decisions effecting leased lands would be applied if the conservation measure is "reasonable" (43 CFR 3101.1-2) with the valid existing rights.

The most restrictive of these management decisions (MA-MIN-22, Alternatives B and C) states:

> *Do not allow new surface occupancy on federal leases within PHMA, this includes winter concentration areas (Doherty et al. 2008, Carpenter et al. 2010) during any time of the year. Consider an exception:*
>
> - *If the lease is entirely within PHMA, apply a 4 mile NSO around the lek, and limit permitted disturbances to one per section with no more than three percent surface disturbance in that section.*
> - *If the entire lease is within the 4 mile lek perimeter, limit permitted disturbances to one per section with no more than three percent surface disturbance in that section. Require any development to be placed at the most distal part of the lease from the lek, or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to GRSG.*

Implicit in this decision is recognition that GRSG conservation measures applied to exploration development on existing leases may vary based on the location of the lease in relationship to the PHMA as well as the proximity of the lease to any GRSG leks. In all cases the BLM would apply GRSG conservation measures to the extent possible without denying reasonable access to develop the lease. Implementation of the management decisions under Alternatives B, C, and D, and the Proposed Plan would likely result in changes in well pad location when compared with Alternatives A or E. Requirements to place any new well pads a maximum distance within the lease boundaries from any GRSG lek would likely result in the construction of fewer well pads and promote an increase in multi-well pads from which directional or horizontal drilling could occur.

Based on the fact that the BLM and Forest Service must recognize valid and existing rights, and that decisions include a phased decision strategy, within the Draft LUPA/EIS, the BLM assumed the same level of development would occur on valid and existing rights under all alternatives. However, during the public comment period, multiple commenters noted that the Draft LUPA/EIS underestimated the impact that management actions would have on the development of existing leases. In an effort to address these comments, the BLM has revised this RFD scenario for the Proposed LUPA/Final EIS.

In making this assumption, the BLM and Forest Service supposed that development would not shift to other areas or leases. If faced with higher costs for developing in areas covered by stipulations or mitigation related to GRSG, operators may shift their development and production investments to other existing and future leases. Stated differently, developers/producers may shift their efforts from the restricted lease areas to other lease areas that may have been originally viewed as relatively less profitable (but are now more profitable at the margin).

Operator decisions over time are likely to be driven more by the price of oil and gas than by the costs of operating in PHMA. If the price reaches a certain level, the costs associated with drilling in PHMA would be minor compared to the revenues received from extracting the resource. If

the one commodity becomes more profitable than the other commodity there would also likely be shifts from one type of drilling and production to the other.

In order to calculate a reduction in development, the BLM has assumed that oil and gas companies operate on fixed annual operating budgets; and, as such, there would be a reduction in number of wells that directly corresponds to increases in costs. Increased costs would primarily occur as a result of 1) off-location mitigation requirements; 2) application of required design features identified in **Appendix G** of the Utah Greater Sage-Grouse LUPA/EIS, and 3) increased drilling costs.

Expected increases in cost would vary by well type; however, the average increase in cost of drilling and completing a well in PHMA would be 118 percent for horizontal wells, 131 percent for directional wells, and 130 percent for vertical wells.

In addition to cost increases, based on restrictions mentioned above, it was assumed that there would be fewer vertical wells and more directional and horizontal wells in PHMA. Based on actual well data from 2011-2013, within the planning area, 2 percent of wells are horizontal, 55 percent directional, and 43 percent vertical. For analysis purposes, it was assumed that within PHMA, under Alternatives B, C, and D, and the Proposed Plan that 5 percent of wells would be horizontal, and 75 percent of the wells directional, and 20 percent vertical.

Given the increased costs of operating in PHMA, it was assumed that under Alternative C there would be 494 fewer wells drilled from existing leases than under Alternative A. Under Alternatives B and D and the Proposed Plan there would be 165 fewer wells drilled from existing leases than under Alternative A.

Development from New Leases

In addition to changes in the amount of predicted development on existing leases, there would be variations in the amount of development under each alternative tied to potential development of new leases in PHMA. Below is a summary of how the proposed management decisions considered under each the alternatives would affect the reasonably foreseeable oil and gas development from new leases.

Alternative C

Under Alternative C, all GRSG occupied habitat would be included in PHMA. The PHMA would be closed to fluid mineral leasing. Therefore, under this alternative, no new leases would be issued. As previously noted, land use planning decisions only apply to federal surface and areas where the BLM has federal mineral interest. While leasing and development could occur on state and private land within GRSG habitat, the interest in exploration and development of state and private land could be reduced if large areas of contiguous National Forest System lands and BLM-administered land are closed to new oil and gas leasing. The actual impact on state and private lands largely depends on land ownership patterns in an area. Under Alternative C, it was assumed that there would be no new leases issued on state or private lands in areas where there are contiguous federal lands closed to leasing. Under Alternative C, it was assumed that closing PHMA to new leasing would result in 364 fewer wells than Alternative A. Of these 364 wells, 270 would have been from Federal surface and minerals and 94 would have been from non-Federal minerals.

Alternative B

Similar to Alternative C, areas designated as PHMA would be closed to fluid mineral leasing under Alternative B. However, not all occupied GRSG habitat would become PHMA. Areas that are not designated as PHMA would be designated as general habitat management areas (GHMA). The GHMA would continue to be managed under current management direction. Therefore, there would be no change in the RFD scenario for new leases in GHMA. In order to calculate the reduction in wells that would occur under this alternative, the BLM used the same methodology that was used to calculate the RFD scenario under Alternative C, plus one additional step. From the Alternative C numbers, the BLM multiplied the number of wells projected on new leases in occupied habitat by the percent of lands within each county that have high oil and gas potential, and would be designated as PHMA. This exercise shows that impacts would vary by county. For example, comparing two of Utah's largest oil and gas producing counties, 83 percent of the occupied GRSG habitat in Carbon County that would be designated as PHMA has high oil and gas potential, whereas only 13 percent of the GRSG occupied habitat in Uintah County that would be designated as PHMA has high oil and gas potential. As such the proportional impact is much greater in Carbon County. Under Alternative B, it was assumed that closing PHMA to new leasing would result in 164 fewer wells than Alternative A. Of these 164 wells, 115 would have been from Federal surface and minerals, and 48 would have been from non-Federal minerals.

Alternative D

For PHMA, in areas where oil and gas development is anticipated, there is no difference between Alternatives B and D. However, under Alternative D, no new areas would be closed to fluid mineral leasing. Rather, major constraints (NSO) would be placed on development within four miles of an occupied GRSG lek. To calculate the RFD scenario under Alternative D, the BLM used the same methodology that was used to calculate the number of wells that would be drilled under Alternatives B, plus two additional steps.

As part of step one, the BLM multiplied the number of potential wells on new leases in PHMA by the percent of PHMA that would be NSO (it was assumed that there would be no reduction in development in PHMA where there are minor constraints i.e., controlled surface use [CSU] and timing limitation [TL]).

Restrictions on surface occupancy (NSO) are not equivalent to closure. To determine the number of wells that would not be developed in areas where there are major constraints such as NSO, the BLM again applied the assumption that if a 4-mile buffer were placed on occupied GRSG leks, areas within one mile of the lek would likely be inaccessible given current drilling technology. In the Draft LUPA/EIS the BLM assumed that areas within 2 miles would be accessible; however, in response to comments received on the Draft LUPA/EIS from multiple commenters, including the State of Utah, this was changed to one mile. Based on this assumption, step two consisted of multiplying the number of potential wells on new leases in PHMA, that are also in areas that would be NSO, by 56 percent. Fifty-six percent was used because it is the percent of lands within a 4-mile area that could effectively be closed by an NSO restriction until drilling technology makes reaching these areas feasible. Under Alternative D, it was assumed that closing PHMA to new leasing would result in 58 fewer wells than Alternative

A. Of these 58 wells, 40 would have been from Federal surface and minerals, and 18 would have been from non-Federal minerals.

Alternative E

Alternative E1 is based on the State of Utah's *Conservation Plan for Greater Sage-grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013). Under Alternative E1, BLM-administered lands inside State of Utah Sage-Grouse Management Areas within 1 mile of an active lek would be subject to major constraints (NSO). GRSG habitat outside of the 1-mile lek buffer would be subject to minor constraints (CSU and TL). It is not anticipated that this would result in any changes in the RFD scenario. Therefore, the same number of wells predicted under Alternative A is also predicted under Alternative E1.

Proposed Plan

Under the Proposed Plan, all PHMA would be managed as NSO. The Proposed Plan includes an exception allowing companies to drill from existing well pads, which would require some surface disturbance. Similar to Alternative D, it was assumed that areas beyond one mile of an existing well pad and areas greater than 1 mile from the PHMA boundaries would effectively be closed by an NSO restriction until drilling technology makes reaching these areas feasible. Under the Proposed Plan, it was assumed that making PHMA an NSO would result in 63 fewer wells than Alternative A. Of these 63 wells, 44 would have been from Federal surface and minerals, and 19 would have been from non-Federal minerals.

SURFACE DISTURBANCE ESTIMATES

Table R.3, Estimated Surface Disturbance: Alternatives A and E, through **Table R.7**, Estimated Surface Disturbance: Proposed Plan, provide information on estimated surface disturbance under each alternative. These tables are organized by both population area and county. Changes in disturbance are directly proportional to the number of well pads expected under each alternative. Surface disturbance estimates are based on previous experience with oil and gas development in the planning area. It is assumed that all future seismic surveys would use buggies rather than helicopters, and the associated disturbance would be 1.2 acres per mile. Surface disturbance resulting from road construction was calculated using a value of 6 acres per mile, and pipelines were assumed to disturb a width of 50 feet. Well pads in Utah, Wyoming, and Colorado were studied in detail and ranged from one to five acres per pad. The value used in this RFD scenario is four acres per pad, but this could vary based on terrain and rig size, and whether the pad is for a single or multiple wells. Ancillary facilities include compressor stations, pumping stations, office and shop space, and other facilities that are required in a given oil or gas field.

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TABLES

Table R.1
Predicted Number of Wells Drilled by Alternative in Each Population Area and County

GRSG Population Area	County Name	Alternatives A and E			Alternative B			Alternative C			Alternative D			Proposed Plan		
		Total Wells by County	Total Gas Wells by County	Total Oil Wells by County	Total Wells by County	Total Gas Wells by County	Total Oil Wells by County	Total Wells by County	Total Gas Wells by County	Total Oil Wells by County	Total Wells by County	Total Gas Wells by County	Total Oil Wells by County	Total Wells by County	Total Gas Wells by County	Total Oil Wells by County
Bald Hills	BEAVER	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
	IRON	**1**	0	1	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Carbon	CARBON	**770**	770	0	**585**	585	0	**547**	547	0	**651**	651	0	**648**	648	0
	DUCHESNE	**647**	247	400	**588**	224	364	**483**	184	299	**604**	231	374	**611**	233	378
Emery	EMERY	**45**	45	0	**45**	45	0	**27**	27	0	**45**	45	0	**45**	45	0
Hamlin Valley	BEAVER	**1**	1	0	**1**	1	0	**0**	0	0	**1**	1	0	**1**	1	0
Panguitch	BEAVER	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
	GARFIELD	**1**	1	0	**1**	1	0	**0**	0	0	**1**	1	0	**1**	1	0
Parker Mountain	GARFIELD	**1**	1	0	**1**	0	1	**0**	0	0	**1**	0	1	**1**	0	1
Rich	RICH	**25**	18	7	**9**	9	0	**9**	9	0	**17**	14	4	**12**	11	1
	SUMMIT	**10**	5	5	**6**	1	5	**6**	1	5	**6**	1	5	**6**	1	5
Sheeprocks	JUAB	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
	TOOELE	**1**	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Strawberry	DUCHESNE	**96**	0	96	**96**	0	96	**96**	0	96	**96**	0	96	**96**	0	96
	WASATCH	**24**	0	24	**24**	0	24	**23**	0	23	**24**	0	24	**24**	0	24
Uintah	DAGGETT	**30**	30	0	**19**	19	0	**19**	19	0	**23**	23	0	**22**	22	0
	UINTAH	**1,545**	1,400	145	**1,491**	1,352	139	**1,127**	1,030	97	**1,501**	1,361	141	**1,498**	1,358	140
Total		**3,196**	**2,522**	**678**	**2,867**	**2,240**	**628**	**2,338**	**1,819**	**519**	**2,973**	**2,330**	**644**	**2,968**	**2,324**	**645**

Table R.2
Predicted Number of Producing Wells by Alternative in Each Population Area and County

Population Area	County Name	Success Rates (Production Potential)		Alternative A&E - Producing Wells			Alternative B - Producing Wells			Alternative C - Producing Wells			Alterative D - Producing Wells			Proposed Plan - Producing Wells		
		Potential for Gas Production	Potential for Oil Production	Total Wells by County	Total Production Gas Wells by County	Total Production Oil Wells by County	Total Wells by County	Total Wells by County	Total Wells by County	Total Wells by County	Total Production Gas Wells by County	Total Production Oil Wells by County	Total Wells by County	Total Production Gas Wells by County	Total Production Oil Wells by County	Total Wells by County	Total Production Gas Wells by County	Total Production Oil Wells by County
Bald Hills	BEAVER	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
	IRON	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Carbon	CARBON	75%	85%	**578**	578	0	**438**	438	0	**410**	410	0	**489**	489	0	**486**	486	0
	DUCHESNE	75%	85%	**525**	185	340	**477**	168	309	**392**	138	254	**491**	173	318	**496**	175	321
Emery	EMERY	60%	60%	**27**	27	0	**27**	27	0	**16**	16	0	**27**	27	0	**27**	27	0
Hamlin Valley	BEAVER	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Panguitch	BEAVER	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
	GARFIELD	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Parker Mountain	GARFIELD	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Rich	RICH	20%	20%	**5**	4	1	**2**	2	0	**2**	2	0	**3**	3	1	**2**	2	0
	SUMMIT	20%	20%	**2**	1	1	**1**	0	1	**1**	0	1	**1**	0	1	**1**	0	1
Sheeprocks	JUAB	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
	TOOELE	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
Strawberry	DUCHESNE	10%	10%	**10**	0	10	**10**	0	10	**10**	0	10	**10**	0	10	**10**	0	10
	WASATCH	10%	10%	**2**	0	2	**2**	0	2	**2**	0	2	**2**	0	2	**2**	0	2
Uintah	DAGGETT	50%	50%	**15**	15	0	**10**	10	0	**10**	10	0	**11**	11	0	**11**	11	0
	DUCHESNE	85%	70%	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0
	UINTAH	85%	70%	**1,292**	1,190	102	**1,246**	1,149	97	**943**	875	68	**1,255**	1,157	98	**11**	11	0
Total				**2,456**	**2,000**	**456**	**2,214**	**1,795**	**419**	**1,786**	**1,451**	**335**	**2,290**	**1,860**	**430**	**2,289**	**1,857**	**432**

Table R.3
Estimated Surface Disturbance: Alternatives A and E

GRSG Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads				Roads				Pipelines				Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Avg. Dist./ Mi.	Dist. Acres	Total Wells	Total Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Roads Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Road Dist. Acres	Pipe-lines Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipeline Dist. acres		
Hamlin Valley	**L**	50	1.2	**60**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.00	1.2	**0**	**0**	**136**
Bald Hills	**M,** L	75	1.2	**90**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.00	1.2	**0**	**0**	**242**
Panguitch	**L,** M	60	1.2	**72**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.00	1.2	**0**	**0**	**224**
Parker Mtn.	**L,** H	65	1.2	**78**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.00	1.2	**0**	**0**	**154**
Emery	H, **M, L**	75	1.2	**90**	45	45	4	**180**	99	2.2	4.8	**475**	99	2.20	1.2	**119**	**20**	**884**
Sheeprocks	**M, L**	100	1.2	**120**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.00	1.2	**0**	**0**	**272**
Strawberry	**M,** H	120	1.2	**145**	120	60	4.5	**270**	132	2.2	4.8	**634**	132	2.20	1.2	**158**	**40**	**1,247**
Carbon	**M, H,** L	300	1.2	**360**	1,417	709	4.5	**3,188**	425	0.60	4.8	**2,040**	496	0.70	1.2	**595**	**200**	**6,384**
Uintah	**H,** M, L	300	1.2	**360**	1,575	788	4.5	**3,544**	276	0.35	4.8	**1,323**	433	0.55	1.2	**520**	**200**	**5,947**
Rich	**H,** M, L	75	1.2	**90**	35	35	4	**140**	77	2.2	4.8	**370**	77	2.20	1.2	**92**	**20**	**712**
Box Elder	**L**	70	1.2	**84**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.00	1.2	**0**	**0**	**84**
STATEWIDE TOTALS		**1,290**		**1,549**	**3,200**	**1,644**		**7,354**	**1,129**			**5,418**	**1,237**			**1,484**	**480**	**16,285**

[1] L=low, M=moderate, H=high

Table R.4
Estimated Surface Disturbance: Alternative B

GRSG Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads				Roads				Pipelines				Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Avg. Dist./ Mi.	Dist. Acres	Total Wells	Total Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Roads Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Road Dist. Acres	Pipe-lines Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipeline Dist. acres		
Hamlin Valley	**L**	45	1.2	**53**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**53**
Bald Hills	**M,** L	67	1.2	**80**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**80**
Panguitch	**L,** M	53	1.2	**64**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.0	1.2	**0**	**0**	**216**
Parker Mtn.	**L,** H	58	1.2	**69**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**145**
Emery	H, **M, L**	67	1.2	**80**	45	45	4	**180**	99	2.2	4.8	**475**	99	2.2	1.2	**119**	**20**	**874**
Sheeprocks	**M, L**	89	1.2	**107**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**183**
Strawberry	**M,** H	107	1.2	**128**	120	30	5.5	**165**	66	2.2	4.8	**317**	66	2.2	1.2	**79**	**40**	**729**
Carbon	**M, H,** L	267	1.2	**320**	1,172	293	5.5	**1,612**	185	0.6	4.8	**886**	205	0.7	1.2	**246**	**200**	**3,264**
Uintah	**H,** M, L	267	1.2	**320**	1,481	370	5.5	**2,036**	56	0.2	4.8	**267**	93	0.3	1.2	**111**	**200**	**2,934**
Rich	**H,** M, L	67	1.2	**80**	15	15	4	**60**	33	2.2	4.8	**158**	33	2.2	1.2	**40**	**20**	**358**
Box Elder	**L**	62	1.2	**75**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**75**
STATEWIDE TOTALS		**1148**		**1,378**	**2,837**	**757**		**4,069**	**498**			**2,391**	**496**			**595**	**480**	**8,912**

[1] L=low, M=moderate, H=high

Table R.5
Estimated Surface Disturbance: Alternative C

GRSG Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads				Roads				Pipelines				Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Avg. Dist./ Mi.	Dist. Acres	Total Wells	Total Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Roads Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Road Dist. Acres	Pipe-lines Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipeline Dist. acres		
Hamlin Valley	**L**	36	1.2	**43**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**43**
Bald Hills	**M,** L	54	1.2	**65**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**65**
Panguitch	**L,** M	43	1.2	**52**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.0	1.2	**0**	**0**	**204**
Parker Mtn.	**L,** H	47	1.2	**56**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**132**
Emery	H, **M, L**	54	1.2	**65**	27	27	4	**108**	59	2.2	4.8	**285**	59	2.2	1.2	**71**	**20**	**549**
Sheeprocks	**M, L**	72	1.2	**86**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**162**
Strawberry	**M,** H	86	1.2	**104**	119	30	5.5	**164**	65	2.2	4.8	**314**	65	2.2	1.2	**79**	**40**	**700**
Carbon	**M, H,** L	216	1.2	**259**	1,030	258	5.5	**1,416**	155	0.6	4.8	**742**	180	0.7	1.2	**216**	**200**	**2,833**
Uintah	**H,** M, L	216	1.2	**259**	1,136	284	5.5	**1,562**	43	0.2	4.8	**204**	71	0.3	1.2	**85**	**200**	**2,311**
Rich	**H,** M, L	54	1.2	**65**	14	14	4	**56**	31	2.2	4.8	**148**	31	2.2	1.2	**37**	**20**	**326**
Box Elder	**L**	50	1.2	**60**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**60**
STATEWIDE TOTALS		**929**		**1,115**	**2,330**	**616**		**3,322**	**413**			**1,981**	**407**			**488**	**480**	**7,386**

[1] L=low, M=moderate, H=high

Table R.6
Estimated Surface Disturbance: Alternative D

GRSG Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads				Roads				Pipelines				Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Avg. Dist./ Mi.	Dist. Acres	Total Wells	Total Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Roads Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Road Dist. Acres	Pipe-lines Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipeline Dist. acres		
Hamlin Valley	**L**	46	1.2	**55**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**55**
Bald Hills	**M,** L	69	1.2	**83**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**83**
Panguitch	**L,** M	55	1.2	**66**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.0	1.2	**0**	**0**	**218**
Parker Mtn.	**L,** H	60	1.2	**72**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**148**
Emery	H, **M, L**	69	1.2	**83**	45	45	4	**180**	99	2.2	4.8	**475**	99	2.2	1.2	**119**	**20**	**877**
Sheeprocks	**M, L**	92	1.2	**110**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**186**
Strawberry	**M,** H	110	1.2	**132**	120	30	5.500	**165**	66	2.2	4.8	**317**	66	2.2	1.2	**79**	**40**	**733**
Carbon	**M, H,** L	276	1.2	**331**	1,256	314	5.500	**1,727**	188	0.6	4.8	**904**	220	0.7	1.2	**264**	**200**	**3,426**
Uintah	**H,** M, L	276	1.2	**331**	1,514	379	5.500	**2,082**	57	0.2	4.8	**273**	95	0.3	1.2	**114**	**200**	**2,999**
Rich	**H,** M, L	69	1.2	**83**	23	23	4	**92**	51	2.2	4.8	**243**	51	2.2	1.2	**61**	**20**	**498**
Box Elder	**L**	64	1.2	**77**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**77**
STATEWIDE TOTALS		**1187**		**1,424**	**2,962**	**795**		**4,262**	**521**			**2,500**	**530**			**636**	**480**	**9,302**

[1] L=low, M=moderate, H=high

Table R.7
Estimated Surface Disturbance: Proposed Plan

GRSG Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads				Roads				Pipelines				Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Avg. Dist./ Mi.	Dist. Acres	Total Wells	Total Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Roads Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Road Dist. Acres	Pipe-lines Miles	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipeline Dist. acres		
Hamlin Valley	**L**	46	1.2	**55**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**55**
Bald Hills	**M,** L	69	1.2	**83**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**83**
Panguitch	**L,** M	55	1.2	**66**	2	2	4	**8**	30	15.0	4.8	**144**	0	0.0	1.2	**0**	**0**	**218**
Parker Mtn.	**L,** H	60	1.2	**72**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**148**
Emery	H, **M, L**	69	1.2	**83**	45	45	4	**180**	99	2.2	4.8	**475**	99	2.2	1.2	**119**	**20**	**877**
Sheeprocks	**M, L**	92	1.2	**110**	1	1	4	**4**	15	15.0	4.8	**72**	0	0.0	1.2	**0**	**0**	**186**
Strawberry	**M,** H	110	1.2	**132**	120	30	5.500	**165**	66	2.2	4.8	**317**	66	2.2	1.2	**79**	**40**	**733**
Carbon	**M, H,** L	276	1.2	**331**	1,259	315	5.500	**1,731**	189	0.6	4.8	**906**	220	0.7	1.2	**264**	**200**	**3,433**
Uintah	**H,** M, L	276	1.2	**331**	1,511	378	5.500	**2,078**	57	0.2	4.8	**272**	94	0.3	1.2	**113**	**200**	**2,994**
Rich	**H,** M, L	69	1.2	**83**	18	18	4	**72**	40	2.2	4.8	**190**	40	2.2	1.2	**48**	**20**	**412**
Box Elder	**L**	64	1.2	**77**	0	0	4	**0**	0	15.0	4.8	**0**	0	0.0	1.2	**0**	**0**	**77**
STATEWIDE TOTALS		**1187**		**1,424**	**2,957**	**790**		**4,242**	**510**			**2,449**	**519**			**623**	**480**	**9,218**

[1] L=low, M=moderate, H=high

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Appendix S

BLM ACEC Evaluation and Forest Service Zoological Areas

APPENDIX S
BLM ACEC EVALUATION AND FOREST SERVICE ZOOLOGICAL AREAS

INTRODUCTION

During the scoping process for this LUPA/EIS the BLM invited the public to nominate or recommend areas on BLM-administered lands for GRSG and their habitat to be considered as areas of critical environmental concern (ACECs). In response to this invitation, the BLM received ACEC nominations from a number of interested organizations. In addition to nominating ACECs on BLM-administered lands, during scoping, interested organizations also identified potential Greater Sage-Grouse (GRSG)-related Research Natural Areas (RNAs) for National Forest System lands.

Federal Land Policy and Management Act (FLPMA) Section 103 (a) defines ACECs as BLM-administered lands for which special management attention is required (when such areas are developed or used or when no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes or to protect life and safety from natural hazards. FLPMA Section 202(c)(3) requires that priority be given to the designation and protection of ACECs.

RNAs are areas with valuable ecological resources. These areas are protected and maintained in natural conditions, for the purposes of conserving biological diversity, conducting non-manipulative research and monitoring, and fostering education.

The identification and establishment of a national network of RNAs is congressionally mandated in the National Forest Management Act (36 CFR Part 219.25; 36 CFR Part 251.23). The need for and value of RNAs have a basis in the National Forest Management Act, which states that LUPs will include a plan to monitor and evaluate the effects of implementing the management plan (36 CFR Sec. 219.11(d)).

ACEC NOMINATIONS

During the scoping process for this LUPA/EIS, the BLM received specific ACEC nominations from Wild Utah. These nominations were included in the comment letter submitted by Wild

Earth Guardians, on behalf a consortium of environmental organizations. Potential ACECs identified by Wild Utah contain all breeding, brooding, winter, and other critical occupied GRSG habitat. The boundary of these externally nominated ACECs were developed by Wild Utah using the following process.

1. The ACEC boundary was created by merging all active leks, buffered by 8.5 kilometers (Doherty et al. 2010), with GRSG brooding, transitional and winter habitat (UDWR).
2. Significantly impacted lands near active oil and gas wells were removed from the proposal by subtracting an area of 1-mile radius around oil and gas wells from the GRSG priority habitat.
3. All remaining BLM-administered lands were then selected for ACECs.

Using the abovementioned criteria, nearly all UDWR-mapped occupied GRSG habitat in Utah (and some land outside of UDWR-mapped occupied habitat) was included within an ACEC nomination.

In addition to the nomination received from Wild Utah, the BLM received less specific nominations from other organizations. For example, Western Watersheds Project stated that because of the disconnected nature of habitat, all scattered isolated population in Utah should be protected in separate ACECs.

Finally, multiple organizations stated that the BLM should consider all ACEC nominations submitted to during the scoping process for the ongoing Cedar City Field Office Land Use Plan Revision. Previously submitted ACEC nominations in the Cedar City planning area that overlap UDWR mapped occupied habitat included:

- Black Mountains- USFWS/State of Utah
- Buckskin Valley- USFWS/State of Utah
- Great Basin Core- Wilderness Society
- Pine Valley- USFWS
- South Central Utah- Wilderness Society

ACEC Evaluation Process

Based on the nominations received, all UDWR-mapped GRSG occupied habitat was taken through the evaluation process.

In compliance with BLM Manual 1613, Areas of Critical Environmental Concern, a BLM interdisciplinary team conducted an initial evaluation of all GRSG mapped occupied habitat to decide which if any areas should be carried forward for further evaluation in the land use planning process. The ACEC evaluations were conducted by the BLM's GRSGS core team, which included wildlife biologists and land use planners assigned to the project. Additional input was provided by specialists from each Field and District Office that has GRSG habitat within their respective boundaries. The BLM's multi-step evaluation process consisted of:

1. The BLM core team evaluated external ACEC nominations to determine relevance and importance.
2. Habitat was broken down into 22 areas.
3. Draft evaluation tables and maps were created that were reviewed by the full BLM interdisciplinary team and ad hoc interdisciplinary team members (which includes representatives from each field office).
4. Adjustments were made based on local understanding and knowledge of GRSG in the mapped areas.

RELEVANCE AND IMPORTANCE CRITERIA

As mentioned in the introduction, to be considered for designation as an ACEC, an area must meet the requirements of relevance and importance as described at 43 CFR 1610.7.2. The definitions for relevance and importance are as follows:

Relevance

An area is considered relevant if it contains one or more of the following:

1. A significant historic, cultural, or scenic value (for example, rare or sensitive archaeological resources and religious or cultural resources important to Native American Indians).
2. A fish and wildlife resource (for example, habitat for endangered, sensitive, or threatened species or habitat essential for maintaining species diversity).
3. A natural process or system (for example, endangered, sensitive, or threatened plant species; rare, endemic, or relict plants or plant communities; and rare geologic features).
4. A natural hazard (for example, areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action could meet the relevance criteria if it is determined through the resource management planning process that it has become part of the natural process.

Importance

The value, resource, system, process, or hazard described above must have substantial significance to satisfy the importance criteria, which generally means it is characterized by one or more of the following:

1. Has more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared with any similar resource.
2. Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to change.
3. Has been recognized as warranting protection to order to satisfy national priority concerns or to carry out the mandates of FLPMA.

ACEC boundaries identified by Wild Utah were based on older UDWR GRSG habitat and lek data than is being used for the other aspects of this planning process. In many cases, areas that were previous identified as habitat are no longer considered habitat. Historical leks located in some locations are no longer considered active, meaning they have not been occupied for at least 10 years.

It was determined that all areas located outside of the most recent UDWR-mapped occupied habitat that do not contain GRSG habitat do not meet the relevance criteria.

As part of their external nomination, Wild Utah also proposed ACECs that extended across administrative boundaries (included both BLM-administered and National Forest System lands). ACEC designations only apply to BLM-administered lands. Therefore, all non-federal lands or federal lands managed by another agency were removed from consideration.

Once ACEC nominations were trimmed down to mapped occupied habitat administered by the BLM the following process was used to determine whether an area had relevance and importance.

As part of the ACEC evaluation process, the BLM determined that the mere presence of GRSG or GRSG habitat does not constitute a significant wildlife resource (43 CFR Part 1610.7.2). In determining which areas meet the relevance criteria, the BLM used a combination of the range-wide breeding bird density map developed by Doherty (2010) and a state-wide breeding bird density map developed by the UDWR (UDWR 2012). The UDWR breeding bird density map was developed applying the same process used by Doherty; however, this map shows only the breeding bird density in the State of Utah based on the total number of birds in Utah rather than the number of birds range-wide.

The breeding bird density maps were used as the basis the ACEC evaluation for the following reason. As part of the BLM's National GRSG planning strategy, each state was asked to identify preliminary priority habitat (PPH). PPH comprises areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. As part of the Instruction Memorandum 2012-043 (GRSG Interim Management Policies and Procedures), it was stated that that BLM state offices that have not identified PPH should defer to Breeding Bird Density maps developed by Doherty 2010. Utah was one of these states.

Based on this information, as part of the initial screening process, the Utah BLM determined that leks with 75-25 percent breeding bird density and all contiguous habitats may meet relevance because these areas have the highest conservation value.

In continuing the ACEC evaluation process, the BLM overlaid the state's breeding bird density map with Doherty's national breeding bird density map. All areas that have 75-25 percent leks based on the national breeding bird density map have 50-25 percent breeding bird density leks based on the state's breeding bird density map except the West Tavaputs, Bald Hills, and Hamlin Valley areas. According to the State of Utah's data, these areas do not include 50-25 percent leks.

In addition, four areas (Three Corners, Blue Mountain, Sheeprocks, and Ibapah), which were shown to only include 100 percent leks according to Doherty's national breeding bird density

map, include 50-25 percent leks according to the state's breeding bird density map. This discrepancy is likely tied to the fact that the Doherty breeding bird density map, which was developed in 2010 is based on 2008 data; whereas the Utah breeding bird density map is based on more recent data (2011).

At the conclusion of the this process it was determined that all areas that either contain a 75-25 percent lek according to the national breeding bird density map or a 50-25 percent lek based on the state's breeding bird density map would meet the relevance criteria unless specific local conditions warrant preclusion of an area from further consideration.

In review of individual areas, it was determined that two areas contain at least one 75-25 percent lek (national) or a 50-25 percent lek (state) that does not meet the relevance criteria. Both of these areas, Emma Park and West Tavaputs, are located in the Carbon Population Area. These leks were determined not to have relevance for the following reasons:

- The Emma Park area includes a 50 percent leks according to the state and national breeding bird density maps. This area is predominately comprised of private lands with very few isolated BLM parcels. Many of the lands in the Emma Park area are split-estate lands. The BLM is responsible for management of the federal minerals. Based on the limited amount of federal surface, ACEC prescriptions would have limited effect on GRSG habitat or the existing populations.
- The West Tavaputs area includes a 75 percent lek according to the national breeding bird density map. The area does not include any 50-25 percent leks according to the State of Utah's data. Similar to Emma Park, the 75 percent lek located in the West Tavaputs area is located on private lands. In addition, nearly all nesting and brood-rearing habitat associated with this lek is located on private lands. BLM-administered lands provide winter habitat for this and other leks; however, based on the location of the lek, ACEC prescriptions would have limited effect on the GRSG or the existing population.

At the conclusion the BLM's ACEC evaluation process, it was determined that 13 of the 22 areas meet the relevance criteria. All areas that meeting the relevance criteria were determined to have importance because protection of GRSG is a national priority. **Table S.1**, ACEC Evaluations for Individual GRSG Habitat Areas, includes information on each of the individual areas evaluated by the BLM.

ZOOLOGICAL AREAS

After the BLM completed its ACEC evaluation process, the Forest Service evaluated GRSG habitat adjacent to potential ACECs found to have relevance and importance. The Forest Service is considering designating these areas as Zoological Areas to ensure consistent management across the landscape. When considering Zoological Areas, the Forest Service is not required to go through the same screening criteria that the BLM is required to go through when considering ACEC designation. In addition to considering zoological areas that are contiguous to BLM-administered lands, the Forest Service is considering designating some disconnected GRSG habitat as a zoological area. These areas include the Strawberry, Anthro Mountain, and Wildcat Knolls areas, located in the Strawberry, Carbon, and Emery population areas, respectively.

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
Uintah	Three Corners/ Browns Park	Yes. The area is a significant wildlife resource for GRSG. Three Corners area has several leks in the 100 percent breeding bird density range at the national level, but with one in the 25 percent breeding bird density range at the state level, as well as several in the 75 percent range. While the Brown's Park area doesn't have any leks, it provides winter habitat and brood-rearing habitat for birds from adjacent areas. This area is part of a larger population that extends into Wyoming.
Uintah	Diamond Mountain	Yes. The area is a significant wildlife resource for GRSG. There are more than 20 leks with several in the 50 percent range nationally and 25, 50, and 75 percent range at the state level. While there is a large proportion of private land in this area, there are extensive areas of public lands that provide for the full life-cycle of GRSG.
Uintah	Little Mountain – Halfway Hollow	Yes. The area is a significant wildlife resource for GRSG. While there are leks in the 100 percent range nationally and 75 percent range at the state level, the habitat is considered contiguous with the Diamond Mountain population and therefore provides habitat as part of a larger population. However, habitat south of Highway 40 includes more mineral development, an increased occurrence of oil and gas wells, and a corresponding decrease in population size. Given the diminished quality of the habitat in that area, it is not part of the potential ACEC.
Uintah	Blue Mountain	Yes. The area is a significant wildlife resource for GRSG. This are includes habitat that is intact and extends into Colorado. The area has several leks in the 100 percent breeding bird density range at the national level, but with one in the 50 percent breeding bird density range at the state level. The ACEC boundary was drawn to include areas that have similar elevation and vegetation characteristics. The potential ACEC includes all brooding and nesting habitat. Occupied habitat excluded from the ACEC is lower in elevation and includes more woodland vegetation.
Uintah	Dead Man's Bench	No. This area only includes two leks and supports a very small resident population. Both of these leks are in the 100 percent breeding bird density range at the state and national level. One lek has not been used since 2002. The other lek only had 2 males in 2012. Also, existing natural gas development has occurred through approximately 60 percent of the area. This development has diminished the habitat quality.
Uintah	East Bench/Willow Creek	No. The only leks located in this area are 100 percent leks according to the national breeding bird density map and 100-75 percent lek according state breeding bird density map. The number of active leks and average lek counts has declined substantially down to less than an average of 3 males in the last 5 years. In 2012, only 1 male was observed in the area. In addition, this area includes margin GRSG habitat. Impacts from oil and gas development have diminished the quality of the habitat. In addition, this area receives very little

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
		precipitation. Marginal habitat, at best.
Uintah	Book Cliffs South	No. The area is a naturally fragmented landscape and there have been no active leks since 1990.
Carbon	Badland Cliffs	No. This area does not include any active leks. The area does provide winter habitat for the Anthro Mountain GRSG population and the West Tavaputs GRSG population. This winter habitat is disconnected from the Anthro Mountain and West Tavaputs areas and is not used every year. Much of this habitat has already been developed and the number of wells exceeds one well per section. Existing development has already diminished the habitat value.
Carbon	West Tavaputs Plateau	No. The area does not include any 50-25 percent leks according to the state's breeding bird density data, but does include a 75 percent lek according to the national breeding bird density data. The 75 percent lek is located on private lands. Land ownership is about half private, with all leks but one on private land. The one active lek located on BLM-administered land was last used in 2007. BLM administered lands provide important winter habitat. Oil and gas development has occurred in the area.
Carbon	Emma Park	No. This area includes 75-50 percent leks according to both the national and state breeding bird density maps. However, the area is predominately comprised of private lands with very few isolated BLM parcels. Based on the limited amount of federal surface, ACEC prescriptions would have limited effect on GRSG habitat or the existing populations.
Carbon	Gordon Creek	No. This area does not include any active leks. The eastern half of the area exceeds one well per section. Existing development has diminished habitat quality.
Parker Mountain	Parker Mountain	Yes. The area is a significant wildlife resource for GRSG. The Parker Mountain area supports the second largest GRSG population in Utah. The habitat is largely undeveloped. According to the state and national breeding bird density map, there are several 25 percent and 50 percent leks in the area. GRSG occupied habitat extends across Grass Valley by Koosharem. Isolated BLM-administered lands located west of Koosharem were not included in the ACEC because these lands are non-contiguous with the large block of habitat associated with Parker Mountain. The BLM-administered land is separated by agricultural and urban development around Koosharem. Likewise, north of Koosharem Reservoir was excluded from the ACEC because development and roads have fragmented the habitat. This habitat is of a lesser quality than the unfragmented habitat located on Parker Mountain. Finally, lands east of Loa were excluded from the ACEC because these lands are non-contiguous with the large block of habitat associated

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
		with Parker Mountain. The BLM-administered land is separated by agricultural and urban development around Loa.
Panguitch	Southern Mountain Valleys	Yes. The area is a significant wildlife resource for GRSG. There are multiple leks, with several in the 75-50 percent breeding bird density (according to both the national and state breeding bird density data). This area is contiguous with the Buckskin Valley potential ACEC.
Panguitch	Buckskin Valley	Yes. The area is a significant wildlife resource for GRSG. There are multiple leks, with several in the 75-50 percent breeding bird density (according to both the national and state breeding bird density data). This area is contiguous with the Southern Mountain Valleys potential ACEC. This area was included as a separate ACEC only because it was carried forward from the Cedar City RMP revision.
Panguitch	Alton/Sink Valley	No. The GRSG and associated habitat in this area does not constitute a significant wildlife resource. According to the national and state breeding bird density maps, this area only includes 100 percent leks. The population is very small and the number of birds observed on the lek has been declining. There are some historic leks that were last used about 15-20 years ago in the area. Habitat quality has been reduced by encroaching pinyon-juniper. The amount of habitat is limited now and does not support a large population of grouse. The Sink Valley lek is located on private lands. Lek attendance has declined the past 6 years and now there is a surface coal mine on private lands adjacent to the lek.
Hamlin Valley	Southern Great Basin	Yes. The area is a significant wildlife resource for GRSG. The area includes a 75 percent lek according to the national breeding bird density map. The nominated area provides breeding, nesting, winter and brood-rearing habitat for GRSG. This potential ACEC includes all GRSG habitat included in the Pine Valley and Great Basin Core ACEC nominations, which were submitted by external organization as part of the ongoing Cedar City RMP revision.
Bald Hills	Black Mountains	Yes. The area is a significant wildlife resource for GRSG. This area includes several 75 percent leks according to the national breeding bird density map. The area contains leks, nesting, brood-rearing and winter habitat for GRSG, a federal candidate species. This potential ACEC includes GRSG habitat included in the Black Mountains and South Central Utah ACEC nominations that were submitted by external organization as part of the ongoing Cedar City RMP revision.
Sheeprock Mountains	Sheep Creek Mountains	Yes. The area is a significant wildlife resource for GRSG. The area has a lek within the 50 percent breeding bird density. The Sheeprock Mountains also support numerous other leks.

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
Box Elder	Pilot Mountains	No. There are no leks in this area. This area is a small ring of sagebrush at the base of the Pilot mountains. The area does provide winter habitat, although it is unknown where the birds are originating from. The winter habitat is disconnected from other GRSG habitat in the Box Elder Population Area.
Box Elder	Box Elder/Grouse Creek	Yes. The area is a significant wildlife resource for GRSG. This area supports the third largest GRSG population in the state and is part of a larger population that extends into Idaho and Nevada. It has several leks in the 25, 50, 75 and 100 percent ranges at both the national and state level. While the area is naturally fragmented and has areas of scattered land ownership, there is sufficient habitat on BLM-administered lands to provide for the full life-cycle.
Rich	Rich County	Yes. The area is a significant wildlife resource for GRSG. This area supports Utah's largest GRSG population. The area includes numerous 25 percent leks according to both the state and national breeding bird density maps. Lands in Rich County are part of a much larger relatively unfragmented habitat that extends into Wyoming and Idaho. The Rich County area is has scattered land ownership patterns. Isolated tracks of land located Morgan, Summit, and Wasatch counties were not included in the ACEC.
Ibapah	Ibapah	Yes. The area is a significant wildlife resource for GRSG. This area has a 50 percent lek according to the state's breeding bird density map. GRSG habitat located in this population area extends across the planning area boundary into Nevada.

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Appendix T

Detailed Employment and Earnings Data

Appendix T. Detailed Employment and Earnings Data

Table T.1
Employment Levels by Industry Sector and County in 2010[1,2]

	Beaver	Box Elder	Cache	Carbon	Daggett	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Morgan
Farm	560	1,352	1,389	298	39	882	544	301	97	666	357	136	332
Forestry, fishing, & related activities[3]	(D)	136	248	(D)	(D)	(D)	(D)	(D)	(D)	231	(D)	(D)	(D)
Mining (including oil and gas)	93	76	244	1,115	(D)	1,716	(D)	(D)	(D)	137	(D)	(D)	(D)
Utilities	(D)	37	74	142	(L)	39	(D)	(D)	28	94	(D)	(D)	19
Construction	166	1,520	3,475	587	(D)	796	607	162	444	1,400	498	209	457
Manufacturing	85	5,971	10,704	366	(D)	235	86	72	76	1,493	685	(D)	246
Wholesale trade	(D)	587	999	490	40	171	(D)	55	88	326	48	(D)	166
Retail trade	393	2,457	7,128	1,446	(D)	1,039	615	244	871	2,773	417	469	297
Transportation and warehousing	248	1,525	1,286	528	(D)	920	120	(D)	110	459	(D)	96	58
Information	(D)	163	823	105	(D)	212	142	(D)	63	204	(D)	30	(D)
Finance and insurance	(D)	945	4,125	379	0	288	(D)	72	159	1,523	181	166	458
Real estate, rental, and leasing	(D)	991	2,921	369	(D)	436	(D)	140	396	1,623	212	241	304
Professional and technical services	47	644	4,396	(D)	(D)	221	247	67	302	961	218	116	200
Management of companies and enterprises	0	201	409	(D)	0	(D)	(D)	0	(D)	276	0	0	(D)
Administrative and waste services	(D)	687	3,072	638	(D)	(D)	(D)	(D)	(D)	1,331	83	117	(D)
Educational services	16	337	1,055	(D)	44	56	(D)	(D)	124	297	(D)	(D)	(D)
Health care and social assistance	125	1,712	5,653	(D)	(L)	501	(D)	(D)	341	1,930	(D)	(D)	(D)
Arts, entertainment, and recreation	(D)	341	1,223	157	46	108	36	(D)	385	532	(D)	101	(D)
Accommodation and food services	(D)	1,339	3,465	779	102	405	303	(D)	1,450	1,708	(D)	879	(D)
Other services, except public administration	168	1,278	3,364	852	(D)	661	417	123	272	1,274	(D)	646	(D)
Federal government	81	460	883	267	56	180	111	214	287	566	84	143	57
State government	39	220	5,181	613	21	117	61	73	79	1,796	40	64	21
Local government	622	2,099	4,800	1,261	152	1,636	765	327	587	1,983	649	533	391
Categories for which data were not disclosed	978	0	0	1,936	306	542	1,549	1,752	423	0	1,427	542	1,255
Total Employment	**3,621**	**25,078**	**66,917**	**12,328**	**806**	**11,161**	**5,603**	**3,602**	**6,582**	**23,583**	**4,899**	**4,488**	**4,261**

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.
[3] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.1
Employment Levels by Industry Sector and County in 2010 (continued)[1,2]

	Piute	Rich	Sanpete	Sevier	Summit	Tooele	Uintah	Wasatch	Wayne	Davis[3]	Millard	Salt Lake	Utah	Weber
Farm	148	186	1,050	686	636	435	975	430	217	707	985	588	2,764	1,050
Forestry, fishing, and related activities[4]	(D)	(D)	142	(D)	121	(D)	105	(D)	(D)	(D)	(D)	340	496	(D)
Mining (including oil and gas)	51	(D)	72	599	228	119	2,915	91	(D)	(D)	110	3,469	483	(D)
Utilities	(L)	(D)	17	(D)	59	(D)	146	(D)	(D)	117	(D)	1,606	302	240
Construction	28	(D)	733	553	2,025	1,003	1,283	1,076	142	9,682	280	39,648	14,773	6,075
Manufacturing	17	(D)	719	447	859	1,581	258	321	39	9,642	254	52,549	17,475	12,103
Wholesale trade	(D)	11	142	(D)	365	(D)	667	160	29	3,294	(D)	30,850	5,969	3,540
Retail trade	(D)	96	1,265	1,700	3,765	2,278	1,869	1,065	115	17,294	751	74,199	29,105	13,795
Transportation and warehousing	46	(D)	278	1,103	544	1,121	964	(D)	(D)	4,981	188	27,989	3,019	2,312
Information	0	0	213	88	383	289	169	168	(D)	1,910	37	17,513	9,510	1,132
Finance and insurance	(D)	(D)	490	393	2,125	726	792	695	(D)	11,370	223	65,013	17,696	7,240
Real estate, rental, and leasing	19	(D)	742	317	4,449	1,050	827	1,040	47	9,884	174	38,423	14,351	5,318
Professional and technical services	(D)	(D)	(D)	330	2,168	(D)	554	(D)	(D)	11,349	(D)	53,715	20,007	4,972
Management of companies and enterprises	0	(D)	(D)	0	329	(D)	(D)	(D)	0	1,301	(D)	14,986	2,544	888
Administrative and waste services	16	25	235	263	1,136	2,458	(D)	508	(D)	7,470	360	47,325	13,440	6,665
Educational services	(L)	(D)	(D)	(D)	613	290	121	156	(D)	3,183	(D)	18,587	20,168	1,659
Health care and social assistance	(D)	(D)	(D)	(D)	1,196	1,517	1,075	655	(D)	11,835	(D)	61,994	22,225	12,662
Arts, entertainment, and recreation	15	(D)	174	100	3,495	460	122	322	39	4,205	(D)	13,694	4,857	2,125
Accommodation and food services	58	(D)	525	907	5,096	1,130	998	1,119	266	8,058	(D)	42,736	12,918	6,959
Other services, except public administration	(D)	101	681	622	1,669	1,265	1,065	703	79	8,687	357	34,519	12,862	6,876
Federal government	0	25	218	302	327	2,131	570	167	120	18,476	155	16,157	3,492	7,891
State government	15	25	968	323	161	186	145	203	22	1,026	132	40,468	7,427	4,863
Local government	117	158	1,476	1,121	2,212	2,499	2,252	952	163	10,974	803	40,379	18,611	9,040
Categories for which data were not disclosed	215	747	1,457	1,377	0	1,649	652	1,102	490	484	2,002	0	0	251
Total Employment	745	1,374	11,597	11,231	33,961	22,187	18,524	10,933	1,768	155,929	6,811	736,747	254,494	117,656

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.
[3] Davis, Millard, Salt Lake, Utah, and Weber counties in Utah constitute a secondary study area, as documented in the text.
[4] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.2
Employment Percentages by Industry Sector and County in 2010[1,2]

	Beaver	Box Elder	Cache	Carbon	Daggett	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Morgan
Farm	15.5%	5.4%	2.1%	2.4%	4.8%	7.9%	9.7%	8.4%	1.5%	2.8%	7.3%	3.0%	7.8%
Forestry, fishing, & related activities[3]	(D)	0.5%	0.4%	(D)	(D)	(D)	(D)	(D)	(D)	1.0%	(D)	(D)	(D)
Mining (including oil and gas)	2.6%	0.3%	0.4%	9.0%	(D)	15.4%	(D)	(D)	(D)	0.6%	(D)	(D)	(D)
Utilities	(D)	0.1%	0.1%	1.2%	(L)	0.3%	(D)	(D)	0.4%	0.4%	(D)	(D)	0.4%
Construction	4.6%	6.1%	5.2%	4.8%	(D)	7.1%	10.8%	4.5%	6.7%	5.9%	10.2%	4.7%	10.7%
Manufacturing	2.3%	23.8%	16.0%	3.0%	(D)	2.1%	1.5%	2.0%	1.2%	6.3%	14.0%	(D)	5.8%
Wholesale trade	(D)	2.3%	1.5%	4.0%	5.0%	1.5%	(D)	1.5%	1.3%	1.4%	1.0%	(D)	3.9%
Retail trade	10.9%	9.8%	10.7%	11.7%	(D)	9.3%	11.0%	6.8%	13.2%	11.8%	8.5%	10.5%	7.0%
Transportation and warehousing	6.8%	6.1%	1.9%	4.3%	(D)	8.2%	2.1%	(D)	1.7%	1.9%	(D)	2.1%	1.4%
Information	(D)	0.6%	1.2%	0.9%	(D)	1.9%	2.5%	(D)	1.0%	0.9%	(D)	0.7%	(D)
Finance and insurance	(D)	3.8%	6.2%	3.1%	0.0%	2.6%	(D)	2.0%	2.4%	6.5%	3.7%	3.7%	10.7%
Real estate, rental, and leasing	(D)	4.0%	4.4%	3.0%	(D)	3.9%	(D)	3.9%	6.0%	6.9%	4.3%	5.4%	7.1%
Professional and technical services	1.3%	2.6%	6.6%	(D)	(D)	2.0%	4.4%	1.9%	4.6%	4.1%	4.4%	2.6%	4.7%
Management of companies and enterprises	0.0%	0.8%	0.6%	(D)	0.0%	(D)	(D)	0.0%	(D)	1.2%	0.0%	0.0%	(D)
Administrative and waste services	(D)	2.7%	4.6%	5.2%	(D)	(D)	(D)	(D)	(D)	5.6%	1.7%	2.6%	(D)
Educational services	0.4%	1.3%	1.6%	(D)	5.5%	0.5%	(D)	(D)	1.9%	1.3%	(D)	(D)	(D)
Health care and social assistance	3.5%	6.8%	8.4%	(D)	(L)	4.5%	(D)	(D)	5.2%	8.2%	(D)	(D)	(D)
Arts, entertainment, and recreation	(D)	1.4%	1.8%	1.3%	5.7%	1.0%	0.6%	(D)	5.8%	2.3%	(D)	2.3%	(D)
Accommodation and food services	(D)	5.3%	5.2%	6.3%	12.7%	3.6%	5.4%	(D)	22.0%	7.2%	(D)	19.6%	(D)
Other services, except public administration	4.6%	5.1%	5.0%	6.9%	(D)	5.9%	7.4%	3.4%	4.1%	5.4%	(D)	14.4%	(D)
Federal government	2.2%	1.8%	1.3%	2.2%	6.9%	1.6%	2.0%	5.9%	4.4%	2.4%	1.7%	3.2%	1.3%
State government	1.1%	0.9%	7.7%	5.0%	2.6%	1.0%	1.1%	2.0%	1.2%	7.6%	0.8%	1.4%	0.5%
Local government	17.2%	8.4%	7.2%	10.2%	18.9%	14.7%	13.7%	9.1%	8.9%	8.4%	13.2%	11.9%	9.2%
Categories for which data were not disclosed	27.0%	0.0%	0.0%	15.7%	38.0%	4.9%	27.6%	48.6%	6.4%	0.0%	29.1%	12.1%	29.5%

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.
[3] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.2
Employment Percentages by Industry Sector and County in 2010 (continued)[1,2]

	Piute	Rich	Sanpete	Sevier	Summit	Tooele	Uintah	Wasatch	Wayne	Davis[3]	Millard	Salt Lake	Utah	Weber
Farm	19.9%	13.5%	9.1%	6.1%	1.9%	2.0%	5.3%	3.9%	12.3%	0.5%	14.5%	0.1%	1.1%	0.9%
Forestry, fishing, and related activities[4]	(D)	(D)	1.2%	(D)	0.4%	(D)	0.6%	(D)	(D)	(D)	(D)	0.0%	0.2%	(D)
Mining (including oil and gas)	6.8%	(D)	0.6%	5.3%	0.7%	0.5%	15.7%	0.8%	(D)	(D)	1.6%	0.5%	0.2%	(D)
Utilities	(L)	(D)	0.1%	(D)	0.2%	(D)	0.8%	(D)	(D)	0.1%	(D)	0.2%	0.1%	0.2%
Construction	3.8%	(D)	6.3%	4.9%	6.0%	4.5%	6.9%	9.8%	8.0%	6.2%	4.1%	5.4%	5.8%	5.2%
Manufacturing	2.3%	(D)	6.2%	4.0%	2.5%	7.1%	1.4%	2.9%	2.2%	6.2%	3.7%	7.1%	6.9%	10.3%
Wholesale trade	(D)	0.8%	1.2%	(D)	1.1%	(D)	3.6%	1.5%	1.6%	2.1%	(D)	4.2%	2.3%	3.0%
Retail trade	(D)	7.0%	10.9%	15.1%	11.1%	10.3%	10.1%	9.7%	6.5%	11.1%	11.0%	10.1%	11.4%	11.7%
Transportation and warehousing	6.2%	(D)	2.4%	9.8%	1.6%	5.1%	5.2%	(D)	(D)	3.2%	2.8%	3.8%	1.2%	2.0%
Information	0.0%	0.0%	1.8%	0.8%	1.1%	1.3%	0.9%	1.5%	(D)	1.2%	0.5%	2.4%	3.7%	1.0%
Finance and insurance	(D)	(D)	4.2%	3.5%	6.3%	3.3%	4.3%	6.4%	(D)	7.3%	3.3%	8.8%	7.0%	6.2%
Real estate, rental, and leasing	2.6%	(D)	6.4%	2.8%	13.1%	4.7%	4.5%	9.5%	2.7%	6.3%	2.6%	5.2%	5.6%	4.5%
Professional and technical services	(D)	(D)	(D)	2.9%	6.4%	(D)	3.0%	(D)	(D)	7.3%	(D)	7.3%	7.9%	4.2%
Management of companies and enterprises	0.0%	(D)	(D)	0.0%	1.0%	(D)	(D)	(D)	0.0%	0.8%	(D)	2.0%	1.0%	0.8%
Administrative and waste services	2.1%	1.8%	2.0%	2.3%	3.3%	11.1%	(D)	4.6%	(D)	4.8%	5.3%	6.4%	5.3%	5.7%
Educational services	(L)	(D)	(D)	(D)	1.8%	1.3%	0.7%	1.4%	(D)	2.0%	(D)	2.5%	7.9%	1.4%
Health care and social assistance	(D)	(D)	(D)	(D)	3.5%	6.8%	5.8%	6.0%	(D)	7.6%	(D)	8.4%	8.7%	10.8%
Arts, entertainment, and recreation	2.0%	(D)	1.5%	0.9%	10.3%	2.1%	0.7%	2.9%	2.2%	2.7%	(D)	1.9%	1.9%	1.8%
Accommodation and food services	7.8%	(D)	4.5%	8.1%	15.0%	5.1%	5.4%	10.2%	15.0%	5.2%	(D)	5.8%	5.1%	5.9%
Other services, except public administration	(D)	7.4%	5.9%	5.5%	4.9%	5.7%	5.7%	6.4%	4.5%	5.6%	5.2%	4.7%	5.1%	5.8%
Federal government	0.0%	1.8%	1.9%	2.7%	1.0%	9.6%	3.1%	1.5%	6.8%	11.8%	2.3%	2.2%	1.4%	6.7%
State government	2.0%	1.8%	8.3%	2.9%	0.5%	0.8%	0.8%	1.9%	1.2%	0.7%	1.9%	5.5%	2.9%	4.1%
Local government	15.7%	11.5%	12.7%	10.0%	6.5%	11.3%	12.2%	8.7%	9.2%	7.0%	11.8%	5.5%	7.3%	7.7%
Categories for which data were not disclosed	28.9%	54.4%	12.6%	12.3%	0.0%	7.4%	3.5%	10.1%	27.7%	0.3%	29.4%	0.0%	0.0%	0.2%

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.
[3] Davis, Millard, Salt Lake, Utah, and Weber Counties in Utah constitute a secondary study area, as documented in the text.
[4] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.3
Labor Income Levels by Industry Sector and County in 2010, presented in 2010 dollars (millions)

	Beaver	Box Elder	Cache	Carbon	Daggett	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Morgan
Population	6,650	50,175	113,324	21,443	1,066	18,640	10,990	5,186	9,303	46,291	10,268	7,153	9,524
Total personal income	$184.2	$1,492.5	$3,093.4	$697.7	$32.1	$632.4	$305.1	$142.3	$307.9	$1,072.3	$237.2	$225.0	$298.5
Adjustment for residence[1]	-$3.1	$62.2	$66.9	-$15.5	-$4.6	$54.8	-$11.9	$4.8	-$11.7	$17.4	$27.2	$20.7	$107.8
Dividends, interest, and rent	$29.0	$218.7	$555.2	$87.2	$6.3	$84.1	$35.1	$21.2	$84.8	$197.9	$26.3	$45.6	$58.6
Personal current transfer receipts[2]	$42.1	$244.7	$475.3	$166.2	$6.0	$103.6	$64.0	$32.1	$57.8	$251.8	$56.0	$49.7	$36.0
Contributions for government social insurance[3]	$15.4	$123.8	$258.4	$62.9	$2.5	$51.7	$29.5	$12.9	$24.2	$78.7	$17.8	$15.6	$12.8
Earnings by place of work[4]	$131.6	$1,090.7	$2,254.4	$522.6	$26.8	$441.6	$247.3	$97.2	$201.1	$683.9	$145.5	$124.6	$108.9
Total earnings by place of work by sector[5,6]													
Farm	$30.8	$30.9	$22.9	-$0.8	-$0.4	-$7.0	-$2.2	-$3.0	-$2.0	$15.0	$3.5	$0.3	-$0.1
Forestry, fishing, and related activities[7]	(D)	$2.1	$5.1	(D)	(D)	(D)	(D)	(D)	(D)	$4.4	(D)	(D)	(D)
Mining (including oil and gas)	$2.3	$2.0	$1.4	$121.2	(D)	$124.8	(D)	(D)	(D)	$2.2	(D)	(D)	(D)
Utilities	(D)	$2.7	$6.6	$17.2	(L)	$3.1	(D)	(D)	$3.2	$9.7	(D)	(D)	$0.6
Construction	$7.8	$50.8	$167.3	$25.3	(D)	$37.5	$33.6	$4.8	$19.8	$29.8	$21.2	$5.2	$18.0
Manufacturing	$2.9	$534.8	$539.1	$21.1	(D)	$9.5	$1.2	$1.5	$2.4	$70.4	$29.5	(D)	$14.4
Wholesale trade	(D)	$29.3	$40.4	$32.1	$0.3	$9.6	(D)	$1.1	$3.0	$9.6	$1.1	(D)	$12.1
Retail trade	$7.9	$68.0	$162.3	$40.2	(D)	$23.8	$9.9	$4.7	$23.3	$62.3	$6.7	$8.2	$6.1
Transportation and warehousing	$17.1	$69.9	$60.6	$27.6	(D)	$59.0	$4.1	(D)	$3.7	$19.4	(D)	$2.3	$0.8
Information	(D)	$3.1	$23.8	$2.2	(D)	$9.8	$6.4	(D)	$1.4	$3.9	(D)	$0.6	(D)
Finance and insurance	(D)	$15.6	$64.7	$9.5	$0.0	$5.9	(D)	$1.1	$4.3	$38.5	$2.8	$2.9	$2.7
Real estate, rental, and leasing	(D)	$6.0	$18.8	$3.0	(D)	$4.1	(D)	$0.7	$5.5	$10.3	$1.7	$4.9	$1.4

[1] Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs.

[2] Personal current transfer receipts are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.

[3] Contributions for government social insurance consist of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly administered workers' compensation; military medical insurance; and temporary disability insurance.

[4] Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.

[5] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

[6] (L) Less than $50,000, but the estimates for this item are included in the totals.

[7] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.3
Labor Income Levels by Industry Sector and County in 2010, presented in 2010 dollars (millions) (continued)

	Beaver	Box Elder	Cache	Carbon	Daggett	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Morgan
Professional and technical services	$0.7	$16.6	$131.4	(D)	(D)	$6.1	$18.1	$0.6	$7.6	$23.4	$7.9	$2.1	$7.3
Management of companies and enterprises	$0.0	$1.2	$24.2	(D)	$0.0	(D)	(D)	$0.0	(D)	$1.7	$0.0	$0.0	(D)
Administrative and waste services	(D)	$10.1	$61.9	$19.0	(D)	(D)	(D)	(D)	(D)	$22.1	$3.6	$0.7	(D)
Educational services	(L)	$1.6	$11.7	(D)	$0.0	$0.2	(D)	(D)	$1.5	$3.9	(D)	(D)	(D)
Health care and social assistance	$4.0	$51.7	$203.9	(D)	$0.8	$27.2	(D)	(D)	$12.3	$58.4	(D)	(D)	(D)
Arts, entertainment, and recreation	(D)	$2.2	$10.0	$1.4	$1.1	$0.4	(L)	(D)	$6.2	$6.5	(D)	$2.2	(D)
Accommodation and food services	(D)	$19.2	$51.5	$11.7	$2.3	$6.0	$5.1	(D)	$35.4	$27.9	(D)	$21.5	(D)
Other services, except public administration	$6.5	$45.9	$113.3	$31.9	(D)	$29.7	$17.3	$4.4	$10.3	$52.6	(D)	$25.3	(D)
Federal government	$5.4	$32.4	$56.0	$20.4	$4.7	$10.9	$6.3	$14.4	$21.4	$40.2	$4.5	$9.7	$2.9
State government	$2.7	$12.8	$285.7	$32.8	$1.8	$6.9	$4.0	$4.4	$5.3	$88.4	$2.7	$4.4	$1.6
Local government	$24.3	$81.9	$191.7	$49.9	$5.3	$66.0	$30.5	$13.4	$23.7	$83.4	$22.4	$21.3	$14.3
Categories for which data were not disclosed	$19.2	$0.0	$0.0	$57.0	$10.8	$8.1	$112.9	$49.1	$12.9	$0.0	$37.5	$12.9	$26.9

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T.3
Labor Income Levels by Industry Sector and County in 2010, presented in 2010 dollars (millions) (continued)

	Piute	Rich	Sanpete	Sevier	Summit	Tooele	Uintah	Wasatch	Wayne	Davis[1]	Millard	Salt Lake	Utah	Weber
Population	1,562	2,262	27,891	20,833	36,533	58,513	32,435	23,702	2,771	307,806	12,540	1,033,223	519,837	232,216
Total personal income	$36.9	$70.9	$594.1	$548.8	$2,503.4	$1,566.8	$935.9	$666.2	$73.8	$10,409.1	$368.9	$39,083.8	$12,946.9	$7,647.9
Adjustment for residence[2]	$5.0	$16.4	$67.1	$4.2	$569.0	$326.4	-$23.6	$142.5	$2.1	$1,908.9	$1.6	-$4,931.4	$625.8	$943.9
Dividends, interest, and rent	$6.0	$17.6	$78.0	$86.8	$687.9	$162.4	$124.7	$168.1	$16.6	$1,509.2	$50.0	$6,458.5	$1,865.6	$1,252.5
Personal current transfer receipts[3]	$12.5	$10.7	$157.1	$137.0	$128.8	$232.6	$145.0	$87.7	$15.4	$1,199.8	$71.0	$5,008.2	$2,002.9	$1,230.3
Contributions for government social insurance[4]	$1.9	$3.3	$36.7	$44.8	$133.6	$111.2	$93.0	$35.1	$5.6	$697.0	$27.5	$4,115.7	$1,071.8	$553.6
Earnings by place of work[5]	$15.2	$29.5	$328.6	$365.6	$1,251.3	$956.6	$782.9	$303.0	$45.2	$6,488.3	$273.8	$36,664.2	$9,524.4	$4,774.8
Total earnings by place of work by sector[6,7]														
Farm	$2.4	$2.4	$15.1	$1.1	$6.3	$4.6	-$0.9	-$2.1	$2.6	$8.3	$37.7	$2.0	$40.0	$0.2
Forestry, fishing, and related activities[8]	(D)	(D)	$4.1	(D)	$2.0	(D)	$1.2	(D)	(D)	(D)	(D)	$4.1	$9.0	(D)
Mining (including oil and gas)	(L)	(D)	$3.9	$36.9	$6.9	$5.7	$202.7	$4.6	(D)	(D)	$5.7	$300.5	$6.6	(D)
Utilities	(L)	(D)	$1.0	(D)	$6.5	(D)	$19.8	(D)	(D)	$20.5	(D)	$210.2	$34.4	$27.5
Construction	$0.7	(D)	$20.4	$16.4	$113.8	$51.9	$69.4	$46.2	$4.3	$548.2	$11.2	$2,410.9	$618.0	$297.6
Manufacturing	(L)	(D)	$38.8	$14.9	$74.6	$97.8	$7.3	$9.2	$0.4	$617.6	$25.7	$3,639.4	$920.5	$742.0
Wholesale trade	(D)	(L)	$3.7	(D)	$27.8	(D)	$42.1	$6.1	$0.5	$165.4	(D)	$2,112.2	$393.7	$175.2
Retail trade	(D)	$1.4	$23.1	$40.0	$111.0	$45.7	$49.5	$24.2	$1.8	$419.6	$14.3	$2,784.4	$761.8	$404.6
Transportation and warehousing	$2.7	(D)	$12.8	$63.1	$19.3	$56.0	$57.6	(D)	(D)	$246.6	$9.0	$1,664.4	$164.6	$127.2
Information	$0.0	$0.0	$9.8	$2.6	$16.1	$11.4	$6.2	$4.9	(D)	$73.9	$0.8	$1,004.9	$682.5	$32.8
Finance and insurance	(D)	(D)	$7.8	$8.9	$53.9	$11.1	$10.3	$10.8	(D)	$169.2	$2.7	$3,175.4	$315.4	$204.9
Real estate, rental, and leasing	(L)	(D)	$3.8	$2.1	$100.4	$6.9	$26.0	$7.6	$0.2	$82.0	$2.5	$742.8	$230.6	$47.2

[1] Davis, Millard, Salt Lake, Utah, and Weber Counties in Utah constitute a secondary study area, as documented in the text.

[2] Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs.

[3] Personal current transfer receipts are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.

[4] Contributions for government social insurance consist of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly administered workers' compensation; military medical insurance; and temporary disability insurance.

[5] Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.

[6] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

[7] (L) Less than $50,000, but the estimates for this item are included in the totals.

[8] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.3
Labor Income Levels by Industry Sector and County in 2010, presented in 2010 dollars (millions) (continued)

	Piute	Rich	Sanpete	Sevier	Summit	Tooele	Uintah	Wasatch	Wayne	Davis[1]	Millard	Salt Lake	Utah	Weber
Professional and technical services	(D)	(D)	(D)	$12.0	$100.0	(D)	$28.5	(D)	(D)	$552.7	(D)	$3,510.2	$1,015.2	$216.7
Management of companies and enterprises	$0.0	(D)	(D)	$0.0	$11.8	(D)	(D)	(D)	$0.0	$56.0	(D)	$1,358.6	$82.2	$80.9
Administrative and waste services	(L)	$0.6	$2.3	$4.2	$34.6	$147.1	(D)	$10.7	(D)	$170.9	$9.9	$1,552.6	$374.6	$164.0
Educational services	$0.0	(D)	(D)	(D)	$12.4	$3.0	$0.9	$2.0	(D)	$49.5	(D)	$485.6	$708.0	$28.2
Health care and social assistance	(D)	(D)	(D)	(D)	$77.5	$55.5	$39.0	$21.9	(D)	$481.4	(D)	$3,007.7	$996.8	$585.4
Arts, entertainment, and recreation	(L)	(D)	$0.6	$0.3	$111.9	$8.2	$0.5	$2.6	$0.2	$47.8	(D)	$286.0	$55.4	$23.5
Accommodation and food services	$0.5	(D)	$5.3	$14.0	$154.4	$17.5	$16.9	$26.8	$4.5	$133.4	(D)	$944.1	$222.5	$118.3
Other services, except public administration	(D)	$3.1	$25.9	$20.9	$69.7	$52.3	$42.1	$26.2	$2.4	$341.5	$12.9	$1,502.1	$539.7	$272.4
Federal government	$0.7	$1.2	$12.7	$23.1	$20.3	$207.6	$44.8	$9.4	$8.1	$1,795.3	$10.0	$1,251.5	$204.8	$580.6
State government	$1.3	$2.1	$46.0	$16.5	$8.7	$12.4	$9.7	$9.8	$1.7	$57.1	$8.4	$2,802.3	$366.1	$247.1
Local government	$4.0	$5.9	$57.5	$42.3	$111.3	$102.7	$94.4	$50.3	$5.3	$438.5	$31.6	$1,912.2	$782.2	$391.4
Categories for which data were not disclosed	$2.9	$12.7	$34.0	$46.2	$0.0	$59.2	$14.8	$31.8	$13.2	$12.8	$91.4	$0.0	$0.0	$6.9

Table T.4
Labor Income Percentages by Industry Sector and County in 2010

	Beaver	Box Elder	Cache	Carbon	Daggett	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Morgan
Population	6,650	50,175	113,324	21,443	1,066	18,640	10,990	5,186	9,303	46,291	10,268	7,153	9,524
Total personal income ($ millions)	$184.2	$1,492.5	$3,093.4	$697.7	$32.1	$632.4	$305.1	$142.3	$307.9	$1,072.3	$237.2	$225.0	$298.5
Adjustment for residence as a proportion of total personal income[1]	-1.7%	4.2%	2.2%	-2.2%	-14.2%	8.7%	-3.9%	3.4%	-3.8%	1.6%	11.5%	9.2%	36.1%
Dividends, interest, and rent as a proportion of total personal income	15.7%	14.7%	17.9%	12.5%	19.8%	13.3%	11.5%	14.9%	27.6%	18.5%	11.1%	20.3%	19.6%
Personal current transfer receipts as a proportion of total personal income[2]	22.9%	16.4%	15.4%	23.8%	18.8%	16.4%	21.0%	22.5%	18.8%	23.5%	23.6%	22.1%	12.1%
Contributions for government social insurance as a proportion of total personal income[3]	8.4%	8.3%	8.4%	9.0%	7.9%	8.2%	9.7%	9.1%	7.9%	7.3%	7.5%	6.9%	4.3%
Earnings by place of work ($ millions)[4]	$131.6	$1,090.7	$2,254.4	$522.6	$26.8	$441.6	$247.3	$97.2	$201.1	$683.9	$145.5	$124.6	$108.9
Total earnings by place of work by sector [5,6]													
Farm	23.4%	2.8%	1.0%	-0.1%	-1.4%	-1.6%	-0.9%	-3.1%	-1.0%	2.2%	2.4%	0.3%	-0.1%
Forestry, fishing, and related activities[7]	(D)	0.2%	0.2%	(D)	(D)	(D)	(D)	(D)	(D)	0.6%	(D)	(D)	(D)
Mining (including oil and gas)	1.7%	0.2%	0.1%	23.2%	(D)	28.3%	(D)	(D)	(D)	0.3%	(D)	(D)	(D)
Utilities	(D)	0.2%	0.3%	3.3%	(L)	0.7%	(D)	(D)	1.6%	1.4%	(D)	(D)	0.5%
Construction	5.9%	4.7%	7.4%	4.8%	(D)	8.5%	13.6%	4.9%	9.8%	4.4%	14.6%	4.2%	16.5%
Manufacturing	2.2%	49.0%	23.9%	4.0%	(D)	2.1%	0.5%	1.6%	1.2%	10.3%	20.3%	(D)	13.2%
Wholesale trade	(D)	2.7%	1.8%	6.1%	1.2%	2.2%	(D)	1.1%	1.5%	1.4%	0.8%	(D)	11.1%
Retail trade	6.0%	6.2%	7.2%	7.7%	(D)	5.4%	4.0%	4.8%	11.6%	9.1%	4.6%	6.6%	5.6%
Transportation and warehousing	13.0%	6.4%	2.7%	5.3%	(D)	13.4%	1.7%	(D)	1.9%	2.8%	(D)	1.8%	0.7%
Information	(D)	0.3%	1.1%	0.4%	(D)	2.2%	2.6%	(D)	0.7%	0.6%	(D)	0.5%	(D)
Finance and insurance	(D)	1.4%	2.9%	1.8%	0.0%	1.3%	(D)	1.1%	2.1%	5.6%	2.0%	2.3%	2.5%

[1] Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs.

[2] Personal current transfer receipts are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.

[3] Contributions for government social insurance consist of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly administered workers' compensation; military medical insurance; and temporary disability insurance.

[4] Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.

[5] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

[6] (L) Less than $50,000, but the estimates for this item are included in the totals.

[7] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.4
Labor Income Percentages by Industry Sector and County in 2010 (continued)

	Beaver	Box Elder	Cache	Carbon	Daggett	Duchesne	Emery	Garfield	Grand	Iron	Juab	Kane	Morgan
Real estate, rental, and leasing	(D)	0.5%	0.8%	0.6%	(D)	0.9%	(D)	0.7%	2.7%	1.5%	1.2%	3.9%	1.3%
Professional and technical services	0.5%	1.5%	5.8%	(D)	(D)	1.4%	7.3%	0.7%	3.8%	3.4%	5.5%	1.7%	6.7%
Management of companies and enterprises	0.0%	0.1%	1.1%	(D)	0.0%	(D)	(D)	0.0%	(D)	0.2%	0.0%	0.0%	(D)
Administrative and waste services	(D)	0.9%	2.7%	3.6%	(D)	(D)	(D)	(D)	(D)	3.2%	2.5%	0.5%	(D)
Educational services	(L)	0.1%	0.5%	(D)	0.0%	0.0%	(D)	(D)	0.7%	0.6%	(D)	(D)	(D)
Health care and social assistance	3.0%	4.7%	9.0%	(D)	3.1%	6.2%	(D)	(D)	6.1%	8.5%	(D)	(D)	(D)
Arts, entertainment, and recreation	(D)	0.2%	0.4%	0.3%	4.0%	0.1%	(L)	(D)	3.1%	0.9%	(D)	1.7%	(D)
Accommodation and food services	(D)	1.8%	2.3%	2.2%	8.6%	1.4%	2.1%	(D)	17.6%	4.1%	(D)	17.3%	(D)
Other services, except public administration	5.0%	4.2%	5.0%	6.1%	(D)	6.7%	7.0%	4.5%	5.1%	7.7%	(D)	20.3%	(D)
Federal government	4.1%	3.0%	2.5%	3.9%	17.6%	2.5%	2.5%	14.8%	10.7%	5.9%	3.1%	7.8%	2.6%
State government	2.1%	1.2%	12.7%	6.3%	6.8%	1.6%	1.6%	4.5%	2.6%	12.9%	1.9%	3.6%	1.5%
Local government	18.4%	7.5%	8.5%	9.5%	19.9%	15.0%	12.3%	13.8%	11.8%	12.2%	15.4%	17.1%	13.1%
Categories for which data were not disclosed	14.6%	0.0%	0.0%	10.9%	40.2%	1.8%	45.7%	50.5%	6.4%	0.0%	25.8%	10.3%	24.7%

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T.4
Labor Income Percentages by Industry Sector and County in 2010 (continued)

	Piute	Rich	Sanpete	Sevier	Summit	Tooele	Uintah	Wasatch	Wayne	Davis[1]	Millard	Salt Lake	Utah	Weber
Population	1,562	2,262	27,891	20,833	36,533	58,513	32,435	23,702	2,771	307,806	12,540	1,033,223	519,837	232,216
Total personal income ($ millions)	$36.9	$70.9	$594.1	$548.8	$2,503.4	$1,566.8	$935.9	$666.2	$73.8	$10,409.1	$368.9	$39,083.8	$12,946.9	$7,647.9
Adjustment for residence as a proportion of total personal income[2]	13.6%	23.1%	11.3%	0.8%	22.7%	20.8%	-2.5%	21.4%	2.9%	18.3%	0.4%	-12.6%	4.8%	12.3%
Dividends, interest, and rent as a proportion of total personal income	16.3%	24.9%	13.1%	15.8%	27.5%	10.4%	13.3%	25.2%	22.5%	14.5%	13.6%	16.5%	14.4%	16.4%
Personal current transfer receipts as a proportion of total personal income[3]	34.0%	15.1%	26.4%	25.0%	5.1%	14.8%	15.5%	13.2%	20.9%	11.5%	19.2%	12.8%	15.5%	16.1%
Contributions for government social insurance as a proportion of total personal income[4]	5.1%	4.7%	6.2%	8.2%	5.3%	7.1%	9.9%	5.3%	7.5%	6.7%	7.4%	10.5%	8.3%	7.2%
Earnings by place of work ($ millions)[5]	$15.2	$29.5	$328.6	$365.6	$1,251.3	$956.6	$782.9	$303.0	$45.2	$6,488.3	$273.8	$36,664.2	$9,524.4	$4,774.8
Total earnings by place of work by sector [6,7]														
Farm	15.9%	8.1%	4.6%	0.3%	0.5%	0.5%	-0.1%	-0.7%	5.8%	0.1%	13.8%	0.0%	0.4%	0.0%
Forestry, fishing, and related activities[8]	(D)	(D)	1.2%	(D)	0.2%	(D)	0.2%	(D)	(D)	(D)	(D)	0.0%	0.1%	(D)
Mining (including oil and gas)	(L)	(D)	1.2%	10.1%	0.5%	0.6%	25.9%	1.5%	(D)	(D)	2.1%	0.8%	0.1%	(D)
Utilities	(L)	(D)	0.3%	(D)	0.5%	(D)	2.5%	(D)	(D)	0.3%	(D)	0.6%	0.4%	0.6%
Construction	4.9%	(D)	6.2%	4.5%	9.1%	5.4%	8.9%	15.3%	9.5%	8.4%	4.1%	6.6%	6.5%	6.2%
Manufacturing	(L)	(D)	11.8%	4.1%	6.0%	10.2%	0.9%	3.0%	0.9%	9.5%	9.4%	9.9%	9.7%	15.5%
Wholesale trade	(D)	(L)	1.1%	(D)	2.2%	(D)	5.4%	2.0%	1.2%	2.5%	(D)	5.8%	4.1%	3.7%
Retail trade	(D)	4.7%	7.0%	11.0%	8.9%	4.8%	6.3%	8.0%	3.9%	6.5%	5.2%	7.6%	8.0%	8.5%
Transportation and warehousing	18.1%	(D)	3.9%	17.3%	1.5%	5.9%	7.4%	(D)	(D)	3.8%	3.3%	4.5%	1.7%	2.7%
Information	0.0%	0.0%	3.0%	0.7%	1.3%	1.2%	0.8%	1.6%	(D)	1.1%	0.3%	2.7%	7.2%	0.7%

[1] Davis, Millard, Salt Lake, Utah, and Weber Counties in Utah constitute a secondary study area, as documented in the text.

[2] Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs.

[3] Personal current transfer receipts are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.

[4] Contributions for government social insurance consist of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly administered workers' compensation; military medical insurance; and temporary disability insurance.

[5] Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.

[6] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

[7] (L) Less than $50,000, but the estimates for this item are included in the totals.

[8] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T.4
Labor Income Percentages by Industry Sector and County in 2010 (continued)

	Piute	Rich	Sanpete	Sevier	Summit	Tooele	Uintah	Wasatch	Wayne	Davis[1]	Millard	Salt Lake	Utah	Weber
Finance and insurance	(D)	(D)	2.4%	2.4%	4.3%	1.2%	1.3%	3.6%	(D)	2.6%	1.0%	8.7%	3.3%	4.3%
Real estate, rental, and leasing	(L)	(D)	1.2%	0.6%	8.0%	0.7%	3.3%	2.5%	0.4%	1.3%	0.9%	2.0%	2.4%	1.0%
Professional and technical services	(D)	(D)	(D)	3.3%	8.0%	(D)	3.6%	(D)	(D)	8.5%	(D)	9.6%	10.7%	4.5%
Management of companies and enterprises	0.0%	(D)	(D)	0.0%	0.9%	(D)	(D)	(D)	0.0%	0.9%	(D)	3.7%	0.9%	1.7%
Administrative and waste services	(L)	1.9%	0.7%	1.1%	2.8%	15.4%	(D)	3.5%	(D)	2.6%	3.6%	4.2%	3.9%	3.4%
Educational services	0.0%	(D)	(D)	(D)	1.0%	0.3%	0.1%	0.7%	(D)	0.8%	(D)	1.3%	7.4%	0.6%
Health care and social assistance	(D)	(D)	(D)	(D)	6.2%	5.8%	5.0%	7.2%	(D)	7.4%	(D)	8.2%	10.5%	12.3%
Arts, entertainment, and recreation	(L)	(D)	0.2%	0.1%	8.9%	0.9%	0.1%	0.9%	0.4%	0.7%	(D)	0.8%	0.6%	0.5%
Accommodation and food services	3.1%	(D)	1.6%	3.8%	12.3%	1.8%	2.2%	8.8%	10.0%	2.1%	(D)	2.6%	2.3%	2.5%
Other services, except public administration	(D)	10.6%	7.9%	5.7%	5.6%	5.5%	5.4%	8.6%	5.3%	5.3%	4.7%	4.1%	5.7%	5.7%
Federal government	4.6%	4.2%	3.9%	6.3%	1.6%	21.7%	5.7%	3.1%	17.8%	27.7%	3.6%	3.4%	2.1%	12.2%
State government	8.6%	7.3%	14.0%	4.5%	0.7%	1.3%	1.2%	3.2%	3.7%	0.9%	3.1%	7.6%	3.8%	5.2%
Local government	26.0%	20.0%	17.5%	11.6%	8.9%	10.7%	12.1%	16.6%	11.8%	6.8%	11.5%	5.2%	8.2%	8.2%
Categories for which data were not disclosed	18.8%	43.2%	10.4%	12.6%	0.0%	6.2%	1.9%	10.5%	29.3%	0.2%	33.4%	0.0%	0.0%	0.1%

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2012

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mining												
Beaver County	56	54	(D)	(D)	(D)	(D)	80	134	169	146	222	(D)
Box Elder County	(D)	(D)	68	65	49	(D)	63	(D)	58	80	129	123
Cache County	(D)	(D)	(D)	(D)	48	(D)	75	69	216	603	82	90
Carbon County	(D)	(D)	(D)	(D)	824	(D)	(D)	(D)	(D)	909	994	(D)
Daggett County	12	10	12	10	10	11	15	44	(D)	(D)	(D)	(D)
Duchesne County	653	588	543	617	750	1,083	1,387	1,814	1,651	1,702	1,939	2,375
Emery County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Garfield County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Grand County	(D)	(D)	110	105	124	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Iron County	46	(D)	(D)	(D)	(D)	70	(D)	(D)	(D)	139	165	168
Juab County	(D)	(D)	(D)	(D)	(D)	92	115	125	106	(D)	275	261
Kane County	12	(D)	(D)	10	10	11	(D)	(D)	(D)	(D)	(D)	(D)
Morgan County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Piute County	12	10	12	(D)	(D)	(D)	(D)	(D)	(D)	73	35	36
Rich County	0	10	(L)	(D)	(D)	(D)	(D)	48	(D)	(D)	(D)	(D)
Sanpete County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	130	101	78	81	90
Sevier County	354	407	404	412	437	508	535	577	596	630	626	624
Summit County	150	155	165	147	162	194	265	268	226	198	155	188
Tooele County	75	73	64	60	56	(D)	(D)	(D)	106	183	275	280
Uintah County	1,930	1,849	2,022	2,244	2,668	3,426	3,785	4,009	3,103	3,056	3,308	3,434
Wasatch County	(D)	(D)	(D)	(D)	(D)	91	85	88	82	126	103	59
Wayne County	0	0	0	0	0	0	0	0	(D)	(D)	(D)	(D)
Socioeconomic Study Area	**3,301**	**3,158**	**3,403**	**3,674**	**5,143**	**5,492**	**6,412**	**7,314**	**6,423**	**7,933**	**8,400**	**7,740**
Farming												
Beaver County	575	520	563	544	554	560	534	551	538	560	525	519
Box Elder County	1,510	1,404	1,384	1,335	1,322	1,301	1,328	1,338	1,323	1,351	1,308	1,294
Cache County	1,901	1,769	1,740	1,600	1,514	1,412	1,366	1,378	1,362	1,390	1,348	1,332
Carbon County	274	266	268	268	274	275	299	297	294	298	295	292
Daggett County	40	37	38	37	37	36	40	40	40	39	39	39
Duchesne County	1,075	1,032	997	940	905	857	884	876	874	882	871	861
Emery County	560	536	529	518	516	506	546	540	540	544	538	532
Garfield County	287	259	261	264	272	277	299	299	297	301	294	291

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2012 (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Grand County	110	102	104	99	98	94	95	97	96	97	94	94
Iron County	813	779	805	745	718	683	651	658	651	666	640	634
Juab County	319	310	320	322	328	331	351	355	352	357	346	343
Kane County	157	147	143	138	134	129	134	136	135	136	134	131
Morgan County	324	305	304	303	306	309	329	330	329	332	325	322
Piute County	153	144	144	140	141	141	145	146	144	148	142	141
Rich County	216	199	198	189	185	182	181	185	182	186	178	177
Sanpete County	1,088	1,023	1,040	1,012	1,013	1,004	1,036	1,041	1,032	1,050	1,019	1,009
Sevier County	728	703	707	680	673	655	683	681	679	686	674	666
Summit County	631	607	595	588	593	591	632	632	628	636	623	616
Tooele County	490	471	467	444	436	422	434	432	428	435	425	420
Uintah County	1,018	975	961	936	933	914	976	969	965	974	961	950
Wasatch County	421	414	408	402	402	398	428	427	426	430	423	419
Wayne County	214	196	197	196	200	200	215	215	214	217	211	209
Socioeconomic Study Area	**12,905**	**12,200**	**12,176**	**11,704**	**11,559**	**11,283**	**11,593**	**11,631**	**11,538**	**11,725**	**11,424**	**11,303**
Retail trade												
Beaver County	362	390	373	379	387	377	420	384	384	392	398	418
Box Elder County	2,413	2,511	2,614	2,716	2,752	2,774	2,868	2,752	2,611	2,407	2,401	2,411
Cache County	5,926	6,007	6,244	6,217	6,453	6,643	6,874	7,331	7,237	7,183	7,296	7,236
Carbon County	1,548	1,636	1,645	1,578	1,656	1,703	1,711	1,561	1,525	1,452	1,414	1,407
Daggett County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Duchesne County	933	894	873	930	987	1,042	1,093	1,125	1,097	1,017	1,048	1,089
Emery County	611	586	597	667	686	704	733	657	629	611	648	654
Garfield County	235	254	248	263	278	272	285	281	262	256	273	308
Grand County	782	810	816	811	848	891	928	913	876	868	913	945
Iron County	2,351	2,399	2,442	2,462	2,621	2,760	2,879	3,029	2,897	2,757	2,693	2,689
Juab County	408	433	457	459	478	451	436	452	462	412	414	420
Kane County	424	404	427	454	480	508	500	489	484	461	454	431
Morgan County	293	309	309	292	263	267	303	306	299	321	353	329
Piute County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	96	90	93	105	102	101	98	92	107	86	89	81
Sanpete County	1,268	1,308	1,298	1,322	1,327	1,361	1,477	1,486	1,434	1,257	1,207	1,213
Sevier County	1,397	1,389	1,381	1,569	1,477	1,548	1,632	1,779	1,766	1,676	1,652	1,639
Summit County	2,816	2,921	2,959	2,935	3,355	3,683	3,764	3,948	3,709	3,755	3,870	3,910

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2012 (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Tooele County	1,938	2,032	2,056	2,109	2,190	2,338	2,466	2,397	2,383	2,186	2,214	2,317
Uintah County	1,705	1,663	1,719	1,759	1,852	1,951	2,075	2,130	2,033	1,817	1,880	1,956
Wasatch County	833	854	879	885	830	919	1,010	1,132	1,072	1,038	1,227	1,342
Wayne County	145	146	128	127	129	137	142	126	124	122	116	119
Socioeconomic Study Area	**26,485**	**27,038**	**27,561**	**28,043**	**29,156**	**30,436**	**31,701**	**32,378**	**31,400**	**30,084**	**30,571**	**30,926**
Accommodation and food services												
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	1,242	1,151	1,198	1,209	1,271	1,388	1,454	1,418	1,397	1,329	1,307	1,312
Cache County	2,772	2,890	2,853	3,091	3,036	3,171	3,172	3,232	3,334	3,456	3,450	3,565
Carbon County	775	797	748	747	732	797	817	759	773	769	737	678
Daggett County	123	118	106	99	98	100	108	101	105	107	102	103
Duchesne County	329	(D)	423	429	428	(D)	499	511	438	409	430	492
Emery County	253	252	277	316	322	315	(D)	332	311	291	282	292
Garfield County	832	774	763	803	(D)	843	881	930	855	(D)	(D)	996
Grand County	1,318	1,333	1,364	1,331	1,325	1,376	1,449	1,467	1,426	1,433	1,478	1,553
Iron County	1,554	1,432	1,478	1,534	1,651	1,680	1,799	1,758	1,657	1,724	1,802	1,861
Juab County	(D)	(D)	(D)	(D)	(D)	(D)	353	(D)	(D)	(D)	(D)	(D)
Kane County	642	(D)	611	611	615	666	(D)	964	900	885	920	1,016
Morgan County	158	143	155	169	156	159	168	(D)	(D)	(D)	160	166
Piute County	(D)	41	49	54	47	73	82	(D)	(D)	59	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	526	517	533	577	525	545	536	511	532	515	557	607
Sevier County	812	880	875	945	960	963	976	981	913	913	914	935
Summit County	3,632	3,651	3,963	4,131	4,357	4,654	4,836	5,799	5,244	5,083	5,750	5,960
Tooele County	1,021	(D)	1,211	1,122	1,205	1,259	1,264	1,151	1,070	1,127	1,178	1,242
Uintah County	863	864	886	927	914	933	995	1,094	1,011	986	1,085	1,218
Wasatch County	1,011	992	944	919	997	1,187	1,333	1,336	1,174	1,127	1,107	1,082
Wayne County	(D)	(D)	(D)	(D)	184	197	207	239	239	271	288	318
Socioeconomic Study Area	**17,864**	**15,837**	**18,440**	**19,018**	**18,828**	**20,312**	**20,936**	**22,591**	**21,388**	**20,494**	**21,558**	**23,408**
Arts, entertainment, and recreation												
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	252	252	259	275	278	296	303	310	324	333	336	361
Cache County	898	1,133	1,009	1,018	1,031	1,099	1,181	1,168	1,196	1,213	1,239	1,350
Carbon County	130	132	133	139	154	155	149	143	159	159	143	148

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2012 (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Daggett County	41	48	47	48	47	50	43	40	40	50	51	54
Duchesne County	60	(D)	69	65	67	(D)	104	118	111	107	102	103
Emery County	40	49	46	47	41	38	(D)	34	35	34	35	36
Garfield County	39	89	80	82	(D)	83	89	94	91	(D)	(D)	102
Grand County	305	285	315	321	329	344	370	375	372	365	385	426
Iron County	350	366	377	440	461	450	479	517	585	573	581	593
Juab County	(D)	(D)	(D)	(D)	(D)	(D)	43	(D)	(D)	(D)	(D)	(D)
Kane County	349	(D)	367	380	287	294	(D)	96	92	100	104	107
Morgan County	53	56	55	51	48	53	61	(D)	(D)	(D)	81	86
Piute County	(D)	(L)	(L)	(L)	(L)	(L)	(L)	(D)	(D)	25	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	99	107	114	125	122	123	133	163	170	164	172	175
Sevier County	83	49	55	58	66	67	70	85	89	88	86	86
Summit County	2,583	2,750	2,869	3,070	3,171	3,532	3,815	3,311	3,306	3,454	3,666	3,817
Tooele County	149	(D)	159	176	203	297	391	413	441	463	449	460
Uintah County	200	162	160	136	157	146	136	111	110	121	112	110
Wasatch County	121	138	145	200	211	228	251	297	342	328	327	359
Wayne County	(D)	(D)	(D)	(D)	27	30	36	37	39	46	48	47
Socioeconomic Study Area	**5,753**	**5,618**	**6,262**	**6,635**	**6,705**	**7,291**	**7,661**	**7,320**	**7,511**	**7,633**	**7,928**	**8,432**

Source: US Department of Commerce 2012a. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.
(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2004-2012 (thousands)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mining									
Beaver County	(D)	(D)	(D)	$3,492	$4,940	$7,240	$2,258	$1,956	(D)
Box Elder County	$2,436	$2,769	(D)	$3,412	(D)	$2,763	$3,850	$4,059	$3,974
Cache County	(D)	$2,926	(D)	$2,403	$10,778	$3,043	$2,674	$4,286	$5,247
Carbon County	(D)	$74,751	(D)	(D)	(D)	(D)	$93,830	$98,255	(D)
Daggett County	$167	$234	$415	$368	$184	(D)	(D)	(D)	(D)
Duchesne County	$37,325	$50,865	$83,880	$111,204	$150,023	$123,088	$131,165	$153,524	$189,977
Emery County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Garfield County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Grand County	$5,219	$6,264	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Iron County	(D)	(D)	$1,839	(D)	(D)	(D)	$2,198	$4,069	$3,862
Juab County	(D)	(D)	$4,065	$5,146	$4,223	$2,859	(D)	$3,869	$3,180
Kane County	(L)	$74	$98	(D)	(D)	(D)	(D)	(D)	(D)
Morgan County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Piute County	(D)	(D)	(D)	(D)	(D)	(D)	$0	$0	$0
Rich County	(D)	(D)	(D)	(D)	$2,582	(D)	(D)	(D)	(D)
Sanpete County	(D)	(D)	(D)	(D)	$10,660	$5,355	$5,504	$8,334	$9,316
Sevier County	$23,153	$22,395	$26,957	$30,477	$35,253	$34,229	$35,784	$36,609	$32,149
Summit County	$4,665	$6,986	$8,660	$9,902	$22,102	$9,346	$11,303	$13,007	$15,827
Tooele County	$6,218	$9,416	(D)	(D)	(D)	$5,739	$6,635	$7,577	$7,774
Uintah County	$157,026	$197,473	$287,080	$298,640	$372,594	$242,908	$248,024	$272,779	$288,751
Wasatch County	(D)	(D)	$5,869	$5,474	$4,622	$4,075	$4,478	$4,052	$895
Wayne County	$0	$0	$0	$0	$0	(D)	(D)	(D)	(D)
Socioeconomic Study Area	**$236,208**	**$374,153**	**$418,863**	**$470,517**	**$617,962**	**$440,645**	**$547,703**	**$612,375**	**$560,950**
Farming									
Beaver County	$55,404	$48,845	$19,734	$19,116	$23,812	$24,780	$27,215	$26,955	$21,856
Box Elder County	$43,736	$40,450	$26,790	$33,591	$35,013	$14,914	$27,461	$44,870	$39,206
Cache County	$39,644	$17,983	$6,175	$19,674	$25,099	$9,705	$20,846	$28,818	$28,683
Carbon County	$1,682	$2,559	$1,062	-$689	-$1,247	-$1,317	-$1,052	-$39	-$888
Daggett County	-$2	$104	-$292	-$455	-$433	-$156	-$382	-$258	-$331
Duchesne County	$12,664	$11,601	$3,182	-$8,860	-$7,056	-$10,232	-$8,510	-$5,055	-$6,005
Emery County	$2,822	$2,000	-$244	-$3,076	-$4,033	-$4,470	-$2,965	-$1,829	-$3,509
Garfield County	$2,792	$2,469	$534	-$3,838	-$4,045	-$3,460	-$3,892	-$1,959	-$3,818

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2004-2012 (thousands) (continued)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Grand County	-$115	-$964	-$1,967	-$2,280	-$2,226	-$2,403	-$2,239	-$1,954	-$2,067
Iron County	$31,950	$33,421	$23,537	$21,394	$16,797	$12,259	$11,775	$20,918	$15,896
Juab County	$5,886	$6,464	$5,974	$4,270	$3,939	$2,317	$2,884	$6,183	$4,144
Kane County	$2,893	$3,432	$4,880	$44	$362	$227	$386	-$76	-$212
Morgan County	-$1,338	-$1,305	-$107	-$991	-$857	-$1,335	-$998	$1,089	$419
Piute County	$4,062	$4,697	$1,376	$2,668	$1,980	$1,706	$2,187	$2,600	$1,987
Rich County	$4,683	$4,726	$3,400	$2,545	$833	$952	$2,023	$4,404	$3,659
Sanpete County	$5,551	$595	-$4,187	$12,467	$17,092	-$3,712	$14,974	$20,179	$18,485
Sevier County	$15,182	$12,384	$3,801	$408	$1,432	-$3,577	-$949	$2,788	$1,677
Summit County	$13,266	$12,156	$8,378	$5,742	$5,175	$2,748	$5,144	$9,206	$7,781
Tooele County	$4,230	$3,602	$4,939	$4,186	$4,018	$3,392	$4,158	$3,924	$3,565
Uintah County	$10,898	$6,188	-$61	-$2,797	-$1,326	-$2,464	-$2,157	$1,688	$565
Wasatch County	-$566	-$1,331	-$1,954	-$2,277	-$2,829	-$3,271	-$2,698	-$681	-$1,724
Wayne County	$4,369	$4,446	$310	$2,825	$1,985	$1,056	$2,116	$3,819	$2,909
Socioeconomic Study Area	**$259,693**	**$214,521**	**$105,260**	**$103,667**	**$113,484**	**$37,660**	**$95,327**	**$165,589**	**$132,279**
Retail trade									
Beaver County	$7,706	$8,441	$9,200	$9,162	$7,329	$7,683	$7,956	$7,829	$8,175
Box Elder County	$67,989	$71,816	$83,287	$82,470	$75,334	$70,742	$66,373	$57,391	$56,694
Cache County	$146,709	$155,291	$168,683	$169,146	$158,529	$157,322	$159,684	$157,291	$157,124
Carbon County	$36,161	$39,154	$42,796	$41,785	$41,294	$42,175	$40,409	$39,211	$40,646
Daggett County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Duchesne County	$16,343	$17,503	$21,081	$24,109	$24,703	$23,907	$22,889	$22,658	$24,812
Emery County	$10,357	$10,994	$12,247	$11,976	$9,988	$10,000	$9,936	$10,317	$10,520
Garfield County	$4,233	$4,418	$4,328	$4,244	$3,996	$4,281	$4,006	$4,571	$4,892
Grand County	$19,072	$19,430	$21,805	$22,534	$23,046	$22,340	$22,432	$23,540	$24,421
Iron County	$60,953	$67,467	$74,708	$74,845	$67,397	$63,457	$61,367	$58,754	$59,258
Juab County	$8,770	$9,581	$9,151	$8,530	$8,360	$8,053	$6,291	$5,805	$5,932
Kane County	$9,543	$11,677	$13,590	$11,516	$9,121	$8,554	$8,177	$8,019	$7,898
Morgan County	$8,046	$8,235	$9,056	$8,931	$6,307	$5,802	$6,054	$6,115	$5,823
Piute County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	$1,453	$1,600	$1,711	$1,670	$1,177	$1,481	$1,354	$1,505	$1,460
Sanpete County	$22,323	$23,114	$26,055	$27,644	$26,799	$26,389	$22,884	$21,067	$21,269
Sevier County	$39,150	$39,471	$42,066	$43,597	$41,073	$41,387	$39,184	$37,641	$38,137
Summit County	$84,398	$101,656	$119,571	$125,301	$121,619	$109,564	$108,935	$115,338	$119,012

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2004-2012 (thousands) (continued)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Tooele County	$43,827	$44,167	$49,847	$52,444	$47,400	$47,236	$45,026	$45,623	$46,714
Uintah County	$39,506	$43,485	$49,376	$53,899	$56,759	$53,638	$48,381	$50,727	$51,515
Wasatch County	$20,202	$17,606	$20,958	$23,376	$25,658	$24,485	$23,311	$26,296	$29,195
Wayne County	$1,947	$2,167	$2,122	$2,103	$1,755	$1,841	$1,723	$1,501	$1,600
Socioeconomic Study Area	**$648,688**	**$697,272**	**$781,637**	**$799,282**	**$757,644**	**$730,335**	**$706,372**	**$701,199**	**$715,098**
Accommodation and food services									
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	$17,424	$18,023	$19,399	$19,890	$19,346	$18,881	$18,242	$18,861	$19,651
Cache County	$43,867	$42,499	$44,844	$46,830	$47,647	$47,880	$49,389	$50,278	$52,675
Carbon County	$10,074	$9,775	$11,097	$10,948	$10,559	$10,741	$11,078	$11,152	$10,450
Daggett County	$2,018	$2,217	$2,065	$2,379	$2,268	$2,230	$2,266	$2,000	$2,076
Duchesne County	$6,641	$6,654	(D)	$7,267	$7,239	$6,392	$5,584	$5,671	$6,739
Emery County	$4,743	$4,707	$4,734	(D)	$4,886	$4,771	$4,573	$4,710	$4,804
Garfield County	$17,275	(D)	$16,727	$18,521	$20,117	$17,807	(D)	(D)	$21,790
Grand County	$26,513	$27,459	$29,555	$30,865	$33,004	$32,868	$33,212	$35,973	$37,981
Iron County	$23,943	$26,520	$26,875	$28,729	$27,748	$25,807	$25,867	$27,080	$28,329
Juab County	(D)	(D)	(D)	$5,062	(D)	(D)	(D)	(D)	(D)
Kane County	$10,226	$10,549	$11,672	(D)	$19,813	$18,780	$20,513	$22,192	$25,813
Morgan County	$1,475	$1,465	$1,634	$1,775	(D)	(D)	(D)	$2,402	$2,493
Piute County	$365	$362	$573	$643	(D)	(D)	$426	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	$5,118	$4,504	$4,756	$4,831	$4,843	$4,934	$4,808	$5,574	$6,286
Sevier County	$12,792	$12,511	$13,360	$13,653	$14,105	$13,032	$12,875	$13,179	$13,787
Summit County	$109,560	$115,249	$125,397	$134,678	$172,118	$149,746	$146,269	$175,620	$178,090
Tooele County	$16,397	$17,766	$19,202	$19,221	$16,885	$15,893	$16,671	$17,491	$18,584
Uintah County	$11,547	$12,168	$13,609	$15,823	$18,842	$17,496	$16,181	$17,072	$19,567
Wasatch County	$18,020	$18,759	$24,899	$29,668	$31,959	$24,489	$24,330	$24,820	$24,338
Wayne County	(D)	$2,670	$2,923	$3,116	$3,418	$3,316	$4,317	$4,723	$5,151
Socioeconomic Study Area	**$338,001**	**$333,856**	**$373,324**	**$393,899**	**$454,798**	**$415,064**	**$396,601**	**$438,799**	**$478,605**
Arts, entertainment, and recreation									
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	$1,301	$1,479	$1,660	$887	$1,755	$1,531	$1,746	$2,167	$2,051
Cache County	$9,630	$9,480	$9,698	$9,188	$9,787	$9,981	$10,130	$10,775	$11,103
Carbon County	$1,113	$1,249	$1,290	$940	$1,222	$1,387	$1,438	$1,406	$1,336

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2004-2012 (thousands) (continued)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Daggett County	$951	$1,018	$1,004	$994	$1,047	$1,019	$1,074	$1,035	$922
Duchesne County	$98	$134	(D)	$81	$350	$352	$289	$426	$289
Emery County	(L)	(L)	(L)	(D)	(L)	(L)	(L)	(L)	(L)
Garfield County	$1,850	(D)	$1,830	$1,945	$2,155	$2,080	(D)	(D)	$1,590
Grand County	$5,044	$5,199	$5,259	$5,624	$5,806	$5,689	$6,111	$6,345	$6,772
Iron County	$4,822	$5,234	$5,136	$3,781	$5,450	$5,064	$5,289	$5,710	$4,791
Juab County	(D)	(D)	(D)	(L)	(D)	(D)	(D)	(D)	(D)
Kane County	$10,019	$9,093	$9,246	(D)	$1,833	$2,031	$2,071	$2,315	$2,285
Morgan County	$233	$195	$188	$223	(D)	(D)	(D)	$316	$357
Piute County	$0	(L)	(L)	(L)	(D)	(D)	(L)	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	$510	$511	$524	$429	$697	$599	$764	$829	$792
Sevier County	$109	$179	$151	$63	$161	$175	$288	$259	$224
Summit County	$92,513	$96,786	$108,255	$110,942	$97,971	$90,782	$117,330	$129,131	$129,003
Tooele County	$762	$1,328	$4,482	$5,736	$7,799	$8,400	$8,517	$7,842	$7,834
Uintah County	$891	$881	$706	$552	$352	$319	$555	$509	$424
Wasatch County	$1,752	$1,944	$2,241	$1,995	$2,774	$2,973	$2,562	$2,719	$3,490
Wayne County	(D)	$64	$115	(L)	$153	$182	$177	$188	$196
Socioeconomic Study Area	**$131,598**	**$134,775**	**$151,785**	**$143,380**	**$139,314**	**$132,562**	**$158,341**	**$171,971**	**$173,460**

Values were converted to 2010 dollars using the Consumer Price Index (US BLS 2012a).
(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
(L) Less than $50,000, and the estimates for this item are not included in the totals.

Table T.7
Annual Population by County, 2001-2010

County	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Beaver County	6,195	6,279	6,276	6,296	6,327	6,411	6,446	6,500	6,550	6,655
Box Elder County	43,263	43,844	44,069	44,716	45,382	46,081	47,603	48,843	49,570	50,110
Cache County	93,640	95,392	96,845	99,419	100,948	103,483	106,201	108,700	110,805	113,272
Carbon County	19,865	20,545	20,368	20,892	20,500	20,930	21,155	21,237	21,225	21,463
Daggett County	928	915	907	937	981	997	987	980	1,003	1,078
Duchesne County	14,686	14,956	14,972	15,229	15,879	16,252	17,158	17,799	18,434	18,665
Emery County	10,473	10,541	10,478	10,494	10,493	10,440	10,463	10,613	10,851	11,018
Garfield County	4,628	4,596	4,528	4,620	4,696	4,764	4,862	5,032	5,136	5,184
Grand County	8,388	8,405	8,374	8,491	8,674	8,839	8,909	9,075	9,207	9,231
Iron County	35,208	35,793	36,743	38,117	40,543	42,642	43,798	45,328	45,836	46,272
Juab County	8,574	8,650	8,723	8,840	8,991	9,337	9,680	10,070	10,226	10,253
Kane County	6,106	6,163	6,192	6,331	6,508	6,732	6,907	7,039	7,089	7,137
Morgan County	7,498	7,548	7,801	8,064	8,281	8,596	8,913	9,229	9,468	9,469
Piute County	1,414	1,427	1,383	1,399	1,408	1,421	1,442	1,515	1,557	1,556
Rich County	1,973	2,032	2,053	2,035	2,020	2,070	2,102	2,206	2,247	2,270
Sanpete County	23,560	24,499	24,755	25,001	25,401	25,735	26,388	26,872	27,545	27,914
Sevier County	19,170	19,213	19,291	19,379	19,604	19,930	20,378	20,545	20,690	20,839
Summit County	30,329	31,357	32,053	32,847	33,600	34,051	34,864	35,540	35,802	36,496
Tooele County	43,768	45,741	47,368	48,461	50,926	53,120	55,081	56,722	57,606	58,422
Uintah County	26,182	26,224	26,367	26,683	27,465	28,464	29,671	31,489	32,495	32,619
Wasatch County	16,244	17,411	18,416	19,042	19,826	20,836	21,689	22,535	23,072	23,682
Wayne County	2,510	2,520	2,549	2,575	2,586	2,613	2,727	2,698	2,748	2,788
Socioeconomic Study Area	**734,490**	**750,937**	**764,722**	**784,677**	**809,418**	**832,583**	**855,134**	**876,055**	**888,738**	**901,999**
Davis County	245,093	251,536	257,977	265,246	275,373	283,951	292,258	297,840	303,266	307,550
Millard County	12,405	12,380	12,268	12,173	12,316	12,299	12,319	12,384	12,464	12,516
Salt Lake County	913,716	920,198	928,532	943,247	967,017	985,362	995,648	1,007,205	1,018,737	1,033,299
Utah County	384,928	396,775	408,958	424,881	441,720	462,033	480,717	497,637	508,354	519,299
Weber County	201,208	203,946	206,623	210,595	215,016	217,650	221,785	225,727	228,636	232,102

Source: Utah Office of Planning and Budget 2012.

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Appendix U

Non-Market Valuation Methods

APPENDIX U
NON-MARKET VALUATION METHODS

NON-MARKET VALUATION METHODS

This section addresses economic valuation of three categories of non-market resources that are present in the study area and could potentially be affected by the alternatives. These three categories of non-market value are recreation, values of GRSG to households in the intermountain west, and value of the ranching tradition to the ranchers themselves, residents, and visitors to the region. Recreation is included because actions that promote the conservation of GRSG habitat may result in changes in recreation opportunities, such as increasing the amount of habitat for other wildlife species that may be hunted or viewed that depend on public lands, roads open or closed for recreation access, and the quality of the recreation experience.

The economic non-market values described in this appendix are not directly comparable to regional economic indicators commonly used to describe how natural resources on public lands contribute to the regional economic indicators such as output/sales, labor income, and employment. These indicators provide valuable information to the local public as well as to regional government agencies for purposes of public service and infrastructure planning. These impacts or contributions are often referred to as distributional effects as they describe the effects to the region. However, these indicators do not represent net economic value. For example, in economic terms, labor income associated with mineral production would actually be considered a cost to the producer. Similarly, expenditures by a recreation visitor associated with a visit to public lands would be viewed by the recreationist as a cost. One last example would be the total sales generated by the sale of minerals extracted from federally owned minerals: the total sales do not reflect the net economic value since the costs associated with the extraction are not accounted for (including labor income, supplies, and equipment, as well as potentially non-market costs such as those associated with pollution). This section considers the economic value of the non-market outputs, a concept described below.

Total Non-Market Economic Value

Many of the multiple uses in the study area are not bought and sold in competitive markets. For instance, many recreational visitors to public lands pay no or low admission fees, and the presence of wild animals such as GRSG have no "market price," yet both have value to people.

In some cases people gain value from using these non-market resources, such as recreation on public lands; in other cases, protection of some natural resources provides both a use value (e.g., wildlife viewing) as well as a non-use value (e.g., the value some people hold for knowing that a specific natural resource exists and is protected even if they never intend to "use" or visit it).

Economists call the sum of these two values Total Economic Value. Use values typically can be consumptive use (e.g., hunting) and/or non-consumptive, such as viewing or being present on site (e.g., camping and hiking). In contrast, non-use values occur off-site to people who derive enjoyment from knowing a natural environment, habitat or species exists in its natural state, either for themselves (existence value) and/or future generations (bequest value). Krutilla (1967) documents the conceptual origins of these two elements of non-use value, and Freeman (2003) provides a rigorous theoretical treatment.

Non-use or existence values can potentially be enjoyed by millions if the good or service (e.g., the presence of a specific wild species such as wild salmon or rare bird species) is of widespread interest. Thus, while the non-use value per household may much lower than a value per day received by a visitor, in total, non-use values may be quite large.

Recreation Values

Economists measure the net economic use and non-use values as "Consumer Surplus." At its most basic level, consumer surplus is the maximum amount a person would pay minus the amount they actually have to pay. Consumer surplus, which is also sometimes referred to as "net willingness to pay," is a measure of benefit has been used by economists and federal agencies for decades (US Water Resources Council 1983; EPA 2009, 2010).

For public land recreation, especially on BLM and Forest Service recreation sites, entrance fees are typically very low or non-existent, so the value people place on these public land recreation opportunities is not fully measured simply by the entrance fees they pay. In economic terms, there is not a competitive market or a "market clearing price" for access to public recreation sites. Therefore, there can be a substantial difference between what people pay to visit a recreation site (e.g., entrance fees plus travel costs, including the value of time) and the maximum amount they would pay.

A common non-market valuation method used for recreation is the travel cost method. In this method, economists survey visitors to a recreation site and collect data on their frequency of trips, travel distance and costs incurred to access the site. Because the survey uses information from actual visitors, the travel cost method is a "revealed preference" method of valuation; economists use the travel costs as a proxy to determine the value that people gain from using the site. Variations in the travel cost across visitors, along with their respective number of trips, allow economists to statistically estimate a relationship between travel cost and quantity of trips – an aggregate demand curve for the recreation site, much like a demand curve for goods and services that are sold in competitive markets. This aggregate demand curve will tend to show that individuals with a relatively high travel cost take fewer trips on average, while individuals with a lower cost take more trips on average. From this aggregate demand curve, economists can calculate consumer surplus. Many of the consumer surplus values for recreation in the

literature (Loomis 2005) and recently developed by the Forest Service (Bowker et al. 2009) rely upon the travel cost method.

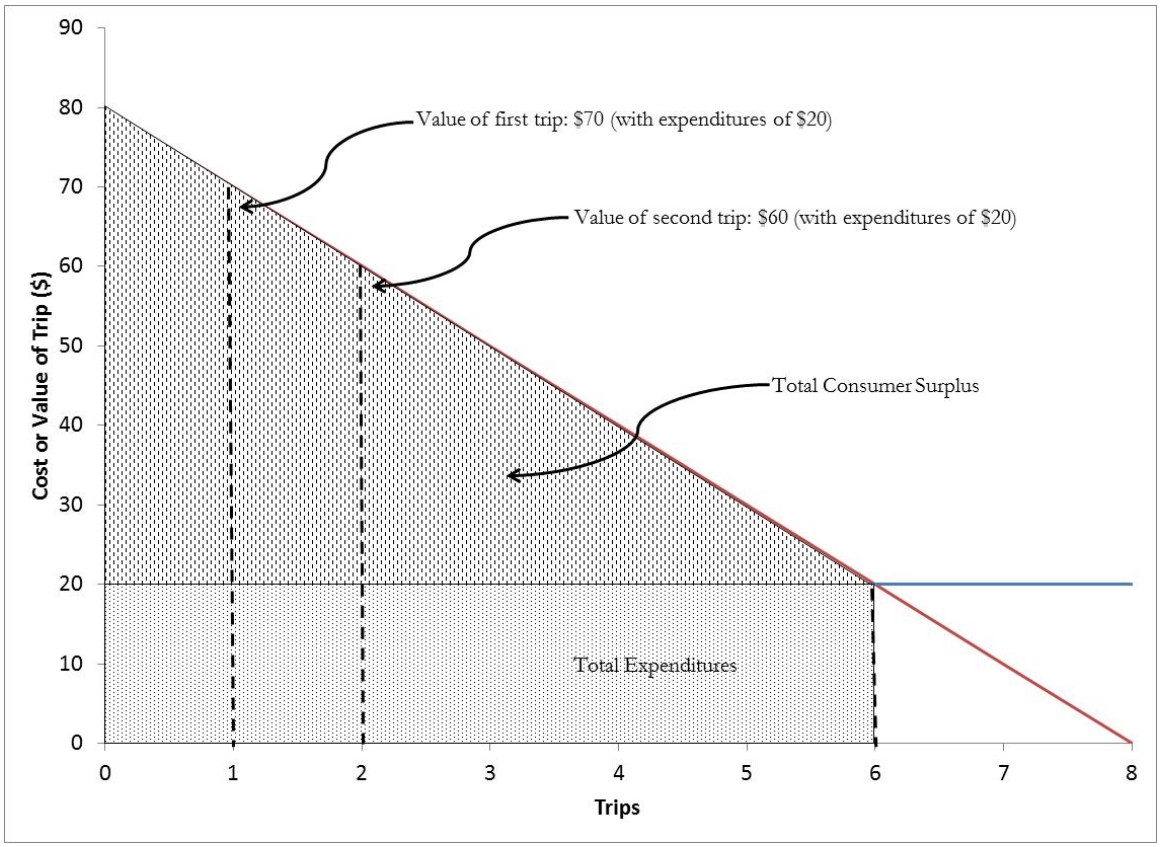
Figure U.1, Consumer Demand Curve and Consumer Surplus for Recreation Trips, provides an illustration of a demand curve for recreation on a particular site. In **Figure U.1**, the aggregate demand is shown on an average basis, that is, for an average individual consumer. The downward-sloping diagonal line in **Figure U.1** represents the relationship between the travel cost and quantity of trips demanded by this average consumer. In the figure, the value of the first several trips is relatively high ($70 for the first and $60 for the second trip), while the value of the sixth trip is lower ($20 in the figure). In a travel cost method study, these values are statistically derived from the aggregate demand calculated for the entire population. The downward slope of the demand curve corresponds to declining value associated with each trip, which is typical for most goods and services.[1] It also corresponds to the fact that visitors will take fewer trips to areas with a higher travel cost.

Each visitor receives a net benefit from each trip, which is measured by the difference between what they had to pay and the maximum amount they would pay for each trip. In **Figure U.1**, the net benefit for the average visitor is the difference between their actual expenditures of $20 per trip and the maximum amount they would pay for each trip. As shown, the first trip has a net benefit of $50 ($70 of value less $20 in expenditures), the second trip $40 ($60 less $20), and so on until the sixth trip. At the sixth trip the visitor's cost is the same as their benefit, and hence there is no net benefit from further trips. Thus, this gain to the visitor over and above what they spend is their "consumer surplus."

Given the large range and diversity of sites in the study area, the BLM and Forest Service did not perform original travel cost method analysis of visitation in the study area. Rather, they relied upon transferring existing recreation values from travel cost method studies such as Bowker et al. (2009) and other recreation values from the existing literature (Loomis 2005; Loomis and Richardson 2007; USFWS 2009) to the recreation activities in the study area, focusing on existing studies in the Rocky Mountain and Great Basin area (Utah, Colorado, Wyoming, Arizona, New Mexico, Idaho, Montana, and Nevada). This approach, known as "Benefit Transfer," is well-developed in academic and policy literature and has been used by federal agencies including the US Environmental Protection Agency (see Griffiths et al. 2012 for a recent listing of economic studies where benefit transfer was used), US Army Corps of Engineers, US Bureau of Reclamation, Forest Service (Forest Service 1991; also see Ervin et al. 2012 for a recent application of benefit transfer to the Mount Hood National Forest), and other agencies. Benefit transfer is widely used in academic applications as well; see Wilson and Hoehn (2006) for a series of journal articles on benefit transfer.

[1] Note that for some types of recreation use, users may gain increased value over a portion of the number of trips; for example, mountain bikers may experience increased enjoyment of subsequent trips to a single location as their trail-specific skills and knowledge increase with repeat visits. Climbers and other users may also experience similar gains over repeat visits. However, even these users will likely hit a point where the marginal value begins to decrease with more trips.

Figure U.1
Consumer Demand Curve and Consumer Surplus for Recreation Trips



The BLM measures recreation activity in various units, including a "visitor hour," which represents the presence of one or more persons in an area for continuous or simultaneous periods of time aggregating 1 hour (i.e., one person for 1 hour or two persons for 30 minutes each). A "visitor day" as defined by BLM represents 12 visitor hours (BLM 2003). The BLM Recreation Management Information System provides data on recreation visitor days (RVDs); to be compatible with these units, BLM identified non-market values for various recreation activities in units of dollars per RVD. Values from economic literature, based on primary research conducted on various recreation sites, were matched to BLM and Forest Service recreation activity classifications. **Table U.1**, Consumer Surplus for Recreation Activities, provides a listing of the values per day representing Utah.

Table U.1
Consumer Surplus for Recreation Activities

Recreation Activity Category	Consumer Surplus per Visitor Day (2012 dollars)
Backpacking	36.48
Camping	31.73
Cross Country Skiing	36.32
Fishing	49.00
Floatboating/Rafting/Canoeing	82.28

Table U.1
Consumer Surplus for Recreation Activities

Recreation Activity Category	Consumer Surplus per Visitor Day (2012 dollars)
General Recreation	42.96
Hiking	107.16
Hunting	72.50
Motorboating	65.24
Mountain Biking	175.21
Off-Road Vehicle Driving/Off-Highway Vehicle	51.35
Other Recreation	47.69
Picnicking	52.27
Pleasure Driving	71.65
Rock Climbing	61.32
Sightseeing	41.33
Snowmobiling	51.75
Swimming	35.10
Waterskiing	69.23
Wildlife Viewing	52.00

Sources: Rosenberger 2012; Loomis 2005; Loomis and Richardson 2007; Bowker et al., 2009; USFWS 2009.

Consistent with the description above of consumer surplus and the travel cost method, readers should interpret the values in **Table U.1** as the consumer surplus or the amount of value that the average visitor derives from a full day of recreation beyond their actual expenditures. Thus, a typical off-highway vehicle user would pay an average value of $51.35 more than their trip cost to have the opportunity to participate in a typical day of driving off-road vehicles.

Table U.2, Total Consumer Surplus for Recreation in Utah Sub-Region, shows the total consumer surplus associated with recreation activities on BLM-administered and National Forest System lands for the Utah sub-region, including the BLM Field Offices of Cedar City, Fillmore, Kanab, Price, Richfield, Salt Lake, and Vernal, as well as the Ashley, Dixie, Fishlake, Manti-LaSal, Uinta, and Wasatch-Cache National Forests. RVDs on BLM lands presented in **Table U.2** are calculated directly from Report 26 from the BLM RMIS (Report 26 provides RVDs based on recorded visitor hours – defined above – and dividing by twelve). For this analysis, BLM used average RVDs per year over the period 2008 to 2012. RVDs on National Forests are calculated from the most recent available data (ranging from Fiscal Year 2006 to Fiscal Year 2009 for the forests noted) from the USFS National Visitor Use Monitoring report (Forest Service 2012). RVDs for National Forest lands were calculated based on the total number of site visits, the "main activity" reported by recreators, and the number of hours per day reported engaging in that activity, with the number of RVDs equal to the number of hours divided by 12. Note that conservation measures for GRSG may affect only specific types and fractions of the public lands that contributed to the visitor days used to estimate the surplus values in **Table U.2**.

Table U.2
Total Consumer Surplus for Recreation in Utah Sub-Region

Recreation Activity	Average RVDs Per Year	Total Consumer Surplus (millions of 2012 dollars)
Backpacking	358,468	$13.1
Big Game Hunting	137,462	$10.0
Camping	5,728,653	$181.8
Cross Country Skiing	138,728	$5.0
Fishing	409,679	$20.1
Floatboating/Rafting/Canoeing	115,459	$9.5
General Recreation	57,887	$2.5
Hiking	684,365	$73.3
Hunting – Other	803,881	$58.3
Motorboating	149,649	$9.8
Mountain Biking	147,078	$25.8
Off Road Vehicle Driving/ Off-Highway Vehicle	551,566	$28.3
Other Recreation	567,369	$27.1
Picnicking	200,841	$10.5
Pleasure Driving	310,647	$22.3
Rock Climbing	6,780	$0.4
Sightseeing	1,162,864	$48.1
Small Game Hunting	30,067	$2.2
Snowmobiling	129,990	$6.7
Swimming	13,789	$0.5
Waterfowl Hunting	1,920	$0.1
Waterskiing	21,402	$1.5
Wildlife Viewing	74,736	$3.9
Total	**12,784,047**	**$560.6**

Source: BLM 2012; Forest Service 2012; consumer surplus per RVD shown in **Table U.1**, Consumer Surplus for Recreation Activities.

To estimate impacts on consumer surplus associated with changes in RVDs, BLM economists worked with BLM and Forest Service recreation specialists to project how RVDs for various activities would change under the alternatives. Because both BLM and Forest Service recreation specialists indicated that RVDs would not differ under the alternatives, no differences in consumer surplus are anticipated.

Values Associated with Greater Sage-Grouse Populations

Economists have long recognized that wildlife species, especially rare, threatened, and endangered species, have economic values beyond just viewing. This is supported by a series of legal decisions and technical analyses. The US Court of Appeals in 1989 first clarified that the US Department of the Interior, in assessing damages in Natural Resource Damage Assessment cases, should include what it termed as "passive use values," that is, existence values provided to non-users of the species, as a compensable value in addition to any use value. These passive use values are also included in Oil Pollution Act damage assessments as well. The term passive values is interchangeable with the term non-use values defined previously. This ruling and

subsequent analysis for Natural Resource Damage Assessment and Oil Pollution Act assessments are consistent with well-established economic theory showing that people derive value from passive use or non-use as well as active uses of resources (Krutilla 1967). Economists have devoted a great deal of conceptual and empirical work to refining concepts and developing methods to measure these passive use values.

The dominant methods are "stated preference" methods, of which the most prominent is the Contingent Valuation Method. The basic element of this method is to use a survey to construct or simulate a market or referendum for protection or improvement of a natural environment, habitat, or species, and then having the respondent indicate whether or not they would pay for an increment of protection, and if so, how much they would pay. While the method has developed a great deal of sophistication that has increased the validity of the willingness to pay responses, there is admittedly a degree of bias that can result in stated willingness to pay exceeding actual willingness to pay by a factor averaging two to three (Loomis 2011; Murphy et al. 2005; List and Gallet 2001). While not a perfect estimator of willingness to pay, the Contingent Valuation Method provides a useful means for estimating the public's passive use values.

Numerous academic papers and even entire books have been written on the Contingent Valuation Method. Mitchell and Carson (1989) was one of the first, while Alberini and Kahn (2006) is a more recent treatment. To date there have been about 7,500 Contingent Valuation Method studies in over 130 countries (Carson 2011). A number of federal agencies have used or referenced stated preference methods, including the US Bureau of Reclamation, US Environmental Protection Agency, National Park Service, and state agencies such as the California Department of Fish and Game, Idaho Fish and Game, and Montana Fish, Wildlife, and Parks. The USFWS commissioned an original Contingent Valuation Method study of the economic values the public receives from reintroduction of wolves in the areas of Idaho, Montana, and Wyoming, and used those values in an EIS on wolf reintroduction (USFWS 1994). The US Bureau of Reclamation, National Park Service, and Lower Elwha S'Klallam Tribe commissioned a Contingent Valuation Method study on the value of removal of the Elwha and Glines Canyon Dams (Meyer et al. 1995). The US Bureau of Reclamation also commissioned an original Contingent Valuation Method study on the values of providing stable river flows to benefit riparian vegetation, endangered species, and cultural resources. That study was cited by then-Secretary of the Interior Bruce Babbitt as a factor in selecting the more protective flow regime from Glen Canyon Dam despite it having more foregone hydroelectricity (Babbitt 1996).

The BLM and Forest Service conducted a literature search to demonstrate the potential range of values that could be associated with species that are candidates for listing as threatened or endangered, such as GRSG populations. Analysts first verified there are no existing studies on Total Economic Value or non-use valuation specific to the GRSG. This is not an uncommon occurrence, as there are dozens of rare or potentially threatened species that have not been valued despite the very high policy relevance of the species and the large magnitude of economic value at stake in these policy decisions.

The BLM and Forest Service used three criteria to identify studies that are most applicable to the current analysis: (1) whether the species valuation study was located in the same geographic

region as the GRSG habitat; (2) whether the species was listed or not listed as threatened or endangered; and (3) whether the species was hunted or not (implying a mix of use and non-use values).

The primary database of articles was the recent peer-reviewed journal article by Richardson and Loomis (2009), which is a compilation of the economic values of threatened, endangered, and rare species. A literature review was also conducted to determine if there had been any recent studies on GRSG or closely related species. Unfortunately, there is not a perfect match in the literature in terms of geographic region (intermountain) and a species that is both hunted and rare. **Table U.3**, Existing Estimates of Annual Total Economic Value of Protecting Habitat for Species Similar to GRSG, provides a summary of the studies with features most similar to the GRSG species.

As can be seen in **Table U.3** there is one study with a geographic region overlapping the sub-region (Mexican spotted owl), and one study on a species that was hunted at the time (wild turkey). At the time of the study, the Mexican spotted owl was a threatened species under the Endangered Species Act, and respondents were told in the survey that it was a threatened species. The whooping crane, red-cockaded woodpecker, and peregrine falcon studies involved an endangered species.

Table U.3
Existing Estimates of Annual Total Economic Value of Protecting Habitat for Species Similar to GRSG

Region	Species	Listed	Hunted	Annual Value per Household[b]	Change Valued
Four Corners (AZ, CO, NM, UT)	Mexican Spotted Owl	Yes	No	$58.49	Avoid extinction in 15 years in Four Corners region
New England	Wild Turkey	No	Yes	$16.72[a]	Avoid extinction in New England
Texas (also L.A., NYC, Chicago, Atlanta)	Whooping Crane	Yes	No	$43.69[a]	Avoid extinction
Maine	Peregrine Falcon	Yes	No	$32.37 (one time)	Restore self-sustaining population
South Carolina & Rest of US	Red-Cockaded Woodpecker	Yes	No	$14.69	Restore habitat to increase chance of survival to 99%

Sources: Loomis and Ekstrand 1997 (Mexican spotted owl); Stevens et al. 1991 (New England wild turkey); Bowker and Stoll 1988 (whooping crane); Kotchen and Reiling 2000 (peregrine falcon); Reaves et al. 1999 (red-cockaded woodpecker). All of these sources are as cited in Richardson and Loomis (2009).
Notes:

a. Average of estimates from the study.
b. As noted in the text, these stated preference values for household may have a degree of hypothetical bias that could overstate the actual monetary amount households would pay by a factor of two to three.

All of these studies used the Contingent Valuation Method in a mail survey. Households were asked whether they would pay a specific dollar amount, with that amount varying across individuals in the sample (i.e., the valuation questions were "closed-ended," although the wild turkey study and red-cockaded woodpecker also used an open-ended valuation question for some respondents). Researchers used the closed-ended valuation questions to generate a statistical valuation function. This valuation function exhibited internal validity: the higher the dollar amount households were asked to pay, the lower the percentage of them that would pay that dollar amount.

With the exception of the peregrine falcon study, which asked respondents to commit to a one-time payment, each survey asked respondents to pay annually to accomplish the stated goal (typically, preventing the species from going extinct in the region of interest, although this varied by study as the table shows). For the peregrine falcon and red-cockaded woodpecker, households were told that their payment would restore a self-sustaining population (i.e., one that would not go extinct).

The original wild turkey study provided an estimate of three values (in 1990 dollars) that were averaged and then adjusted to 2012 dollars using the Consumer Price Index, resulting in a value of $16.72 per household per year. The same procedure was used to update the 1996 dollar values of the Mexican spotted owl to 2012, resulting in values of $58.49 per household per year. The higher values for the Mexican spotted owl may be due to the large area of habitat (4.6 million acres stated in the survey and shown on a map) that would be protected in the Four Corners area by paying, and the fact the species was not a hunted species. The whooping crane values are fairly large at $43.69 per household per year; this value represents a Total Economic Value, including both use and non-use value, as some of the sample included people who actively "used" the species (as wildlife viewers).

The study values in **Table U.3** demonstrate that many people, or segments of the public, hold substantial value for protecting threatened and endangered species, which may carry over to the GRSG. However, additional studies would be needed to identify values specifically for GRSG protection. Given that protection is a public good available to all households in the intermountain west, the aggregate or intermountain regional value could be substantial.

Values Associated with Grazing Land

Public lands managed for livestock grazing provides both market values (e.g., forage for livestock) and non-market values. Many ranchers themselves value the ranching lifestyle in excess of the income generated by the ranching operations. This is evident in some ranch sales transaction data which suggests some ranch properties have sold for more than the market value of the public land forage (Bartlett et al. 2002; Taylor 2006). One of the primary reasons public lands ranchers indicate they own land is for the "tradition, values and culture" rather than primarily for profit (Tanaka et al. 2005). Many public land ranchers work elsewhere part-time and rely on the ranch for only 20 percent of their income (Hanus 2011), relying instead on outside jobs or other savings to support their ranching lifestyle. Land appreciation has also provided increased value and therefore served as an economic resource for ranchers (Tanaka et al. 2005; Torell et al. 2005). As several of these authors note, changes in public land grazing that reduce the profitability of grazing may not directly translate to withdrawal from ranching, due to

the fact that economic factors are not necessarily the primary motivation for public land ranching.

Some studies have found non-market values of ranching associated with use values to residents (Mangun et al. 2005) and tourists in the form of open space and western ranch scenery (Ellingson et al. 2006). However, some others see non-market opportunity costs associated with livestock grazing that may, depending on management methods and other variables, reduce native plant species and forage for wildlife (Todres et al. 2003). The potential exists for other residents or visitors to prefer lifestyles or have lifestyle needs that are not consistent with grazing or ranching lifestyles or landscapes.

Methods available to measure the use values to residents and tourists associated with grazing land include stated preference methods similar to contingent valuation (Ellingson et al. 2006; Mangun et al. 2005). Methods for attempting to isolate any amenity values that ranchers themselves may hold include the hedonic price method. This method uses observed sale prices of ranch land as a function of the characteristics, including both conventional market factors (e.g., size of ranch and quantity of forage) but also amenity values (e.g., scenic views, presence of wildlife species, and on-site fishing or hunting opportunities) that may be provided by the ranch (Torell et al. 2005). The additional value that ranchers pay for the amenity values of the ranch provide some indication of how much they value these amenities. Using the hedonic price method to estimate a "lifestyle value" separate from the market and amenity values has yet to be done in the literature. This may be due to the fact that lifestyle values attributed to living on a ranch or ranching is present on nearly all ranch properties sold. As such, statistically it is difficult to isolate the contribution of ranching lifestyle to differences in ranch property values as ranching lifestyle is a common feature of nearly all ranch properties sold.

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Appendix V

Great Basin Vegetation Modeling using Vegetation Dynamics Development Tool

APPENDIX V
GREAT BASIN VEGETATION MODELING USING VEGETATION DYNAMICS DEVELOPMENT TOOL

INTRODUCTION

Numerous factors influence sagebrush dynamics in the Great Basin. Each year acres of sagebrush increase in density, or are burned, grazed, converted to invasive annual grass, damaged by insects and disease, encroached by conifers, or altered by various management treatments. Due to the importance of sagebrush cover for Greater Sage-Grouse (GRSG), a process to account for all of these changes in sagebrush communities is important in evaluating trends of GRSG habitat. The GRSG land use plan amendments being developed and analyzed in each sub-regional EIS in the Great Basin each have different alternative approaches to management of GRSG habitat. Alternatives propose actions that will influence the extent and distribution of sagebrush. In order to evaluate and compare the estimated effects of each alternative, a team of vegetation ecologists representing each sub-regional EIS in the Great Basin was assembled. The team used the Vegetation Dynamics Development Tool (VDDT, copyright 1995-2003, ESSA Technologies, Vancouver, BC) to accomplish this task. This modeling effort does not include changes in habitat conditions associated with permitted activities such as infrastructure development, travel management, or mineral development.

METHODS

The Great Basin Region planning area was divided into Analysis Areas based upon the Population/subpopulation areas from the *Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats* (Connelly et al. 2004). These polygons were overlaid on the mapped occupied habitat layers identified by each state to ensure all habitat was included. The acreage calculations were based on the underlying GRSG habitats. Attachment A shows this base map.

Existing vegetation was determined using a combination of GAP analysis, LANDFIRE, local knowledge (the process for the Utah Sub-Region is described in Attachment B). These acres were estimated for each vegetation class in each vegetation model in each analysis area. Five models were developed to characterize the vegetation:

- Low Sagebrush (shallow, dry)
- Wyoming Big Sagebrush (warm, dry)
- Mixed Sagebrush
- Mountain Big Sagebrush with conifer (cool, moist)
- Mountain Big Sagebrush without conifer (cool, moist)

Each model has different states or conditions of the vegetation, which are called classes. The classes were designed to best represent both the available vegetation data for the planning area, as well as the GRSG habitat requirements. The following are the classes for each model:

Low Sagebrush

1. Early Seral: less than 10 percent sagebrush cover
2. Late Seral: greater than 10 percent sagebrush cover
3. Late Seral with conifer: greater than 10 percent sagebrush with greater than 10 percent conifer
4. Annual Grass

Wyoming Big Sagebrush

1. Early Seral: less than 10 percent sagebrush cover
2. Mid Seral: 10 to 30 percent sagebrush cover
3. Late Seral: greater than 30 percent sagebrush cover
4. Late Seral with conifer: greater than 30 percent sagebrush cover with greater than 10 percent conifer cover
5. Annual Grass
6. Exotic Perennial Grass

Mixed Sagebrush

1. Early Seral: less than 10 percent sagebrush cover
2. Mid Seral: 10 to 30 percent sagebrush cover
3. Late Seral: greater than 30 percent sagebrush cover
4. Late Seral with conifer: greater than 30 percent sagebrush cover with greater than 10 percent conifer cover

Mountain Big Sagebrush with conifer

1. Early Seral: less than 10 percent sagebrush cover
2. Mid Seral: 10 to 30 percent sagebrush cover
3. Late Seral: greater than 30 percent sagebrush cover
4. Late Seral with conifer: greater than 30 percent sagebrush cover with greater than 10 percent conifer cover

5. Annual Grass

Mountain Big Sagebrush without conifer

1. Early Seral: less than 10 percent sagebrush cover
2. Mid Seral: 10 to 30 percent sagebrush cover
3. Late Seral: greater than 30 percent sagebrush cover
4. Annual Grass

The following natural and background disturbances were applied to the models: stand replacement wildfire, mosaic wildfire, risk of overgrazing, insects and disease, and conifer encroachment. The rates of occurrence of these disturbances varied by model in order to reflect the variable rates for each of the vegetation types represented by these models. Several web meeting/conference calls were conducted to gain consensus among the team members on which models to develop, what disturbances/succession processes to include and determine what amount should be included in each model. The initial foundation was the Biophysical Settings for applicable sagebrush sites from LANDFIRE. Each team member had the opportunity to bring their local knowledge and experience to the discussion and changes were made to reflect that experience.

After agreement was reached on these rates, a review of the models and disturbance rates was conducted by the Science Review Team. This team made several suggestions that were incorporated into the models.

Wildfire history data (1980-2012) was used from the National Interagency Fire Center to determine the average annual acreage burned in each area, magnitude of extreme fire years, and frequency of extreme years. The size and extent of fires vary significantly from year to year, with most acres burned occurring on few years that represent extreme conditions; therefore using an average fire size would not accurately represent the influence of fire on the landscape. Due to the short time period in the fire history data (32 years) the data was reviewed and the most extreme year (most acres burned) and the smallest fire year (fewest acres burned) were dropped. The presence of only 1 extreme year in the data set does not indicate the interval between extreme events unless 2 data points are found within the fire history range. Therefore it is not accurate to make assumptions about an extreme event occurring every 32 years. Annual wildfire probability for each class in each model was estimated based on mean fire return interval (MFRI) information gained from LANDFIRE and adjusted based on team members' experience. The variability in year-to-year fire totals did not alter the long term fire probabilities derived from MFRI.

MODEL OUTPUTS

Alternative A in each Sub-Regional EIS is the No-Action or Current Management Alternative. This alternative represents the existing rates of conifer treatment, sagebrush mechanical treatment, prescribed fire, herbicide treatment, grass seeding, sagebrush seeding, and firebreak utilization. In order to display current vegetation conditions, acres of each type of treatment were collected from the field and input into VDDT. Field monitoring data was used to determine the success rates for grass seeding, herbicide application, and sagebrush seeding.

These treatments are all considered as one package of restoration treatments in the models to avoid double counting acres and thereby overestimating their positive benefit to vegetation. Firebreak utilization was not directly input to the model, but was assumed to be correlated to the existing rates of wildfire in areas where the firebreaks are used.

Upon completion of the Current Management Alternative, the model output reports were reviewed by the team as well as field staff from BLM and Forest Service to ensure the results reflected existing levels of treatment, current vegetation and results of treatment. This review resulted in re-running the models four times in order to capture changes suggested by the reviewers. Changes made included: modification of treatment success rates to reflect field monitoring, removal of double counted acres of treatment when multiple treatment occurred, and errors found within models estimating rates of vegetation change.

An interdisciplinary team conference call/meeting was held with vegetation and wildlife staff to determine the modeled desired conditions that would be applied during the model runs. The *Guidelines to Manage Sage-Grouse Populations and Their Habitats* (Connelly et al. 2000) suggested 80 percent of an area should have 10 to 30 percent sagebrush cover. In addition, the National Technical Team Report (NTT 2011) suggested 50 to 70 percent of an area should have 10 to 30 percent sagebrush cover. Based on these sources, it was determined that the model would use approximately 70 percent of an area in 10 to 30 percent sagebrush canopy cover as the modeled desired condition.

The modeling team then reviewed the amount of each analysis area that currently has 10 to 30 percent sagebrush cover. Vegetation treatment projects were then modeled to determine the amount of a particular treatment necessary to move the vegetation conditions to the modeled desired conditions. The amount of treatment varied by the amount of departure of the area from the modeled desired conditions and the vegetation dynamics of the area. The team reviewed amounts of acres available for treatment when developing these treatments to avoid the error of proposing treating acres that did not exist. When analysis areas had modeled current conditions at or above 70 percent, no additional treatment projects were proposed. The model outputs for this phase of the analysis are called proposed action. These treatment acres may be used to develop objectives in the alternatives, such as:

- "In the Sheeprocks Population Area, treat 10,000 acres annually of annual grass."
- "In the Panguitch Population Area, treat 1,000 acres annually of phase 1 conifer encroachment."
- In the Draft Environmental Impact Statement, the alternatives will be compared by the amount of each population area that meet modeled desired habitat conditions (10 to 30 percent sagebrush cover) projected to occur in 10 and 50 years.

MODEL ASSUMPTIONS

Alternative A: Natural and background disturbances equal to historical averages, vegetation treatments equal to current management rates.

Alternative B: The modeling team reviewed any actions proposed by this alternative and attempted to quantify the effect of implementation of these actions in order to model the effects

of these actions on vegetation. The following are actions found within the National Technical Team Report that were included in the modeling for Alternative B:

- Natural and background disturbances would be the same as Alternative A, except 50 percent less wildfire in Wyoming sage model to estimate the effect of fuels projects.
- No prescribed fire in less than 12 inches precipitation areas Wyoming sagebrush.
- Modeled desired habitat condition to maintain 70 percent of a population area with 10 to 30 percent sagebrush cover.
- Conifer encroachment treatments were included.
- Annual grass restoration treatments were included, consisting of herbicide treatment, grass and sagebrush seeding, etc.

Alternative C: The modeling team reviewed the actions proposed by this alternative and attempted to quantify the effect of implementation of these actions in order to model the effects of these actions on vegetation. The following are actions found within Alternative C and were included in the modeling:

- Natural and background disturbances.
- Modeled desired habitat condition to maintain 70 percent of a population area with 10 to 30 percent sagebrush cover.
- No prescribed fire in less than 12 inches precipitation areas.
- Restore all crested wheatgrass seedings to native vegetation.
- No vegetation treatments would be implemented that reduce sagebrush cover.
- Conifer encroachment treatments were not included.
- No risk of overgrazing, either to the removal of livestock grazing (Alternative C1) or due to a substantial reduction of permitted grazing levels (Alternative C2). In either instance, it was assumed that the risk of overgrazing would be eliminated.
- Wildfire increased 25 percent due to lack of maintenance of existing fuel breaks, and no additional constructed.
- Invasive annual grass would increase due to minimal use of herbicide for treatments resulting in a 50 percent decline in restoration treatment success.

Alternative D: The modeling team reviewed the actions proposed by this alternative and attempted to quantify the effect of implementation of these actions in order to model the effects of these actions on vegetation. The following are actions found within Alternative D and were included in the modeling:

- Natural and background disturbances same as Alternative A except 50 percent less wildfire in Wyoming sage model to estimate the effect of fuels projects.

- Modeled desired habitat condition to maintain at least 50 percent of a population area with 10 to 30 percent sagebrush cover.
- Conifer encroachment treatments were included.
- Annual grass restoration treatments were included, consisting of herbicide treatment, grass and sagebrush seeding, etc.

Alternative E: The modeling team reviewed the actions proposed by this alternative and attempted to quantify the effect of implementation of these actions in order to model the effects of these actions on vegetation. The following are actions found within Alternative E and were included in the modeling:

- Natural and background disturbances same as Alternative A except 50 percent less wildfire in Wyoming sage model to estimate the effect of fuels projects.
- Conifer encroachment treatments were included.
- Annual grass restoration treatments were included, consisting of herbicide treatment, grass and sagebrush seeding, etc.

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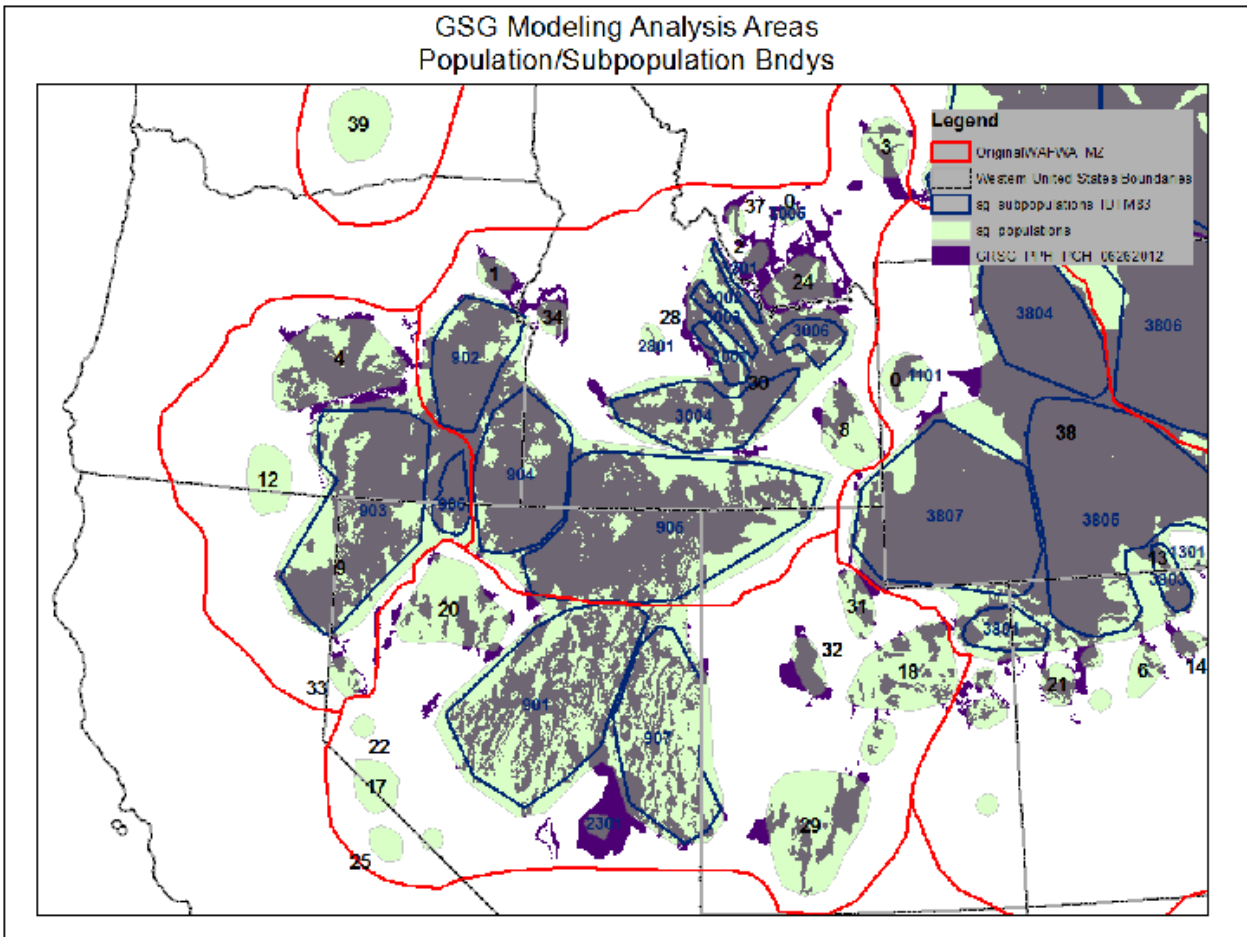
ATTACHMENT A – POPULATION AREA MAP



ATTACHMENT B – DEVELOPMENT OF DATA FOR VDDT SAGE-GROUSE HABITAT MODELS

The State of Utah has chosen to use the most recent GAP vegetation cover type GIS layer to map and calculate GRSG habitat data for the Utah Sub-Region EIS. This GIS layer, however, has no information about cover classes that are critical in analyzing the quality of GRSG habitat. In addition, GAP has no information regarding site potential (i.e. is a juniper-dominated site one that has replaced sagebrush or is it one that occurs on harsh sites that never will support sagebrush). LANDFIRE, on the other hand, has mapped Existing Vegetation Type (EVT) and Biophysical Settings (BPS), which are defined as the site potential for any given area. In addition, LANDFIRE has mapped cover classes for all acres mapped. Each of these components is necessary to adequately identify and describe the current conditions of GRSG habitat areas in Utah. LANDFIRE and GAP both use the same vegetation classification system for existing vegetation, so it was determined that a crossover would be made between each of these mapping methods.

Executive Summary

This section provides a general overview of the process that was employed to determine acres in each cover class for each cover type for use in the VDDT modeling effort. The first step involved combining (union) LANDFIRE EVT, BPS, and Cover Class (SClass) for each GRSG population area. A list of EVTs, BPSs, BPS Groups, and GAP Cover Types is included in Attachment B.

1. Union state-wide precipitation zones with the outcome from the above union to help separate Wyoming big sagebrush from mountain big sagebrush communities.
2. Calculate the percentage of each cover class within each LANDFIRE cover type.
3. Place each cover type/precipitation zone combination into one of the four models used in VDDT for Utah populations.
    a. Low-7
    b. Wyo-6
    c. Mtn-7
    d. Mtn-8
4. Place each of the GAP cover types into one of these four models used.
5. Multiply the acres of each GAP cover type/model by the percentages of each cover class within those models as determined through the LANDFIRE process described above.
6. From the following tables, it is apparent that the classes used by LANDFIRE and the classes used in the VDDT model did not completely correlate. It was necessary, therefore, to convert the LANDFIRE cover classes (1-7) for each model type into the 4 or 5 Classes used in VDDT for each of the four models listed using the following guidelines (**Table 1**).

Table 1
LANDFIRE Cover Classes Associated with the Different Models Used in VDDT

LANDFIRE Class	Low-7 % sagebrush cover	Wyo-6 % sagebrush cover	Mtn-7 % sagebrush cover	Mtn-8 % sagebrush cover
1	0-5	0-10	0-5	0-5
2	6-25	11-25	6-25	6-25
3	10-25	26-35	26-45	greater than 25
4	Juniper	Juniper	Juniper	
5	Juniper	Juniper	Juniper	
6	Uncharacteristic Native (Included in Class C of Low-7, Mtn-7, and Mtn-8 and in Class D of Wyo-6,			
7	Uncharacteristic Non-native vegetation (Included in Class D of Low-7, and Mtn-8 and in Class D of Wyo-6,			

Notes:
Low-7 LANDFIRE Classes derived from Biophysical Setting 1610790 - Great Basin Xeric Mixed Sagebrush Shrubland
Wyo-6 LANDFIRE Classes derived from PNVG R2SBWYwt
Mtn-7 LANDFIRE Classes derived from PNVG R2SBMT
Mtn-8 LANDFIRE Classes derived from Biophysical Setting 1611250 - Inter-Mountain Basins Big Sagebrush Steppe

Table 2
VDDT Model Cover Classes

Low-7	Wyo-6	Mtn-7	Mtn-8
Class A Early Seral 0% to 10% canopy closure 0 to 90 years	**Class A** Early Seral 0% to 10% canopy closure 0 to 25 years	**Class A** Early Seral 0% to 10% canopy closure 0 to 15 years	**Class A** Early Seral 0% to 10% canopy closure 0 to 15 years
Class B Late Seral 11%+ canopy closure 91 to 999 years	**Class B** Mid Seral 10% to 30% canopy closure 26 to 75 years	**Class B** Mid Seral 10% to 30% canopy closure 16 to 45 years	**Class B** Mid Seral 10% to 30% canopy closure 16 to 45 years
Class C Late Seral w/ conifer 11%+ canopy conifer 121 to 999 years	**Class C** Late Seral 30%+ canopy closure 76 to 999 years	**Class C** Late Seral 30%+ canopy closure 46 to 999 years	**Class C** Late Seral 30%+ canopy closure 46 to 999 years
Class D Annual Grass 0 to 999 years	**Class D** Late Seral w/ conifer 10%+ conifer canopy 106 to 999 years	**Class D** Late Seral w/ conifer 10%+ conifer canopy 76 to 999 years	**Class D** Annual Grass 0 to 999 years
	Class E Annual Grass 0 to 999 years	**Class E** Annual Grass 0 to 999 years	
	Class F Exotic Perennial Grass 0 to 999 years		

Table 3
Conversion Factors Used To Convert LANDFIRE Classes Into Those Used in the VDDT Models

Class	Low-7	Wyo-6	Mtn-7	Mtn-8
A	100% of 1 + 20% of 2	100% of 1	100% of 1 + 20% of 2	100% of 1 + 20% of 2
B	80% of 2 + 100% of 3	100% of 2	80% of 2 + 20% of 3	80% of 2 + 20% of 3
C	100% of 4, 5, & 6	100% of 3	80% of 3 + 100% of 6	80% of 3 + 100% of 4, 5 ,& 6
D	100% of 7	100% of 4, 5, & 6	100% of 4 & 5	100% of 4 & 5
E		100% of 7	100% of 4 & 5	
F	Acres planted to Crested Wheatgrass*			

Notes: *Not enough acres to include in any model for any population areas' occupied habitat (only 36 acres mapped in one Population Area – WY-Uinta)

Steps Taken to Use LANDFIRE data to Calculate reGAP Acres

LANDFIRE data were used to define the cover classes present for each vegetation cover type important to GRSG. At the broadest scale, these cover types include 1) low sagebrush species; 2) big sagebrush species; 3) juniper that has replaced sagebrush (typically as a result of fire suppression); and 4) invasive species that have replaced sagebrush. We limited our analysis to only those acres of communities on each of these groups only in what has been mapped as occupied GRSG habitat on BLM and National Forest System lands in Utah. In order to complete this, the following process was followed.

The BLM's Utah state-wide precipitation GIS layer was then combined with the EVT/BPS data in order to better distinguish the occurrences of Wyoming and mountain big sagebrush species. These species have been mapped at all elevations in LANDFIRE, yet their occurrence on any given landscape is limited primarily by amounts of annual precipitation. For that reason, this step was critical in order to separate these species on an ecological basis.

Goodrich and others (1999) found that annual precipitation for Wyoming big sagebrush populations was between 6.8 and 12.6 inches. The authors found that mountain big sagebrush occurred in zones where annual precipitation was between 11.8 and 27.7 inches. According to these authors, plants intermediate to Wyoming and mountain big sagebrush occur in areas with precipitation that ranges from 8.1 to 14.6 inches. Their data suggested that the pinyon-juniper belt in Utah occurs in areas with 9 to 15 inches of annual precipitation. Payne (1980) suggested that the Intermountain pinyon-juniper zone fell between 10 and 14 inches annual precipitation. For the GRSG population areas, precipitation zones were combined with the LANDFIRE layers to assist in distinguishing the various mapped sagebrush communities. The BLM Utah State Office has a precipitation GIS layer that breaks the landscape into 0-2, 2-4, 4-6, etc. inch breaks, which did not allow us to use the 9 or 15 inch levels in our analysis. For this reason, the following rules were established.

- ✓ Below 10 inches annual precipitation, all sagebrush was considered to be Wyoming big sagebrush;

- ✓ Anything between 10 inches (about 2 inches less than the minimum amount listed for mountain big sagebrush) and 14 inches (about 2 inches more than the maximum precipitation for Wyoming big sagebrush, was considered to be a transition zone where either species could possibly occur;
- ✓ Within that 10- to 14-inch zone, the LANDFIRE EVT, BPS (Biophysical Setting), and/or Group types were used to make the determination regarding species that occur;
- ✓ Any sagebrush that occurred in the zones above 14 inches was considered to be mountain big sagebrush; and finally
- ✓ Low sagebrush was low sagebrush, regardless of the precipitation zone in which it occurred.

Following these rules, the following sagebrush zones were established:

- ✓ Zone 1 – Precipitation less than or equal to 10 inches. Non-Seral Zone in which there is insufficient precipitation for juniper to grow. Wyoming big sagebrush is the only *big* sagebrush that can occur with this low amount of precipitation
- ✓ Zone 2 – Precipitation 10 to 14 inches. Seral Zone in which there is sufficient precipitation for juniper to grow. In this transition zone, both Wyoming and mountain big sagebrush species can occur.
- ✓ Zone 3 – Precipitation 14 to 28 inches. Non-Seral Zone in which there is too much precipitation for juniper to be considered as a universal late seral species that replaces sagebrush. Only where juniper is the existing vegetation (EVT), what is considered a seral community. This zone is above where Wyoming big sagebrush is likely to occur, so all big sagebrush communities are considered to be mountain big sagebrush.
- ✓ Zone 4 – Precipitation greater than or equal to 28 inches. Non-Seral Zone in which there is too much precipitation for juniper to be a late seral species. Only where juniper is the existing vegetation (EVT), what is considered a seral community. This is considered to be the cool, moist mountain big sagebrush zone.

The rule regarding the precipitation zone in which juniper is not seral tends to not apply well to GRSG population areas in Utah's west desert (Box Elder; Hamlin Valley; Ibapah; and Sheeprocks) or to those of Rich County and southwestern Wyoming (Rich; Wyoming Blacks Fork; and Wyoming Uinta). Regardless as to whether or not these locations had areas mapped with greater than 14-inch precipitation zones, these population areas do not generally have a significant amount of non-seral sagebrush communities. Most, if not all of these sagebrush communities on BLM and US Forest Service lands are susceptible to being replaced by juniper with significant years of fire suppression. All other population areas in Utah and adjacent southwestern Wyoming have significant acreages of sagebrush that does not succeed to juniper, regardless of fire suppression activities.

Using the GIS data, the LANDFIRE EVT, Biophysical Setting (BPS), and Cover Class (SClass) features were combined (unioned) so that each polygon had the attributes from each of these

layers that was necessary to make the determinations needed for GRSG habitat modeling. Then, the GRSG occupied habitat was selected from the layers that came out of this process, and were again unioned with a precipitation layer that broke the State into the zones listed above (less than or equal to 10, 10-14, 14-28, greater than or equal to 28 inches). It was the combination of all this information that was used to determine which models to develop and apply for the VDDT habitat modeling process used in the Utah Greater Sage-Grouse LUPA/EIS.

Table 4
Key to Models Used with LANDFIRE Data

1	Precipitation less than or equal to 10 inches	2
1	Precipitation greater than or equal to 10 inches	8
2	EVT is Juniper dominated	3
2	EVT is not Juniper dominated	5
3	BPS and/or Group Juniper dominated	Not Modeled
3	BPS low or big sagebrush dominated (non-seral communities)	4
4	BPS and/or BPS Group dominated by any big sagebrush	Wyo-6
4	BPS and/or BPS Group dominated by any low sagebrush	Low-7
5	EVT is one of the non-native types	6
5	EVT is not one of the non-native types	7
6	BPS and/or dominated by any big sagebrush	Wyo-6
6	BPS and/or dominated by any low sagebrush	Low-7
7	EVT dominated by any big sagebrush	Wyo-6
7	EVT dominated by any low sagebrush	Low-7
8	Precipitation 10 to 14 inches (seral communities)	9
8	Precipitation greater than or equal to 14 inches (non-seral communities)	17
9	EVT is Juniper dominated	10
9	EVT is not Juniper dominated	13
10	BPS and/or BPS Group Juniper dominated	Not Modeled
10	BPS low or big sagebrush dominated	11
11	BPS and/or BPS Group dominated by any big sagebrush	12
11	BPS and/or BPS Group dominated by any low sagebrush	Low-7
12	BPS and/or BPS Group dominated by Wyoming big sagebrush	Wyo-6
12	BPS and/or BPS Group dominated by Mountain big sagebrush	Mtn-7
13	EVT is one of the non-native types	14
13	EVT is not one of the non-native types	16

Table 4
Key to Models Used with LANDFIRE Data

14	BPS and/or BPS Group dominated by any big sagebrush	15
14	BPS and/or BPS Group dominated by any low sagebrush	Low-7
15	BPS and/or BPS Group dominated by Wyoming big sagebrush	Wyo-6
15	BPS and/or BPS Group dominated by Mountain big sagebrush	Mtn-7
16	EVT dominated by any big sagebrush	17
16	EVT dominated by any low sagebrush	Low-7
17	BPS and/or BPS Group dominated by Wyoming big sagebrush	Wyo-6
17	BPS and/or BPS Group dominated by Mountain big sagebrush	Mtn-7
18	Precipitation 14-28 inches	19
18	Precipitation greater than or equal to 28 inches	25
19	EVT is Juniper dominated (seral communities)	20
19	EVT is not Juniper dominated (non-seral communities)	22
20	BPS and/or BPS Group Juniper dominated	Not Modeled
20	BPS low or big sagebrush dominated (non-seral communities)	21
21	BPS and/or BPS Group dominated by any big sagebrush	Mtn-7
21	BPS and/or BPS Group dominated by any low sagebrush	Low-7
22	EVT is one of the non-native types	23
22	EVT is not one of the non-native types	24
23	BPS and/or dominated by any big sagebrush	Mtn-8
23	BPS and/or dominated by any low sagebrush	Low-7
24	EVT dominated by any big sagebrush	Mtn-8
24	EVT dominated by any low sagebrush	Low-7
25	EVT is Juniper dominated	26
25	EVT is not Juniper dominated	28
26	BPS and/or BPS Group Juniper dominated	Not Modeled
26	BPS low or big sagebrush dominated (non-seral communities)	27
27	BPS and/or BPS Group dominated by any big sagebrush	Mtn-8
27	BPS and/or BPS Group dominated by any low sagebrush	Low-7
28	EVT is one of the non-native types	29
28	EVT is not one of the non-native types	30
29	BPS and/or dominated by any big sagebrush	Mtn-8
29	BPS and/or dominated by any low sagebrush	Low-7

Table 4
Key to Models Used with LANDFIRE Data

30	EVT dominated by any big sagebrush	Mtn-8
30	EVT dominated by any low sagebrush	Low-7

Using LANDFIRE Data to Calculate Cover Classes for GAP Data

LANDFIRE and GAP both use the same vegetation classification system for existing vegetation, so we chose to identify the percentages of cover types that were in the various stages of succession and apply those percentages to the actual acres mapped using GAP. The following table is an example of how this was applied.

Table 5
Example of Calculating Percentages of Each LANFIRE Cover Class for VDDT Models Used

Low- 7 Model	LANDFIRE Cover Class	LANDFIRE Acres (21,699 Total Acres)	Percent	GAP Acres (23,500 Total Acres)
	1	146	1%	1% X 23,500 = 158
	2	7,777	36%	36% X 23,500 = 8,423
	3	1,669	8%	8% X 23,500 = 1,808
	4	2,103	10%	10% X 23,500 = 2,277
	5	20	0.0009%	0.0009% X 23,500 = 22
	6	9,848	45%	45% X 23,500 = 10,665
	7	137	1%	1% X 23,500 = 148

Literature Cited

Goodrich, S.; E.D. McArthur; A.H. Winward. 1999. *Sagebrush Ecotones and Average Annual Precipitation*. pp. 88-94. *In*: McArthur, E. Durant; Ostler, W. Kent; Wambolt, Carl L., comps. 1999. *Proceedings: shrubland ecotones*; 1998 August 12-14; Ephraim, UT. Proc. RMRS-P-11. Ogden, UT: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 299 p.

ATTACHMENT C – EXISTING VEGETATION TYPES (EVTS), BIOPHYSICAL SETTINGS (BPS), BIOPHYSICAL SETTING GROUPS, AND GAP COVER TYPES USED IN THIS ANALYSIS

LANDFIRE Existing Vegetation Types (EVTs)

Big Sagebrush Types

- *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance
- Great Basin Xeric Mixed Sagebrush Shrubland [1]
- Inter-Mountain Basins Big Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Steppe
- Inter-Mountain Basins Montane Sagebrush Steppe

Low Sagebrush Types

- Colorado Plateau Mixed Low Sagebrush Shrubland
- Columbia Plateau Low Sagebrush Steppe
- Wyoming Basins Dwarf Sagebrush Shrubland and Steppe

Juniper Types

- Colorado Plateau Pinyon-Juniper Woodland
- Great Basin Pinyon-Juniper Woodland
- Inter-Mountain Basins Juniper Savanna

Introduced Vegetation Types

- Introduced Upland Vegetation-Annual and Biennial Forbland
- Introduced Upland Vegetation-Annual Grassland
- Introduced Upland Vegetation-Perennial Grassland and Forbland[2]

GAP Existing Vegetation Types (EVTs)

Big Sagebrush Types

- Great Basin Xeric Mixed Sagebrush Shrubland[2]
- Inter-Mountain Basins Big Sagebrush Shrubland
- Inter-Mountain Basins Big Sagebrush Steppe
- Inter-Mountain Basins Montane Sagebrush Steppe

[1] May be either big sagebrush or low sagebrush depending on Biophysical Setting determination
[2] Typically crested wheatgrass

Low Sagebrush Types

- Colorado Plateau Mixed Low Sagebrush Shrubland
- Wyoming Basins Dwarf Sagebrush Shrubland and Steppe
- Wyoming Basins Low Sagebrush Shrubland

Juniper Types

- Pinyon-Juniper Shrubland
- Pinyon-Juniper Woodland

Introduced Vegetation Types

- Introduced Upland Vegetation - Perennial Grassland[3]
- Invasive species[3]

LANDFIRE Biophysical Setting and Biophysical Setting Group Combinations

Biophysical Settings	Biophysical Setting Groups
Big Sagebrush Types	
Great Basin Xeric Mixed Sagebrush Shrubland	Black Sage-Low Sage-3
Inter-Mountain Basins Big Sagebrush Shrubland	Wyoming Big Sage-Rubber Rabbitbrush-4
Inter-Mountain Basins Big Sagebrush Shrubland - Basin Big Sagebrush	Basin Big Sage-Greasewood-4
Inter-Mountain Basins Big Sagebrush Shrubland - Wyoming Big Sagebrush	Wyoming Big Sage-Indian Ricegrass-4
Inter-Mountain Basins Big Sagebrush Steppe	Wyoming Big Sage-Wheatgrass-4
Inter-Mountain Basins Montane Sagebrush Steppe	Mountain Sagebrush-Bluebunch Wheatgrass-Idaho Fescue
Inter-Mountain Basins Montane Sagebrush Steppe - Mountain Big Sagebrush	Mountain Sagebrush-Bluebunch Wheatgrass-Idaho Fescue
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	Wyoming Threetip Sage-Low Sage-5
Low Sagebrush Types	
Colorado Plateau Mixed Low Sagebrush Shrubland	Bigelow Sage-Low Sage-4
Inter-Mountain Basins Montane Sagebrush Steppe - Low Sagebrush	Low Sage-Black Sage-Silver Sage-5
Juniper Types	
Colorado Plateau Pinyon-Juniper Shrubland	Two Needle Pinyon-Utah Juniper-3
Colorado Plateau Pinyon-Juniper Woodland	Two Needle Pinyon-Utah Juniper-3
Great Basin Pinyon-Juniper Woodland	Singleleaf Pinyon-Utah Juniper-3
Inter-Mountain Basins Juniper Savanna	Western Juniper-Utah Juniper-3

[3] Combination of Introduced Upland Vegetation-Annual and Biennial Forbland and Introduced Upland Vegetation-Annual Grassland

Vegetation Type	Models Used
Colorado Plateau Mixed Low Sagebrush Shrubland (ARNO, ARBI, ARTRWY)	Low-7
Great Basin Xeric Mixed Sagebrush Shrubland (ARNO, ARAR, ARTRWY)	Low-7
Inter-Mountain Basins Big Sagebrush Shrubland (ARTRTR, ARTRWY)	Wyo-6
Inter-Mountain Basins Big Sagebrush Steppe (ARTRTR, ARTRWY, ARTRIP)	Wyo-6
Inter-Mountain Basins Montane Sagebrush Steppe (ARTRVA, ARTRSP)	Mtn-7 and Mtn-8
Wyoming Basins Low Sagebrush Shrubland (ARTRIP, ARNO)	Low-7
Pinyon-Juniper Shrubland	Not Included*
Pinyon-Juniper Woodland	Split among Low-7, Wyo-6, and Mtn-7 Models depending on percentages of each population area covered by each of these three models
Invasives	Split among all models depending on percentages of each population area covered by each of these three models

Appendix W

Economic Impact Analysis Methodology

APPENDIX W
ECONOMIC IMPACT ANALYSIS METHODOLOGY

INTRODUCTION

This appendix describes the methods and data that underlie the economic impact modeling analysis. Input-output models such as the Impact Analysis for Planning (IMPLAN) model, an economic impact analysis model, provide a quantitative representation of the production relationships between individual economic sectors. Thus, the economic modeling analysis uses information about physical production quantities and the prices and costs for goods and services. The inputs required to run the IMPLAN model are described in the following narrative and tables. The resulting estimates from the IMPLAN model, by alternative, are in the Social and Economic Impacts (Including Environmental Justice) section of **Chapter 4**. The first portion of the following information describes general aspects of the IMPLAN model and how it was used to estimate economic impacts. The remaining sections provide additional detailed data used in the analysis for livestock grazing, oil and gas, coal and wind energy.

THE IMPLAN MODEL

IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the ripple effect (also called the multiplier effect) of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly impacted) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production). Because IMPLAN incorporates regional trade data, it is able to separate the economic impact received by a specific region from the impact that is felt beyond the selected geographic area. The estimates reported below for output, employment and earnings reflect only the share supported in the primary and secondary study areas.

This analysis used IMPLAN 2011. This means that parameters such as productivity and trade data reflect estimates for the study area released in the 2011 IMPLAN version. These parameters typically do not meaningfully change from one year to another and would likely not

be substantially affected by more recent growth trends in employment or output in specific sectors. Prior to running the model, cost and price data were converted to a consistent dollar year (2011) using sector-specific adjustment factors from the IMPLAN model. Unless stated otherwise, the values in this appendix are expressed in year 2011 dollars.

The current IMPLAN model has 440 economic sectors, of which 331 are represented in the Primary and 384 are represented in the Secondary Socioeconomic Study Area counties. This analysis involved direct changes in economic activity for 38 IMPLAN economic sectors, as well as changes in all other related sectors due to the ripple effect. The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the Primary and Secondary Socioeconomic Study Areas. As a result, the calibrated model does a better job of generating multipliers and the subsequent impacts that reflect the interaction between and among the sectors in the Primary and Secondary Socioeconomic Study Areas compared to a model using unadjusted national coefficients.

Key variables used in the IMPLAN model were filled in using data specific to the Primary and Secondary Socioeconomic Study Areas, including employment estimates, labor earnings, and total industry output. This data was used to estimate labor productivity and earnings per job. As explained above, recent growth trends in employment and output in specific sectors in the study area would not likely affect these parameters.

The trade data available in the current version of IMPLAN (Version 3.0) make it possible to do multi-region analysis to track how an impact on any of the IMPLAN sectors in the study area affects production in any of the sectors in any other region of the US. For this analysis, this feature allowed the estimation of how an impact in the primary study area disperses into the secondary study area, and how these effects in the secondary study area create additional local effects in the primary study area. As a result, it was possible to estimate not only the jobs and income generation in the primary study area, but to also estimate how the economic activity in the primary study area affected jobs and income generation in the secondary study area.

In addition to analyzing impacts in the primary and secondary study area, the BLM and Forest Service analyzed impacts to smaller regions, where socioeconomic impacts associated with oil and gas, wind energy and coal would likely be concentrated. No similar analysis was done for livestock grazing, given the relatively disperse socioeconomic impacts of alternatives through effects on livestock grazing.

LIVESTOCK GRAZING

Economic impacts from changes to livestock grazing are a function of the amount of forage available and the economic value of forage.

Forage availability was measured in animal unit months (AUMs), with one AUM defined as the amount of forage needed to feed a cow, one horse, or five sheep for one month. For Forest Service data, measurements in AUMs were also obtained. Data were obtained from the BLM's Rangeland Administration System (BLM 2012a) and from the Forest Service's INFRA range module (Forest Service 2013). Two types of AUM measures were used: Active AUMs and Billed AUMs. Active AUMs measure the amount of forage from land available for grazing. The Forest Service designates this measure "permitted" AUMs. Billed AUMs measure the amount of forage

that the BLM and Forest Service bill for annually. The Forest Service uses the designation "authorized" AUMs. Impacts were estimated for the range between billed and active AUMs.

Data for Alternatives A, B, D, and E, and the Proposed Plan were for 2011. Estimates of Active and Billed AUMs under Alternative C1 were obtained by using GIS to remove AUMs intersecting with sage-grouse habitat. In doing so, all allotments containing sage grouse habitat were considered closed for grazing (and not just the portion with sage grouse habitat). Estimates for Active and Billed AUMs for Alternative C2 assume 60 percent of the AUMs made unavailable under Alternative C1 are made unavailable under Alternative C2. the Social and Economic Impacts (Including Environmental Justice) section of **Chapter 4** discusses the possibility of Billed AUMs not being reduced in proportion to reductions in Active AUMs under Alternatives C1 and C2.

Table W.1, below, shows estimated Animal Unit Months by management unit under each Alternative. Data for National Forests corresponds only to AUMs in the portion of those National Forests within the study area and with sage-grouse habitat.

Table W.1
Estimated Annual Animal Unit Months on Federal Lands, 2011

	Active			Billed		
	Alternative A, B, D, and E, Proposed Plan	Alternative C1	Alternative C2	Alternative A, B, D, and E, Proposed Plan	Alternative C1	Alternative C2
Cedar City FO	139,816	66,229	110,381	88,432	37,828	68,190
Fillmore FO	256,674	229,493	245,802	152,760	128,418	143,023
GSENM	76,816	74,896	76,048	38,464	36,950	37,858
Kanab FO	18,686	9,695	15,090	9,189	3,933	7,086
Moab FO	89,648	89,648	89,648	46,957	46,957	46,957
Price FO	100,375	87,530	95,237	51,434	45,111	48,905
Richfield FO	98,462	83,032	92,290	66,371	55,209	61,906
Salt Lake FO	176,398	78,370	137,187	137,686	57,011	105,416
Vernal FO	127,839	36,150	91,163	65,457	15,652	45,535
Sawtooth NF	12,348	0	7,409	12,348	0	7,409
Dixie NF	38,843	0	23,306	38,843	0	23,306
Fishlake NF	69,707	0	41,824	69,707	0	41,824
Manti-Lasal NF	55,561	0	33,337	55,561	0	33,337
Uinta-Wasatch-Cache NF	44,441	0	26,665	44,441	0	26,665
Ashley NF	43,329	0	25,997	43,329	0	25,997
Total	1,348,943	755,043	1,111,383	920,979	427,069	723,414

Sources: Calculated based on data from BLM 2012a and Forest Service 2013. Billed AUMs for Forest Service were assumed equal to active AUMs.

The economic value of forage is estimated based on the value of production associated with the forage. Values for cattle and sheep are estimated separately, and other grazing animals are considered of negligible commercial value.

Due to price fluctuations, average per-AUM values for cattle and sheep are based on the 2002 to 2011 average value of production estimates from the (US Department of Agriculture, Economic Research Service 2012). The value for cattle is $51.19 per AUM, and the value for sheep is $58.01 per AUM in the Primary Socioeconomic Study Area (in 2011 dollars). Including indirect and induced impacts, the value of one AUM in the Primary Socioeconomic Study Area for cattle is $102.12 and for sheep is $127.11 (in 2011 dollars). **Table W.2** shows the economic impact assumptions for cattle and sheep. The direct economic impact is the estimated change in livestock output per AUM; IMPLAN generates the indirect and induced impacts.

Table W.2
Assumptions for Analysis of Impacts on Output for Livestock Grazing

Economic Impact	Primary Study Area	Primary and Secondary Study Area
Cattle		
Direct Economic Impact ($/AUM)	$51.19	$51.19
Indirect Economic Impact ($/AUM)[1]	$44.22	$49.39
Induced Economic Impact ($/AUM)[2]	$6.71	$9.08
Total Economic Impact ($/AUM)	$102.12	$109.66
Multiplier (Total Impact/Direct Impact)	1.99	2.14
Sheep		
Direct Economic Impact ($/AUM)	$58.01	$58.01
Indirect Economic Impact ($/AUM)[1]	$59.85	$67.76
Induced Economic Impact ($/AUM)[2]	$9.25	$12.53
Total Economic Impact ($/AUM)	$127.11	$138.30
Multiplier (Total Impact/Direct Impact)	2.19	2.38

Note: All dollar values are in 2011 dollars.
[1] Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the livestock industry.
[2] Induced impacts reflect increased demand in the consumer and government sectors.

Table W.3 provides a summary of the employment impacts that would result, according to IMPLAN, based on unit changes in livestock AUMs.

The IMPLAN sectors used to model and exogenous change in demand for livestock grazing were the following (IMPLAN sector numbers are shown in brackets): grain farming (2), all other crop farming (10), support activities for agriculture and forestry (19), residential structures maintenance and repairs (40), wholesale trade (319), truck transportation (335), banking (354), real estate (360), accounting (368), veterinary services (379), equipment repair and maintenance (417) and labor income (NA). Cattle grazing used the following additional sector: cattle ranching and farming (11). Sheep grazing used the following additional sectors: (animal production except cattle and poultry and eggs (14), retail-food and beverages (324).

Table W.3
Assumptions for Analysis of Employment Impacts for Livestock Grazing

Employment Impact	Primary Study Area	Primary and Secondary Study Area
	Cattle	
Direct Employment (Jobs/1,000 AUMs)	0.559	0.559
Indirect Employment (Jobs/1,000 AUMs)	0.456	0.486
Induced Employment (Jobs/1,000 AUMs)	0.067	0.087
Total Employment (Jobs/1,000 AUMs)	1.081	1.132
Multiplier (Total Impact/Direct Impact)	1.93	2.03
Average Earnings per Job (2011 dollars)	$36,738	$36,738
	Sheep	
Direct Employment (Jobs/1,000 AUMs)	0.980	0.980
Indirect Employment (Jobs/1,000 AUMs)	0.760	0.801
Induced Employment (Jobs/1,000 AUMs)	0.087	0.110
Total Employment (Jobs/1,000 AUMs)	1.827	1.891
Multiplier (Total Impact/Direct Impact)	1.86	1.93
Average Earnings per Job (2011 dollars)	$15,408	$15,408

Note: Direct, indirect, and induced employment impacts and average earnings per job are calculated using IMPLAN.

OIL AND GAS

The economic impact of oil and gas reflects drilling, completion, and production activities. Estimation of drilling, completion, and production activities was done for a 15-year period (2014 to 2028). **Appendix R**, Oil and Gas Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Occupied Habitat in Utah Sub-Region, provides a complete description of the assumptions and methodology used in developing these estimates.

The number of wells drilled and the number of wells completed under the No Action Alternative (Alternative A) were based on the average number of wells expected to be drilled or completed per year in each BLM field office's current Reasonable Foreseeable Development Scenario. Completion rates ranged from 10 percent in most counties to 85 percent for oil wells in Carbon and Duchesne counties and for gas wells in Uintah County. Drilling and completion numbers were estimated for federal surface, as well as for all surface ownership.

The BLM oil and gas specialists estimated the share of oil and gas that would intersect with GRSG habitat using GIS. The number of wells completed or drilled that would be affected by each alternative is the number that intersects with GRSG habitat, as appropriate for each alternative:

- Alternative A – Existing areas would be available for fluid mineral leasing
- Alternative B – some GRSG occupied habitat would be designated as PHMA and would be closed to new fluid mineral leasing
- Alternative C – All GRSG occupied habitat would be designated as PHMA and would be closed to new fluid mineral leasing

- Alternative D – Some GRSG occupied habitat would be designated as PHMA but would not be closed to new leasing. Rather, NSO, with waivers, exceptions, and modifications, would be placed within 4 miles of an occupied lek in PHMA. NSO with waivers, exceptions, and modifications applies within 1 mile of leks in GHMA.
- Alternative E – Based on the State of Utah's *Conservation Plan for Greater Sage-grouse in Utah*, minor constraints would be placed on management areas.
- Proposed Plan – Some GRSG occupied habitat would be designated as PHMA and subject to NSO restrictions with no waivers, exceptions, or modifications. The remainder of the priority habitat would be subject to NSO restrictions with one exception. Oil and gas development in GHMA would be open but subject to net conservation gain requirements and other conservation measures.

Both wells in new leases and wells in existing leases were considered to be affected by GRSG management (see **Appendix R** for details). In addition, the BLM assumed that leases on state and private lands would be affected similarly to federal lands, if large areas of contiguous BLM-administered land are closed to new oil and gas leasing.

Table W.4 presents the total number of wells drilled and completed in the Primary Socioeconomic Study Area for each alternative, relative to Alternative A.

Table W.4
Oil and Gas Well Numbers in New and Existing Leases Over 15 Years, Relative to Alternative A

Item	Federal, State, and Fee Surface	Federal Surface		State and Fee Surface
		New Leases	Existing Leases	
Alternative B – Wells Drilled	-329	-115	-165	-49
Alternative B – Wells Completed	-242	-93	-126	-23
Alternative C – Wells Drilled	-858	-270	-494	-94
Alternative C – Wells Completed	-670	-217	-397	-56
Alternative D – Wells Drilled	-223	-40	-165	-18
Alternative D – Wells Completed	-166	-31	-126	-9
Alternative E – Wells Drilled	0	0	0	0
Alternative E – Wells Completed	0	0	0	0
Proposed Plan – Wells Drilled	-228	-44	-165	-19
Proposed Plan – Wells Completed	-167	-34	-126	-6

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information

The production per well was assumed based on the typical production of existing wells in the area, or 1,471 million cubic feet per gas well and 200 thousand barrels of oil per oil well over a 20 year well life. Each well was assumed to have a 20-year life and 75 percent of its lifetime production would be reached during the 15-year period. The production that would be affected by each alternative is proportional to the share of wells affected by GRSG habitat, as appropriate for each alternative. Reductions in drilled and completed wells relative to

Alternative A correspond to approximately 7 percent under alternative D and the Proposed Plan, 10 percent under Alternative B, and 27 percent under Alternative C, with no reduction under Alternative E. **Table W.5** presents the projected quantity of oil and gas over the 15-year forecast period on federal surface and on federal, state, and fee surface.

Table W.5
Projected Oil and Gas Production in New and Existing Leases Relative to Alternative A, 15-Year Period

Item	Federal, State, and Fee Surface	Federal Surface	State and Fee Surface
Alternative B – Gas (MMCF)	-113,083	-101,628	-11,455
Alternative B – Oil (MBO)	-2,775	-2,580	-195
Alternative C – Gas (MMCF)	-302,842	-277,417	-25,425
Alternative C – Oil (MBO)	-9,075	-8,366	-709
Alternative D – Gas (MMCF)	-77,228	-72,791	-4,436
Alternative D – Oil (MBO)	-1,950	-1,909	-41
Alternative E – Gas (MMCF)	0	0	0
Alternative E – Oil (MBO)	0	0	0
Proposed Plan – Gas (MMCF)	-78,882	-75,183	-3,699
Proposed Plan – Oil (MBO)	-1,800	-1,827	27

Source: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information.
MMCF = million cubic feet; MBO = thousand barrels

The costs of drilling and completing wells and producing oil and gas also are relevant for the economic impact analysis. Cost of completion or drilling per well were assumed to sum to $3,250,000 for vertical wells under Alternatives A and E, wells not on federal lands, and wells on federal lands not in priority sage grouse habitat. This is a mid-point in the $1,500,000 to $5,000,000 range typical for the region (BLM 2013a). Directional wells were assumed to be approximately 5 percent more expensive to drill per foot and similarly costly to complete, and horizontal wells were assumed to be 30 percent more expensive to drill per foot and similarly costly to complete. Vertical wells were assumed to be 43 percent of total wells, directional wells were assumed to be 55 percent of total wells and horizontal wells were assumed to be 2 percent of total wells.

For Alternatives B, C, D, and the Proposed Plan, wells drilled in priority habitat on federal lands were assumed to have increased costs. These increased costs would affect both wells on existing leases and new wells. The increased costs would be a consequence of increased directional drilling, from 55 percent of total wells to 75 percent of total wells, and horizontal drilling, from 2 percent of total wells to 5 percent of total wells. In addition, increased costs would derive from required design features identified in Appendix J and off-location mitigation requirements. In Alternatives A and E, the average cost of drilling and completing a well was estimated to be $3,371,400. In Alternatives B, C, D, and the Proposed Plan, the average cost for drilling and completing a well was estimated to be $4, 498,000. This increase in costs translates in increases local expenditures per well and, therefore, increased outcome, employment and earnings impacts per well.

The increased costs of drilling in priority habitat was assumed to impact the number of wells drilled under existing leases in Alternatives B, C, D, and the Proposed Plan.[1] Because the reduction in the number of wells drilled in existing leases was assumed to be proportional to the increase in drilling costs under Alternatives B, C, D, and the Proposed Plan. These reductions are already reflected in the number of wells drilled and completed under each alternative, relative to Alternative A, shown in **Table W.4**.

IMPLAN was used to generate output, employment, and earnings multipliers per million dollars of expenditures. These multipliers were then applied to the estimated expenditures with drilling and completion by alternative to obtain the resulting impacts. A summary of the costs of drilling and completion and impacts per well used for the economic analysis is shown in **Table W.6** and **Table W.7**. Assumptions are shown for the Primary Study Area, the Primary and Secondary Study Area and for a Three-County Area consisting of Duchesne, Carbon and Uintah counties. As explained in the Social and Economic Impacts (Including Environmental Justice) section of **Chapter 4**, these three counties are expected to bear a considerable share of the economic impacts associated with the effects of management alternatives on oil and gas development. The analysis of the three-county area assumed all parameters would be the same as those used for the broader analysis of the impacts on the primary and secondary areas (e.g., sectors affected by oil and gas related expenditures, labor productivity, etc.) except that all direct expenditures previously assumed to occur in the primary study area would now only occur in the three-county area.

Table W.6
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Alternatives A and E and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, and D, and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Drilling Impacts			
Total Drilling Costs[1]	$1,640,290	$1,640,290	$1,640,290
Total Local Drilling Costs[2]	$1,439,222	$1,439,222	$1,439,222
Local Direct Impact ($/well)	$1,439,222	$1,439,222	$1,439,222
Local Indirect Impact ($/well)	$299,375	$479,317	$236,831
Local Induced Impact ($/well)	$320,223	$434,455	$286,130
Local Total Impact ($/well)[3]	$2,058,819	$2,352,993	$1,962,183
Multiplier (total impact/direct impact)	1.43	1.63	1.36
Completion Impacts			
Total Completion Costs[1]	$1,731,110	$1,731,110	$1,731,110
Total Local Completion Costs[2]	$1,052,633	$1,052,633	$1,052,633
Local Direct Impact ($/well)	$1,052,633	$1,052,633	$1,052,633
Local Indirect Impact ($/well)	$253,164	$390,856	$195,471
Local Induced Impact ($/well)	$240,337	$325,751	$210,663

[1] Alternatives B, C, D, and the Proposed Plan were assumed to require increased costs of drilling equally, relative to Alternative A.

Table W.6
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Alternatives A and E and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, and D, and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Local Total Impact ($/well)[3]	$1,546,134	$1,769,240	$1,458,766
Multiplier (total impact/direct impact)	1.47	1.68	1.39

Source: Drilling and completion costs (the first row in each part of the table) were based on the mid-point of a range provided by BLM staff (BLM 2013a), $3,250,000 per well for vertical wells. Costs for directional and horizontal wells were adjusted, as explained in the text. Remaining data is from IMPLAN, as described in the text.
[1]Coalbed natural gas wells were assumed to be included in the estimate of the average cost of vertical wells. Coalbed natural gas well costs would correspond to the lower end of the range provided by BLM (2013).
[2]The local cost shares correspond to the percent of total drilling or completion costs that would be spent on goods and services purchased from the local economy and were assumed based on regional experience.
[3]Total impacts estimated using IMPLAN include direct, indirect, and induced impacts.

Table W.7
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, and D, and Proposed Plan

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Drilling Impacts			
Total Drilling Costs[1]	$2,188,416	$2,188,416	$2,188,416
Total Local Drilling Costs[2]	$1,920,157	$1,920,157	$1,920,157
Local Direct Impact ($/well)	$1,920,157	$1,920,157	$1,920,157
Local Indirect Impact ($/well)	$399,415	$639,487	$315,971
Local Induced Impact ($/well)	$427,230	$579,634	$381,745
Local Total Impact ($/well)[3]	$2,746,803	$3,139,279	$2,617,873
Multiplier (total impact/direct impact)	1.43	1.63	1.36
Completion Impacts			
Total Completion Costs[1]	$2,309,584	$2,309,584	$2,309,584
Total Local Completion Costs[2]	$1,404,385	$1,404,385	$1,404,385
Local Direct Impact ($/well)	$1,404,385	$1,404,385	$1,404,385
Local Indirect Impact ($/well)	$337,762	$521,466	$260,790
Local Induced Impact ($/well)	$320,649	$434,605	$281,059
Local Total Impact ($/well)[3]	$2,062,797	$2,360,456	$1,946,233
Multiplier (total impact/direct impact)	1.47	1.68	1.39

Source: Drilling and completion costs (the first row in each part of the table) were based on the mid-point of a range provided by BLM staff (BLM 2013a), $3,250,000 per well for vertical wells. Costs for directional and horizontal wells were adjusted, as explained in the text. Remaining data is from IMPLAN, as described in the text.
[1]Coalbed natural gas wells were assumed to be included in the estimate of the average cost of vertical wells. Coalbed natural gas well costs would correspond to the lower end of the range provided by BLM (2013).
[2]The local cost shares correspond to the percent of total drilling or completion costs that would be spent on goods and services purchased from the local economy and were assumed based on regional experience.
[3]Total impacts estimated using IMPLAN include direct, indirect, and induced impacts.

Table W.8 provides the assumptions used to determine the economic impact associated with the production of oil and gas. For the analysis, the BLM estimated a nonlabor production cost (for gas) of $4.23 per thousand cubic feet and $82.53 per barrel of oil, in year 2011 dollars, based on data from the Energy Information Administration for the Rocky Mountain Region (Energy Information Administration 2013).

The forecasted number of wells and production used for estimating employment impacts is the same as for estimating impacts on labor earnings and output. The direct and total employment impacts attributable to drilling and completion are shown in **Table W.9** and **Table W.10**.

Table W.11 shows the direct and total employment impacts associated with production.

The analysis of potential changes in tax revenues is based on tax rates of 12.5 percent of taxable value for federal mineral royalties and 5 percent of taxable value for state severance taxes: Utah severance tax rates are 5 percent for value above a minimum, so 5 percent is an upper bound (University of Utah 2010). Taxable value was assumed to be 87.5 percent of value of sales based on a report for neighboring Colorado.[2] **Table W.12** shows tax collections for the annual average production under each alternative in the primary study area.

Table W.8
Assumptions for Analysis of Economic Impacts on Output for Oil and Gas Production

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Oil Production (per thousand barrels)			
Direct Economic Impact[1]	$82,530[2]	$82,530	$82,530
Indirect Economic Impact[4]	$8,309	$12,123	$5,760
Induced Economic Impact[5]	$2,924	$4,573	$2,190
Total Economic Impact	$93,763	$99,226	$90,480
Multiplier (total impact/direct impact)	1.14	1.20	1.10
Gas Production (per million cubic feet)			
Direct Economic Impact[1]	$4,230[3]	$4,230	$4,230
Indirect Economic Impact[4]	$425	$621	$295
Induced Economic Impact[5]	$149	$234	$112
Total Economic Impact	$4,805	$5.085	$4,637
Multiplier (total impact/direct impact)	1.14	1.20	1.10

Note: All dollar values are in year 2011 dollars.
[1]Direct economic impact is the market value of output.
[2]Based on an oil price of $82.53 per barrel, which is the 2011 Utah Crude Oil First Purchase Price reported by the US Energy Information Administration (EIA 2013).
[3]Based on a gas price of $4,23 per thousand cubic feet, which is the 2010 Utah Natural Gas Wellhead Price reported by the US Energy Information Administration (EIA 2013).
[4]Indirect impacts from IMPLAN reflect increased demand in sectors that directly or indirectly provide supplies to the oil and gas industry.
[5]Induced impacts from IMPLAN reflect increased demand in the consumer sectors.

[2] This was based on information available for the State of Colorado from the Colorado Oil and Gas Association (Colorado Oil and Gas Association 2011). Valuation for Utah may be slightly above or below this number.

Table W.9
Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, Alternatives A and E, and Wells not on Federal Lands in Priority Habitat in Alternatives B, C, and D, and Proposed Plan[1]

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Drilling Impacts			
Direct Employment (jobs/well)	8.3	8.3	8.2
Indirect Employment (jobs/well)	2.6	3.5	1.9
Induced Employment (jobs/well)	3.1	3.9	2.7
Total Employment Impact (jobs/well)	14.0	15.8	12.8
Multiplier (Total Impact/Direct Impact)	1.69	1.90	1.56
Average Earnings per Job (2011 dollars)	$51,377	$51,337	$56,543
Completion Impacts			
Direct Employment (jobs/well)	6.5	6.5	6.5
Indirect Employment (jobs/well)	2.2	2.9	1.6
Induced Employment (jobs/well)	2.3	2.9	2.0
Total Employment Impact (jobs/well)	11.0	12.3	10.1
Multiplier (Total Impact/Direct Impact)	1.68	1.89	1.54
Average Earnings per Job (2011 dollars)	$49,031	$49,108	$52,704

Note: Direct and total employment impact and average earnings per job are calculated using IMPLAN.
[1]Each job corresponds to a part-time or full-time employment position during a one year period.

Table W.10
Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, and D, and Proposed Plan[1]

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Drilling Impacts			
Direct Employment (jobs/well)	11.1	11.1	10.9
Indirect Employment (jobs/well)	3.5	4.7	2.5
Induced Employment (jobs/well)	4.2	5.3	3.6
Total Employment Impact (jobs/well)	18.7	21.0	17.0
Multiplier (Total Impact/Direct Impact)	1.69	1.90	1.56
Average Earnings per Job (2011 dollars)	$51,377	$51,337	$56,543
Completion Impacts			
Direct Employment (jobs/well)	8.7	8.7	8.7
Indirect Employment (jobs/well)	2.9	3.9	2.1
Induced Employment (jobs/well)	3.0	3.9	2.6

Table W.10
Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, Wells on Federal Lands in Priority Habitat in Alternatives B, C, and D, and Proposed Plan[1]

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Total Employment Impact (jobs/well)	14.7	16.5	13.4
Multiplier (Total Impact/Direct Impact)	1.68	1.89	1.54
Average Earnings per Job (2011 dollars)	$49,031	$49,108	$52,704

Note: Direct and total employment impact and average earnings per job are calculated using IMPLAN.
[1] Each job corresponds to a part-time or full-time employment position during a one year period.

Table W.11
Assumptions for Employment Impact Analysis for Oil and Gas Production

Employment Impact (annual number of jobs per thousand barrels or million cubic feet)	Primary Study Area	Primary and Secondary Study Area	Three-County Area
Oil Production (per thousand barrels)			
Direct Employment	0.028968	0.028968	0.029051
Indirect Employment	0.067014	0.087647	0.036808
Induced Employment	0.027978	0.040935	0.020302
Total Employment	0.123960	0.157550	0.086161
Multiplier (Total Impact/Direct Impact)	4.28	5.44	2.97
Average Earnings per Job (2011 dollars)	$52,485	$52,242	$63,800
Gas Production (per million cubic feet)			
Direct Employment	0.001485	0.001485	0.001489
Indirect Employment	0.003435	0.004492	0.001887
Induced Employment	0.001434	0.002098	0.001041
Total Employment	0.006353	0.008075	0.004416
Multiplier (Total Impact/Direct Impact)	4.28	5.44	2.97
Average Earnings per Job (2011 dollars)	$52,485	$52,242	$63,800

Note: Direct, indirect, and induced employment impact and average earnings per job are calculated using IMPLAN.

The IMPLAN sectors used to model an exogenous change in demand for oil and gas well drilling were the following (IMPLAN sector numbers are shown in brackets): drilling oil and gas wells (28), support activities for oil and gas operations (29), construction of new manufacturing structures (35), construction of other new structures (36), wholesale trade (319), truck transportation (335), telecommunications (351), commercial and industrial equipment leasing (365), architectural and engineering services (369). In the gas of oil and gas production, the sector used was oil and gas extraction (20).

Table W.12
Tax Collections from Oil (MBO) and Gas (MMCF) Production Relative to Alternative A, 15 Year Period, 2011 $

	Alternative B		Alternative C		Alternative D		Alternative E		Proposed Plan	
	Gas	Oil	Gas	Gas	Gas	Oil	Gas	Oil	Gas	Oil
Total production	-113,083	-2,775	-302,842	-9,075	-77,227	-1,950	0	0	-77,227	-1,950
Prices	$4,230	$82,530	$4,230	$82,530	$4,230	$82,530	$4,230	$82,530	$4,230	$82,530
Assessed valuation	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%
Assessed value	-$418,548,454	-$200,393,156	-$1,120,893,953	-$655,339,781	-$285,836,434	-$140,816,813	$0	$0	-$285,836,434	-$140,816,813
Federal royalties rate	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Federal royalty tax	-$47,018,829	-$23,288,934	-$128,348,709	-$75,526,556	-$33,677,211	-$17,241,033	$0	$0	-$34,783,885	-$16,491,815
State severance rate	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
State severance tax	-$20,927,423	-$10,019,658	-$56,044,698	-$32,766,989	-$14,291,822	-$7,040,841	$0	$0	-$14,291,822	-$7,040,841
Total taxes	-$67,946,252	-$33,308,592	-$184,393,407	-$108,293,545	-$47,969,033	-$24,281,873	$0	$0	-$49,075,707	-$23,532,656

Source: Production volumes elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information. Prices are from Energy Information Administration (2013). Assessed valuation percentage is based on information available for Colorado (Colorado Oil and Gas Association 2011).
MMCF = million cubic feet; MBO = thousand barrels

COAL

The economic impact of coal production is estimated based on the volume of coal produced and the sales price of coal. BLM projected coal production in Utah to 2028 based on information from the US Energy Information Administration (EIA) and the Utah Geological Survey (BLM 2013b; Utah Geological Survey et al. 2010). These projections incorporate expected future trends of related prices and quantities (e.g. the price of gas). Although these projections include coal from San Juan County, which is not part of the Study Area for this EIS, the coal from San Juan would not be affected by the choice of alternatives and therefore does not affect the comparison of alternatives. For the estimation of the impacts of the alternatives on coal production, the following assumptions were made, based on information in various documents:

- 77 percent of all production is from federal mineral lands (BLM 2013b)
- New coal leases would be required for underground coal production from 2017 onwards
- BLM made the assumption for analysis purposes only that no new underground leasing would occur in priority habitat (for Alternative B) or occupied habitat (for Alternative C). The idea that closing GRSG habitat to new leases would effectively preclude underground coal mining represents a worst-case scenario because nothing in this alternative would preclude leasing of underground materials.
- For the Proposed Plan, the BLM assumed that underground leasing would occur in the Alton coal field, assuming also that this would reduce the recovery rate in this area from 90 percent to 45 percent. The BLM also assumed that lek buffers under the Proposed Plan would have additional restrictive effects on coal mining.
- The Alton coal field would generate 1,840,000 tons of coal per year starting in 2016 from surface coal mining, under Alternatives A, D and E (BLM 2011) and 792,200 tons of coal per year under the Proposed Plan. For analytical purposes only, this coal is assumed to be produced entirely from federal lands. BLM assumed that no production would occur from the Alton coal field in Alternatives B and C, based on it being a surface mine. To the extent that some underground mining of the deposit could still occur, accessed through surrounding non-Federal lands, this assumption of no production under Alternatives B and C may overstate the actual impacts of those alternatives.
- On National Forest System lands, the SUFCO Mine and Horn Mountain make up the majority of the known recoverable coal resources in PHMA.The PHMA overlying the SUFCO Mine has been partially undermined and should not be impacted by future mining or the Proposed Plan. The Horn Mountain area has three known active leks, two of which overlie areas that could be mined in the future. Under the Proposed Plan, precluding surface disturbance in PHMA could limit coal produced from Horn Mountain if it is ever leased and developed, however, there are is no proposed mining in the Horn Mountain area.

The estimated annual average volume of coal produced on federal lands under each alternative is presented in **Table W.13** below. The average production from surface mining in **Table W.13** includes two years (2014 and 2015) where no federal coal production from the Alton field mines is expected (explaining why surface coal production shown in **Table W.13** is lower than the average annual production expected starting 2016).

Table W.13
Estimated Annual Average Coal Production on Federal Lands in Utah (tons), 2014-2028

	Underground	Surface	Total
Alternative A	15,291,616	1,594,667	16,886,283
Alternative B	13,150,790	0	13,150,790
Alternative C	12,080,377	0	12,080,377
Alternative D	15,291,616	1,594,667	16,886,283
Alternative E	15,291,616	1,594,667	16,886,283
Proposed Plan	15,291,616	686,504	15,978,120

Source: BLM 2013b

Estimates of the impacts of coal production were developed using IMPLAN and assuming a price for underground coal of $33.80 per ton, which is the EIA's 2011 coal price estimate for Utah (EIA 2013), and a price of $23.86 per ton for surface coal. The price for surface coal is estimated as the average between the price for underground coal for Utah and the price of surface mining in Wyoming's Powder River Basin (used as a reference). The basis for this is the fact that the Alton mine coal is expected to have 10,000 BTU per pound (BLM 2011). Surface coal mined from the Powder River Basin in Wyoming contains about 8,800 BTU per pound and has an average price of $13.56 per ton. The EIA estimates the price of underground coal in Utah to be $33.80 per ton based on 11,700 BTU per pound of coal. The simple average in prices would approximate the expected BTU for the coal from the Alton mine.

Table W.14 and **Table W.15** show the multipliers for output and employment, respectively, estimated for coal. Assumptions are shown for the Primary Study Area, the Primary and Secondary Study Area and for an Eight-County Area consisting of Carbon, Emery, Sanpete, and Kane, as well as counties that could be expected to provide construction inputs, materials, transportation services and other supplies, and that are located within the primary or secondary study area. These include Sevier, Paiute, Garfield and Millard. Utah County was also considered but was not included, because it would disproportionately impact the results, given its large population and economy relative to the other counties. As explained in the Social and Economic Impacts (Including Environmental Justice) section of **Chapter 4**, these eight counties are expected to bear a considerable share of the economic impacts associated with the effects of management alternatives on coal development and production.

Table W.14
Assumptions for Analysis of Impacts on Output for Coal

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Eight-County Area
Underground			
Direct Economic Impact ($/MT)	$33,800	$33,800	$33,800
Indirect Economic Impact ($/MT)[1]	$8,147	$15,218	$7,799
Induced Economic Impact ($/MT)[2]	$5,305	$8,258	$4,601
Total Economic Impact ($/MT)	$47,251	$57,276	$46,200
Multiplier (Total Impact/Direct Impact)	1.40	1.69	1.37
Surface			
Direct Economic Impact ($/MT)	$23,680	$23,680	$23,680
Indirect Economic Impact ($/MT)[1]	$5,149	$7,886	$3,911
Induced Economic Impact ($/MT)[2]	$3,018	$4,357	$2,494
Total Economic Impact ($/MT)	$31,847	$35,923	$30,085
Multiplier (Total Impact/Direct Impact)	1.34	1.52	1.27

Source: IMPLAN; Note: All dollar values are in 2011 dollars.
[1]Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the coal industry.
[2]Induced impacts reflect increased demand in the consumer and government sectors.
MT= metric tonne

Table W.15
Assumptions for Analysis of Impacts on Employment for Coal[3]

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Eight-County Area
Underground			
Direct Employment (jobs/MT)	0.089502	0.089502	0.089502
Indirect Employment (jobs/MT)[1]	0.048266	0.079295	0.039952
Induced Employment (jobs/MT)[2]	0.050768	0.073988	0.042250
Total Employment Impact (jobs/MT)	0.188536	0.242785	0.171704
Multiplier (Total Impact/Direct Impact)	2.11	2.71	1.92
Average Earnings per Job (2011 dollars)	$63,113	$61,601	$67,879
Surface			
Direct Employment (jobs/MT)	0.044862	0.044862	0.044862
Indirect Employment (jobs/MT)[1]	0.026481	0.038363	0.025405
Induced Employment (jobs/MT)[2]	0.028898	0.039331	0.022899
Total Employment Impact (jobs/MT)	0.100241	0.122556	0.093166
Multiplier (Total Impact/Direct Impact)	2.23	2.73	2.08
Average Earnings per Job (2011 dollars)	$65,666	$63,715	$69,416

Source: IMPLAN; Note: All dollar values are in 2011 dollars.
[1]Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the coal industry. "For example, the U.S. coal mining industry has a multiplier of 3.6, meaning that, for every ten direct jobs, an additional 26 jobs are supported in the United States through indirect and induced economic activity." by Ernst & Young http://www.nma.org/pdf/coal_export_report.pdf
[2]Induced impacts reflect increased demand in the consumer and government sectors.
[3] Each job corresponds to a part-time or full-time employment position during a one year period.
MT = metric tonne

The IMPLAN sector used to model an exogenous change in demand for coal was coal mining (21).

The employment impacts for the Alton LBA would be in Kane and Garfield counties where nearly all of the mine employees live and where the large majority of domestic, trucking, and mine supply/support services are provided. Based on a 3.6 multiplier[3], the projected mine on-site employment of 160 represents 576 jobs or some 17.7 percent of the jobs in the two counties or the equivalent Salt County employment of some 87,700 jobs. (http://quickfacts.census.gov/qfd/states/49/49025.html, http://quickfacts.census.gov/qfd/states/49/49017.html, and http://quickfacts.census.gov/qfd/states/49/49035.html)

Potential changes in tax revenues associated to Federal mineral royalties are estimated based on a 12.5 percent royalty rate for surface coal and 8 percent royalty rate for underground coal (BLM). The value of coal output under each alternative was estimated as discussed above. **Table W.16** shows royalties collections for the estimated production under each alternative.

WIND ENERGY

The economic impact of wind energy depends on the expenditures made with installation and operations of wind farms. Expenditures made in the Primary Study Area were estimated based on the amount of electricity (nameplate capacity in megawatts, MW[4]) projected under each alternative, and the installation and operations costs per MW.

BLM projected 17,328 acres of reasonably foreseeable wind development in the Hamlin and Bald Hills Sage-Grouse population areas, under Alternative A. Using Utah's Milford Wind Corridor Project as a baseline, BLM estimated that this would correspond to approximately 210 MW of installed capacity. The same installed capacity would be projected under Alternative E. Based on GIS analysis, 121 MW would be potentially installed under Alternatives B, C, and D, and the Proposed Plan.

Installation and operations costs per MW were obtained from default values for the State of Utah used by the Jobs and Economic Development Impact (JEDI) model. The JEDI model for wind energy was developed by the National Renewable Energy Laboratory and default values for construction and operation costs per MW were determined based on extensive interviews with power generation project developers, state tax representatives, and others in the appropriate industries (NREL 2012). Default values were based on projects of 100 MW (50 turbines of 2,000 kilowatts each) and were estimated to be, in 2008 dollars,, $2,000 per kilowatt for installed project costs and $20 per kilowatt for operations and maintenance costs.

[3]"For example, the U.S. coal mining industry has a multiplier of 3.6, meaning that, for every ten direct jobs, an additional 26 jobs are supported in the United States through indirect and induced economic activity." by Ernst & Young http://www.nma.org/pdf/coal_export_report.pdf

[4] Megawatt = one thousand kilowatts

Table W.16
Estimated Average Annual Coal Royalties in Primary Study Area, 2014-2028

	Alternatives A, D and E			Alternative B			Alternative C			Proposed Plan		
	Underground	Surface	Total	Underground	Surface	Total	Underground	Surface	Total	Underground	Surface	Total
Mtons	15,292	1,595	16,886	13,151	0	13,151	12,080	0	12,080	15,292	687	15,978
Output (2011 $000)	$516,857	$37,762	$554,618	$444,497	$0	$444,497	$408,317	$0	$408,317	$516,857	$16,256	$533,113
Royalties (%)	8.0%	12.5%		8.0%	12.5%		8.0%	12.5%		8.0%	12.5%	
Royalties (2011 $000)	$41,349	$4,720	$46,069	$35,560	$0	$35,560	$32,665	$0	$32,665	$41,349	$2,032	$43,381

Table W.17 and **Table W.18** below show the estimated multipliers for output and employment during installation and operations. Assumptions are shown for the Primary Study Area, the Primary and Secondary Study Area and for a Two-County Area consisting of Millard and Beaver counties. As explained in the Social and Economic Impacts (Including Environmental Justice) section of **Chapter 4**, these two counties are expected to bear a considerable share of the economic impacts associated with the effects of management alternatives on wind energy development and production.

Table W.17
Assumptions for Analysis of Impacts on Output for Wind Energy

Economic Impact	Primary Study Area	Primary and Secondary Study Area	Two-County Area
	Installation		
Direct Economic Impact ($/MW)	$303,774	$303,774	$303,774
Indirect Economic Impact ($/MW)[1]	$53,862	$94,884	$30,900
Induced Economic Impact ($/MW)[2]	$46,892	$67,484	$33,776
Total Economic Impact ($/MW)	$404,527	$466,142	$368,450
Multiplier (Total Impact/Direct Impact)	1.33	1.53	1.21
	Operations		
Direct Economic Impact ($/MW)	$17,176	$17,176	$17,176
Indirect Economic Impact ($/MW)[1]	$572	$845	$384
Induced Economic Impact ($/MW)[2]	$5,390	$6,664	$3,883
Total Economic Impact ($/MW)	$23,138	$24,685	$21,442
Multiplier (Total Impact/Direct Impact)	1.35	1.44	1.25

Source: IMPLAN. Note: All dollar values are in 2011 dollars.
[1]Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the installation and operations of wind farms.
[2]Induced impacts reflect increased demand in the consumer and government sectors.

Table W.18
Assumptions for Analysis of Impacts on Employment for Wind Energy[4]

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Two-County Area
	Installation		
Direct Employment (jobs/MW)	1.77	1.77	1.77
Indirect Employment (jobs/MW)[1]	0.37	0.57	0.22
Induced Employment (jobs/MW)[2]	0.45	0.61	0.31
Total Employment Impact (jobs/MW)	2.58	2.94	2.30
Multiplier (Total Impact/Direct Impact)	1.46	1.67	1.30
Average Earnings per Job (2011 dollars)	$40,834	$42,141	$40,177
	Operations		
Direct Employment (jobs/MW)	0.24	0.24	0.24
Indirect Employment (jobs/MW)[1]	0.01	0.01	0.00[3]
Induced Employment (jobs/MW)[2]	0.05	0.06	0.04
Total Employment Impact (jobs/MW)	0.29	0.30	0.28

Table W.18
Assumptions for Analysis of Impacts on Employment for Wind Energy[4]

Employment Impact	Primary Study Area	Primary and Secondary Study Area	Two-County Area
Multiplier (Total Impact/Direct Impact)	1.24	1.28	1.17
Average Earnings per Job (2011 dollars)	$41,985	$42,157	$42,037

Source: IMPLAN. Note: All dollar values are in 2011 dollars.
[1]Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the installation and operations of wind farms.
[2]Induced impacts reflect increased demand in the consumer and government sectors.
[3]0.004
[4]Each job corresponds to a part-time or full-time employment position during a one year period.

The IMPLAN sectors used to model an exogenous change in demand for wind energy development were the following (IMPLAN sector numbers are shown in brackets): sand and gravel mining (26), ready-mix concrete manufacturing (161), wholesale trade (319), retail-building materials and garden supply (323), hotels and motels (411), food services and drinking places (413), labor income change (NA). In the case of wind energy operations, the IMPLAN sectors used were the following: electrical power (31), nonresidential maintenance and power (39), wholesale trade (319), retail – motor vehicle and parts (320), retail – building materials and garden supply (323), retail – gasoline stations (326), other state and local government enterprises (432), labor income change (NA), state and local government – non-educational (NA), state and local government – educational (NA). Unlike other sectors modeled in IMPLAN for this EIS, the state and local government sector was included when modeling wind energy operations following the NREL JEDI model on which the model for this EIS was based.

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Appendix X

Response to Comments on the Draft Land Use Plan Amendment/Environmental Impact Statement

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APPENDIX X
RESPONSE TO COMMENTS ON THE DRAFT LAND USE PLAN AMENDMENT/ENVIRONMENTAL IMPACT STATEMENT

INTRODUCTION

After publishing the Draft Land Use Plan Amendment (LUPA)/Environmental Impact Statement (EIS), the United States (US) Department of the Interior, Bureau of Land Management (BLM) and US Department of Agriculture, Forest Service (Forest Service) held a 90-day public comment period to receive comments on the Draft LUPA/ EIS. The BLM and Forest Service received written comments on the Draft LUPA/EIS by mail, email, and submissions at the public meetings and oral comments transcribed at public meetings. Comments covered a wide spectrum of thoughts, opinions, ideas, and concerns. The BLM and Forest Service recognize that commenters invested considerable time and effort to submit comments on the Draft LUPA/EIS and developed a comment analysis methodology to ensure that all comments were considered, as directed by National Environmental Policy Act of 1969 (NEPA) regulations.

According to the NEPA, the BLM and Forest Service are required to identify and formally respond to all substantive public comments. The BLM and Forest Service developed a systematic process for responding to comments to ensure all substantive comments were tracked and considered. Upon receipt, each comment letter was assigned an identification number and logged into the BLM's comment analysis database, CommentWorks, which allowed the BLM and Forest Service to organize, categorize, and respond to comments. Substantive comments from each letter were coded to appropriate categories based on the content of the comment, retaining the link to the commenter. The categories generally follow the sections presented in the Draft LUPA/EIS, though some relate to the planning process or editorial concerns.

Comments similar to each other were grouped under a topic heading, and the BLM and Forest Service drafted a statement summarizing the issues contained in the comments. The responses were crafted to respond to the comments, and, if warranted, a change to the EIS was made.

Although each comment letter was diligently considered, the comment analysis process involved determining whether a comment was substantive or nonsubstantive in nature. In performing this analysis, BLM and Forest Service relied on the Council on Environmental Quality's (CEQ's) regulations to determine what constituted a substantive comment.

A substantive comment does one or more of the following:

- Questions, with a reasonable basis, the accuracy of the information and/or analysis in the Draft LUPA/EIS
- Questions, with a reasonable basis, the adequacy of the information and/or analysis in the Draft LUPA/EIS
- Presents reasonable alternatives other than those presented in the Draft LUPA/EIS that meet the purpose and need of the proposed action and addresses significant issues
- Questions, with a reasonable basis, the merits of an alternative or alternatives
- Causes changes in or revisions to the proposed action
- Questions, with a reasonable basis, the adequacy of the planning process itself

Additionally, the BLM's NEPA Handbook (H-1790-1) identifies the following types of substantive comments:

- Comments on the Adequacy of the Analysis: Comments that express a professional disagreement with the conclusions of the analysis or assert that the analysis is inadequate are substantive in nature but may or may not lead to changes in the Proposed LUPA/Final EIS. Interpretations of analyses should be based on professional expertise. Where there is disagreement within a professional discipline, a careful review of the various interpretations is warranted. In some cases, public comments may necessitate a reevaluation of analytical conclusions. If, after reevaluation, the manager responsible for preparing the EIS (Authorized Officer) does not think that a change is warranted, the response should provide the rationale for that conclusion.
- Comments That Identify New Impacts, Alternatives, or Mitigation Measures: Public comments on a Draft LUPA/EIS that identify impacts, alternatives, or mitigation measures that were not addressed in the draft are substantive. This type of comment requires the Authorized Officer to determine whether it warrants further consideration. If it does, the Authorized Officer must determine whether the new impacts, new alternatives, or new mitigation measures should be analyzed in the Proposed LUPA/Final EIS, a supplement to the Draft LUPA/EIS, or a completely revised and recirculated Draft LUPA/EIS.
- Disagreements with Significance Determinations: Comments that directly or indirectly question, with a reasonable basis, determinations regarding the significance or severity of impacts are substantive. A reevaluation of these determinations may be warranted and may lead to changes in the Proposed LUPA/Final EIS. If, after

reevaluation, the Authorized Officer does not think that a change is warranted, the response should provide the rationale for that conclusion.

Comments that failed to meet the above description were considered nonsubstantive. Many comments received throughout the process expressed personal opinions or preferences, had little relevance to the adequacy or accuracy of the Draft LUPA/EIS, represented commentary regarding resource management and/or impacts without any real connection to the document being reviewed, or were considered out of scope because they dealt with existing law, rule, regulation, or policy. These comments did not provide specific information to assist the planning team in making changes to the alternatives or impact analysis in the Draft LUPA/EIS and are not addressed further in this document. Examples of nonsubstantive comments include the following:

- The best of the alternatives is Alternative D (or A, B, C, or E).
- The preferred alternative does not reflect balanced land management.
- More land should be protected as wilderness.
- BLM needs to change the Taylor Grazing Act and charge higher grazing fees.
- I want the EIS to reflect the following for this area: no grazing, no logging, no drilling, no mining, and no off-highway vehicles (OHVs).
- More areas should be made available for multiple uses (e.g., drilling, OHVs, or rights-of-ways [ROWs]) without severe restrictions.

Opinions, feelings, and preferences for one element or one alternative over another, and comments of a personal and/or philosophical nature, were all read, analyzed, and considered. However, because such comments are not substantive in nature, the BLM and Forest Service did not include them in the report and did not respond to them. While all comments were reviewed and considered, comments were not counted as "votes." The NEPA public comment period is neither considered an election, nor does it result in a representative sampling of the population. Therefore, public comments are not appropriate to be used as a democratic decision-making tool or as a scientific sampling mechanism.

Comments citing editorial changes to the document were reviewed and incorporated. The Proposed LUPA/Final EIS has been technically edited and revised to fix typographic errors, missing references, definitions, and acronyms, and other clarifications as needed.

Copies of all comment documents received on the Draft LUPA/EIS are available by request from the BLM's Utah State Office. Comments received by mail, email, and at meetings, or delivered orally during the public meetings are tracked by commenter name and submission number.

Campaign Letters

Several organizations and groups held standardized letter campaigns for the GRSG effort through which their constituents were able to submit the standard letter or a modified version of the letter indicating support for the group's position on the BLM and Forest Service actions in the Draft LUPA/EIS. Individuals who submitted a modified standard letter generally added new comments or information to the letter or edited it to reflect their main concern(s). Modified

letters with unique comments were given their own letter number and coded appropriately. All commenters who used an organization's campaign letter were tracked in a commenter list and are available from the BLM upon request.

How This Appendix is Organized

This appendix is divided into three main sections. The first section, Introduction, provides an overview of the comment-response process. The second section, Issue Topics, Responses, and Comments, is organized by the primary topic and then by specific issue subtopics that relate to an aspect of NEPA, the BLM and Forest Service planning processes, or specific resources and resource uses. For example, all comment summaries that relate to Greater Sage-Grouse (GRSG) fall under Section 7, Greater Sage-Grouse. This includes subsections such as Best Available Information and Baseline Data, Range of Alternatives, and Impacts. Each topic or subtopic contains a statement that summarizes all substantive comments received on that topic or subtopic and the BLM's and Forest Service's response to the summary statement. These issue summaries and responses are coded as they appear in CommentWorks. Excerpts of all substantive comments are posted on the project website: http://www.blm.gov/ut/st/en/prog/planning/SG_RMP_rev.html.

The terms preliminary priority management area (PPMA) and preliminary general management area (PGMA) were used in the Draft LUPA/EIS to describe the relative prioritization of areas for GRSG conservation. These are BLM and Forest Service terms used to differentiate the degree of managerial emphasis a given area would have relative to GRSG. As the BLM and Forest Service moved from a Draft LUPA/EIS to a Proposed LUPA/Final EIS, such prioritizations are necessarily no longer "preliminary" in nature. As such, they have been replaced with the terms Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA). Comments on the Draft LUPA/EIS referred to PPMA and PGMA. As such, the summary statements also use these terms. However, responses use the terminology used in the Proposed LUPA/Final EIS.

The third section, Commenter List, provides the names of individuals who submitted unique comment letters (not campaign letters) on the Draft LUPA/EIS. Commenters are listed alphabetically by the organization name or commenter's last name.

ISSUE TOPICS, RESPONSES, AND COMMENTS

Section 4 - NEPA

Section 4.1 - Public Notification

Summary

BLM needs to include a complete listing of commenters on the Draft LUPA/EIS, the number of commenters that are in favor of, or against, any particular alternative, and what changes resulted from the comments.

Response

Requirements for responding to public comments on a Draft LUPA/EIS are found in 40 Code of Federal Regulations (CFR) Section 1503.4. CEQ's *NEPA's Forty Most Asked Questions*, question 29a, also clarifies requirements (46 *Federal Register* 18026 (1981)). All substantive comments received on the Draft LUPA/EIS were considered and reviewed for information that would result in changes to the document. Comments simply stating a preference for or against a specific alternative, or opinions without reasonable basis were considered nonsubstantive since they do not meet the substantive comment requirement of BLM Handbook H-1790-1, Section 6.9.2.1. This appendix summarizes the substantive comments received and responses to those comments. **Section 6.7.4**, Public Comments on the Draft LUPA/EIS, of the Proposed LUPA/FEIS provides additional summaries about all comments received, along with a complete explanation of the procedures followed for analyzing comments. This appendix also includes a list of agencies, organizations, and individuals that submitted unique submissions (see *Commenter List*).

Changes between the Draft LUPA/EIS and the Proposed LUPA/Final EIS have been described at the beginning of each chapter in the Proposed LUPA/Final EIS.

Section 4.2 - Cooperating Agency Relationships

Summary

The BLM did not coordinate with state and local agencies that would be affected by the actions considered in the LUPA/EIS, as required by the NEPA and the Federal Land Policy and Management Act (FLPMA). Several agencies requested cooperator status for review and revisions to the Proposed LUPA/Final EIS.

Response

Both the CEQ and BLM planning regulations define cooperating agency status, including what it is, who is eligible to become a cooperating agency, and how the lead agency should invite participation as a cooperating agency (40 CFR 1501 and 1508; 43 CFR 1601.0-5). Cooperating agency relationships are limited to government entities, state agencies, local governments, tribal governments, and other federal agencies that have jurisdiction by law or special expertise. Additionally, per the regulations and BLM policy, there is no coordinating agency status (BLM Desk Guide to Cooperating Agency Relationships and Coordination with Intergovernmental Partners, pages 21 and 31, respectively). To be a cooperating agency, the local agency must meet the eligibility criteria set out in the regulations and policies. The specific role of each cooperating agency is based on jurisdiction by law or special expertise, which is determined on an agency-by-agency basis and identified in the Memorandum of Understanding.

Cooperating agency relationships are described in the Proposed LUPA/Final EIS in **Section 6.4**, Cooperating Agencies. In December 2011, the BLM sent letters to 15 tribal governments inviting them to be cooperating agencies. The BLM also sent letters to 36 local, state, and federal agencies inviting them to participate as cooperating agencies for the LUPA/EIS. Subsequently, the State of Wyoming and four local government agencies in Wyoming requested and were granted cooperating agency status for the Utah Greater Sage-Grouse LUPA/EIS effort because portions of two National Forests that overlaps into Wyoming and their proximity to the Utah Sub-region. To date, 29 agencies have agreed to participate on the Utah Greater Sage-Grouse LUPA/EIS as designated cooperating agencies, 28 of which have signed Memoranda of Understanding with the BLM's Utah State Office (see **Table 6.1**, Cooperating Agencies, in the Proposed LUPA/Final EIS).

In addition to the BLM's invitations to a wide variety of agencies to participate as cooperating agencies, US Department of the Interior regulations (43 CFR 46.225(c)) require the BLM, as lead agency, to consider any request by a government entity to participate as a cooperating agency (BLM Desk Guide to Cooperating Agency Relationships and Coordination with Intergovernmental Partners, pages 8-9). From the time that the Notice of Intent was published in the Federal Register and throughout the development of the EIS, an agency could notify the BLM requesting cooperating agency status. Section 202 of the FLPMA requires the BLM and Forest Service, to the extent consistent with the laws governing the administration of the public lands, coordinate the land use inventory, planning, and management activities of, or for, such lands with the land use planning and management programs of other federal departments and agencies, and of the States and local governments within which the lands are located.

All agencies participating as cooperating agencies have been given opportunities to participate during various steps of the planning process, including regular briefings, requests for input on draft alternatives and the administrative draft EIS, and identification of issues and data during public scoping and the Draft LUPA/EIS public comment period, as required by 40 CFR 1503.2 and 40 CFR 1506.10. Further, coordination continued with cooperating agencies in order to identify consistency issues and to be compliant with the relevant laws and regulations. While the laws and regulations associated with cooperating agencies and coordination with other federal agencies and state, local, and tribal governments, state that coordination must occur; they do not prescribe the methods necessary to meet the legal or regulatory requirements. Based on the coordination efforts describe above, the BLM and Forest Service have met the legal and regulatory requirements for coordination to date, as described in **Chapter 6**, Consultation and Coordination, of the Proposed LUPA/Final EIS.

Section 4.3 - Range of Alternatives

Summary

The comments were focused on several issues related to the alternatives presented in the Draft LUPA/EIS:

1. Commenters believed that the preferred alternative does not meet the stated purpose and need.
2. Commenters felt that the alternatives were largely the same, and that the BLM needed to provide more distinction (range) between the alternatives.

3. BLM needs to consider the alternatives presented by cooperating agencies and environmental organizations, including county proposed alternatives, the Sage-Grouse Recovery Alternative, and alternatives for the listing of the species or not listing the species.
4. The Draft LUPA/EIS fails to fully account for federal regulatory mechanisms that are currently in place and adequately address the threats to the species.
5. Commenters felt there was no methodology or scientific backing in the Draft LUPA/EIS for establishing the disturbance cap in the alternatives, and that the BLM and Forest Service needed to demonstrate more range in the disturbance cap amounts presented in the alternatives. There is also no discussion in the Draft LUPA/EIS of how this disturbance cap will be implemented.

Response

1. In accordance with NEPA, the BLM and Forest Service have discretion to establish the purpose and need for action (40 CFR 1502.13). CEQ regulations direct that an EIS "…shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 CFR 1502.13). Also, under the CEQ regulations, the BLM and the Forest Service are required to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act [NEPA]." (40 CFR 1501.2(c)). The breadth or narrowness of the purpose and need statement has a substantial influence on the scope of the subsequent analysis. The purpose and need statement provides a framework for issue identification and will inform the rationale for alternative selection. The range of alternatives developed is intended to meet the purpose and need, and address the issue; thereby, providing a basis for eventual selection of an alternative in a decision (BLM NEPA Handbook and Forest Service Handbook 1909.15 – National Environmental Policy Act Handbook Chapter 10 – Environmental Analysis).

   As stated in the Draft LUPA/EIS in Section 1.1, Introduction, the BLM and the Forest Service prepared this Utah Greater Sage-Grouse LUPA/EIS to be applied to lands with GRSG habitat. This effort responds to the US Fish and Wildlife Service's (USFWS) March 2010 'warranted, but precluded' listing petition decision, and that existing regulatory mechanisms in BLM and the Forest Service land use plans were inadequate to protect the species and its habitat. The range of alternatives, including the preferred alternative and its components (such as the disturbance caps), focus on areas affected by threats to GRSG habitat identified by the USFWS in its *12-Month Findings for Petitions to List the Greater Sage-Grouse* (Centrocercus urophasianus) *as Threatened or Endangered*. Formulated by the planning team, the preferred alternative represents those goals, objectives, and actions determined to be most effective at resolving planning issues, balancing resource use at this stage of the process, and meeting the stated purpose and need for action. While collaboration is critical in developing and evaluating alternatives, the final designation of a preferred alternative remains the exclusive responsibility of the BLM and Forest

Service. See Section 2.9, Preferred Alternative, of the Draft LUPA/EIS for further details.

As stated in the Draft LUPA/EIS in Section 1.7, Development of Planning Criteria, the LUPA will recognize all valid existing rights. The potential impacts on valid existing rights from management decisions in this plan amendment are further discussed in Section 4.20, Minerals, and Appendix R, Oil and Gas Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Occupied Habitat in Utah Sub-region, in the Draft LUPA/EIS.

2. The BLM and Forest Service considered a range of reasonable alternatives during the planning process in full compliance with the NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM and Forest Service consider reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. While there are many possible alternatives or actions to manage public lands and GRSG in the planning area, the BLM and Forest Service fully considered the management opportunities presented in the planning issues and criteria developed during the scoping process to determine a range of reasonable alternatives. In addition, question 2a of *NEPA's Forty Most Asked Questions* states that an EIS is required to examine all reasonable alternatives rather than all alternatives (46 *Federal Register* 18026 (1981)). As a result, five alternatives (including two subalternatives) were analyzed in detail in the Draft LUPA/EIS that best addressed the issues and concerns identified by the affected public. The range of alternatives in the Draft LUPA/EIS represented a full spectrum of options which address the issues of GRSG protection, including a no action alternative (current management, Alternative A), up to a conservation of all occupied GRSG habitat within Utah (Alternative C). Suggested alternatives that fit within the range of alternatives are considered to have been adequately analyzed and were not addressed separately.

   As described in Section 1.5, Planning Processes, of the Draft LUPA/EIS, the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The BLM and Forest Service complied with NEPA and the CEQ implementing regulations at 40 CFR 1500 in the development of alternatives for the Draft LUPA/EIS, including seeking public input and analyzing reasonable alternatives. The alternatives include management options for the planning area that would modify or amend decisions made in the BLM or Forest Service land use plans, as amended, to meet the planning criteria, to address issues and comments from cooperating agencies and the public, or to provide a range of reasonable alternatives. Since this is a plan amendment to address GRSG conservation, many decisions from the BLM and Forest Service land use plans are acceptable and reasonable.

   Public input received during the scoping process was considered to ensure that all issues and concerns would be addressed, as appropriate, in developing the alternatives. The planning team developed planning issues to be addressed in the

LUPA, based on broad concerns or controversies related to conditions, trends, needs, and existing and potential uses of planning area lands and resources.

Additionally, the four resulting action alternatives (Alternatives B, C, D, and E) offer a range of possible management approaches for responding to planning issues and concerns identified through public scoping, and to maintain or increase GRSG abundance and distribution in the planning area. While the goal is the same across alternatives, each alternative contains a discrete set of objectives and management actions, and constitutes a separate LUPA with the potential for different long-range outcomes and conditions. Each alternative was analyzed to determine the relative effects and impacts on GRSG as well on other land uses, resource constraints, and socioeconomics.

The relative emphasis given to particular resources and resource uses differs as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives. Meaningful differences among the five alternatives are described in Table 2.3, Summary Comparison of Alternatives by Decision, in the Draft LUPA/EIS.

As part of the alternatives development process, only alternatives that are considered practical and feasible from a technical and economic standpoint were considered for analysis in the Draft LUPA/EIS (CEQ's *NEPA's Forty Most Asked Questions*, question 2a; 46 *Federal Register* 18026 (1981)). Some alternatives were considered, but eliminated from analysis for a variety of reasons. See Section 2.8, Alternatives Considered but Eliminated from Detailed Analysis, in the Draft LUPA/EIS for explanations of these alternatives and why they were eliminated from consideration.

3. Based on this alternative development process, the BLM and Forest Service considered input from cooperating agencies, environmental organizations, and the public. As described in Section 2.1.2, Alternative B, of the Draft LUPA/EIS the BLM and Forest Service used the GRSG conservation measures in *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) to form management direction under Alternative B, which is consistent with the direction provided in BLM Instruction Memorandum (IM) 2012-044 (the BLM must consider all applicable conservation measures developed by the National Technical Team (NTT) in at least one alternative in the land use planning process).

   During scoping for the Utah Greater Sage-Grouse LUPA/EIS, individuals and conservation groups submitted management direction recommendations for protection and conservation of GRSG and their habitat, including the Sage-grouse Recovery Alternative and proposed disturbance cap. The recommendations, in conjunction with resource allocation opportunities and internal sub-regional BLM and Forest Service input, were reviewed in order to develop management direction for GRSG under Alternative C (Draft LUPA/EIS, Section 2.1.3, Alternative C).

Alternative D incorporates adjustments to the NTT report (NTT 2011) to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses, and was developed in full cooperation with the cooperating agencies; taking note of the agencies' concerns with socioeconomic issues.

Alternative E1 is based on the State of Utah's *Conservation Plan for Greater Sage-grouse in Utah,* and would apply to all BLM-administered and National Forest System lands located in Utah. Alternative E2 is based on the State of Wyoming's Governor's Executive Orders 2011-05 and 2013-3 with adjustments by the Forest Service interdisciplinary team, which includes members of the Wyoming Governor's Office.

In Section 2.8 of the Draft LUPA/EIS, the Garfield County Alternative was analyzed but not considered in detail in the Draft LUPA/EIS primarily because it is contained within the existing range of alternatives (see Section 2.8.6 of the Draft LUPA/EIS, County Sage-Grouse Management Plan). The disturbance concept of "no net loss" has been added to the Proposed LUPA/Final EIS in the Proposed Plans.

Whether GRSG is listed as threatened or endangered by the USFWS is outside the jurisdiction of the BLM and Forest Service and beyond the scope of this EIS. As noted in the Purpose and Need, the BLM and Forest Service were to consider regulatory mechanisms that would protect the species and its habitat. As such, the BLM and Forest Service did not develop alternatives should the USFWS choose to list or not list the GRSG (see Section 2.8.9, USFWS-Listing Alternative, of the Draft LUPA/EIS).

4. The BLM is currently in full compliance with existing laws, rules, regulations, and policy, including BLM Manual 6840, Special Status Species Management, rangeland health regulations, found at 43 CFR 4180.2, 36 CFR 219 42 and Forest Service Manual 1920, and Forest Service Handbook 1909.12. As discussed in the USFWS's *12-Month Findings for Petitions to List the Greater Sage-Grouse* (Centrocercus urophasianus) *as Threatened or Endangered*, these current existing regulatory mechanisms have not been sufficient to prevent GRSG habitat loss or population declines. See Section 2.8.8, BLM Policies and Regulations, of the Draft LUPA/EIS for a detailed explanation on why an alternative based on compliance with BLM Manual 6840 and rangeland health regulations was considered but excluded from detailed analysis.

5. In determining the disturbance cap level for each alternative, the BLM and Forest Service utilized the recommendations and input specific to each alternative. For example, for Alternative B, the BLM and Forest Service utilized the cap levels recommended in the NTT report. Conservation measures included in Alternative B focus primarily on PHMA and include a 3-percent disturbance cap in PHMA. PHMA areas have the highest conservation value to maintaining or increasing GRSG populations. Ample literature establishes a relationship between disturbance, and GRSG occupancy and persistence. Two papers in particular establish thresholds of disturbance related to development and GRSG persistence. Section 4.2.2,

Alternative A, of the Draft LUPA/EIS, specifically references to Kirol 2012 and Knick 2013, which are recent studies done on disturbance thresholds and GRSG. Based on this literature, the alternatives consider a range of appropriate disturbance caps.

While the disturbance caps would set a particular level of disturbance, the implementation of the disturbance caps would occur after the LUPA is approved in the record of decision (ROD). The BLM and Forest Service inventoried the habitat with the best available information at the time of the Draft LUPA/EIS, but would also perform additional in-depth analysis and inventory within WAFWA Management Zones in Utah at the implementation stage. The BLM and Forest Service have added **Appendix L**, Baseline Disturbance Inventory, in the Proposed LUPA/Final EIS to more accurately assess current disturbance levels and potential impacts across the planning area. In addition, **Appendix E**, Greater Sage-Grouse Disturbance Cap Guidance, was added to provide additional detail such as enhanced descriptions of what types of activities would count towards the disturbance totals, where disturbance activities would count against the cap, reclamation and habitat requirements for a disturbed area for both temporary and permanent disturbance, and how the cap would be implemented, calculated, and monitored.

Future activities that are expected to cause disturbance, such as ROW/special use permit (SUP) applications, would be evaluated and approved on a case-by-case basis based upon site-specific determination of ability to avoid, minimize, and/or mitigate impacts on GRSG habitat at the implementation phase. A proposed project's contribution to the amount of disturbance on the landscape will be evaluated during site-specific NEPA analysis. Per requirements of the NEPA, the BLM and Forest Service consider disturbance on private lands when making land use decisions since actions on private lands could impact the agencies' ability to manage GRSG. So while the BLM and Forest Service cannot make planning or implementation decisions on private lands, the disturbance levels of nearby private lands will be considered in this planning process and future project-level decisions. Clarifications to the document have been made in the Proposed Plan Amendments (**Section 2.6**) and **Appendix E** of the Proposed LUPA/Final EIS.

Section 4.4 - Best Available Information and Baseline Data

Summary

The Draft LUPA/EIS did not provide sufficient affected environment information to meet NEPA requirements, and failed to include local and site-specific information.

Response

The CEQ regulations require an EIS to "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The description shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Agencies shall avoid useless bulk in statements and shall concentrate effort and attention on important issues" (40 CFR 1502.15). Additionally, the Utah Greater Sage-Grouse LUPA/EIS is a programmatic NEPA effort to conserve GRSG and

its habitat across a broad geographic area. As such, the BLM and the Forest Service described the current conditions and trends in the affected environment broadly, across a range of conditions, appropriate to program-level land use planning actions.

The BLM and the Forest Service complied with these regulations in describing the affected environment. The requisite level of information necessary to make a reasoned choice among the alternatives in an EIS is based on the scope and nature of the proposed decision. The affected environment provided in Chapter 3, Affected Environment, and various appendices in the Draft LUPA/EIS, including Appendices A, N, O, P, and Q, is sufficient to support, at the general land use planning-level of analysis, the environmental impact analysis resulting from management actions presented in the Draft LUPA/EIS. For example, listing every water quality-impaired stream within the planning area by name would not provide useful information at this broad-scale analysis, particularly where the proposed plan alternatives did not vary the level of riparian protections to provide reduced levels for nonimpaired streams. The riparian protections within each alternative were applied to all streams, whether or not they were water quality-impaired. However, understanding the miles of impaired streams, as presented in the Draft LUPA/EIS at Section 3.6.1, Conditions Statewide, of the Draft LUPA/EIS is useful in establishing a baseline by which the BLM and Forest Service may analyze the relative effects of each alternative's broad-based approach.

Since this is a programmatic effort, county-by-county or planning-by-planning area level of detail is not consistent with the level of detail required for a programmatic analysis. Programmatic documents are regional in scope and place emphasis on developing broad environmental policies, programs, or plans. Site-specific data is important during implementation level decisions, which may be tiered to the decisions made in this document. Data scales include broad scale, midscale, fine scale, and site scale. The Utah Greater Sage-Grouse LUPA/EIS utilizes midscale (e.g., Western Association of Fish and Wildlife Agencies [WAFWA] Management Zones) and fine scale (e.g., sub-region data). The Draft LUPA/EIS uses the best available information as generated and provided by the organizations and agencies with authority, and special expertise to provide that information on a planning scale.

The LUPA/EIS contains only planning actions and does not include any implementation actions. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM and Forest Service will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. Site-specific concerns and more detailed environmental descriptions will be addressed when project-level reviews are tiered to the analysis in this LUPA/EIS (40 CFR 1502.20, 40 CFR 1508.28). In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for any site-specific actions.

The BLM and Forest Service added an additional appendix in the Proposed LUPA/Final EIS describing preliminary baseline disturbance information in (see **Appendix L**), including a methodology for how baseline disturbance was calculated. Information that the BLM and Forest Service determined necessary to provide more complete information was also added to the document to help arrive at a final decision, including GRSG population data in **Table 3.2**,

Estimated Population and Acres of GRSG Habitat within Population Areas, of the Proposed LUPA/Final EIS.

Section 4.5 - GIS Data and Analysis

Summary

The BLM and Forest Service has failed to take the "hard look" required by NEPA because it failed to use adequate baseline data for its analysis. Commenters noted several issues with the Geographic Information System (GIS) data and analysis conducted in the Draft LUPA/EIS:

1. The maps and data layers do not provide enough detail to address "local ecological site variability". The data are too course and do not provide assurances to more localized decision making; some habitat type areas are inaccurately identified in the maps.
2. BLM and Forest Service used old data layers to develop maps, including PPMA [now known as PHMA], PGMA [now known as GHMA], and population area boundaries; BLM and Forest Service should use the newer data layers that local and state agencies developed.
3. The agencies must provide a mechanism to ground-truth the proposed PPMA and PGMA [now known as PHMA and GHMA] habitats on a project-specific basis in order to effectively assess the potential impacts of management decisions.

Response

Before beginning the Utah Greater Sage-Grouse LUPA/EIS and throughout the planning effort, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The LUPA/EIS data and information is presented in map and table form, and is sufficient to support the broad-scale analyses required for land use planning.

Additionally, the BLM and the Forest Service consulted with, collected, and incorporated data from other agencies and sources, including but not limited to the USFWS, the Utah Division of Wildlife Resources, and the Public Lands Policy Coordination Office within the Governor's Office. Considering GRSG related data layers, including occupied habitat, GRSG management areas, and lek data, the Utah Division of Wildlife Resources is continually collecting and refining population and habitat data for species, and the Draft LUPA/EIS notes that the BLM and Forest Service would incorporate any refinements or updates once the data was made available.

As a result of these actions, the data gathered by the BLM and Forest Service is of the appropriate scale and provided an adequate analysis that led to an adequate disclosure of the potential environmental consequences of the alternatives.

A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive gathering and monitoring of baseline data. The baseline data provides the necessary basis to make informed land use plan-level decisions. Land use plan-level analyses are typically broad and qualitative rather than focused on site-specific actions (BLM Land Use Planning

Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29; Forest Service Handbook 1909.12 – Land Management Planning). The BLM and Forest Service will conduct subsequent project-specific NEPA analyses for projects proposed for implementation under the land use plan. The subsequent NEPA analyses for project-specific actions will tier to the land-use planning analysis and evaluate project impacts at the appropriate site-specific level (40 CFR 1502.20, 40 CFR 1508.28). As required by NEPA, the public will have the opportunity to participate in the NEPA process for site-specific actions.

Commenters noted that in the discussion of the data from the Baseline Environmental Report (BER), "…some local data may have been omitted." (Draft LUPA/EIS, Section 3.1). Since the BER report covers many states across the western United States, broad-scale national data were deemed to be the most consistent data available. As such, data that may also be collected at a state-wide level by different state agencies were omitted from that report. This allows for a more consistent comparison across state and sub-region boundaries. State data was utilized in the document for other purposes that did not require a region-wide comparison. County-level data was deemed to be too fine scale for the purposes of this analysis.

Section 4.6 - Indirect Impacts

Summary

Indirect impacts discussed in the Draft LUPA/EIS are inadequate because the environmental consequences of the no action alternative (Alternative A) compared with the other alternatives do not differentiate between actual impacts and theoretical impacts.

The Draft LUPA/EIS fails to accurately describe the assumptions used to complete big game and impact analysis.

Response

Chapter 4, Environmental Consequences, of the Draft LUPA/EIS presents the impacts anticipated from the various alternatives based on best available science and professional judgment. Effects from the current management situation are described in Chapter 3 and projected impacts from each alternative are identified in Chapter 4.

As required by 40 CFR 1502.16, the Draft and Final LUPAs/EISs provides a discussion of the environmental impacts of the alternatives including the no action alternative, any adverse environmental effects that cannot be avoided should the alternatives be implemented (e.g., impacts from existing infrastructure), the relationship between short-term uses of the built environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. The Draft and Final LUPAs/EISs provide sufficiently detailed information to aid in determining whether to proceed with the preferred alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1.

Because land use plan-level decisions are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B

at 11-13 and Chapter IV, B at 29; Forest Service Handbook 1909.12 – Land Management Planning), the associated analyses are correspondingly high level.

As stated in **Section 4.2.1**, the discussion of impacts is based on best available data. Knowledge of the planning area and decision area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited.

Section 4.7 - Cumulative Impacts

Summary

The BLM and Forest Service need to consider the cumulative effects of the adjoining sub-regional GRSG planning efforts, and the other actions occurring on state and private lands in the Proposed LUPA/Final EIS, including reasonably foreseeable future actions on private lands, which were omitted from the Draft LUPA/EIS.

Response

The BLM and Forest Service have complied fully with the requirements of 40 CFR 1508.7 and prepared a cumulative impact analysis to the extent possible based on the broad nature and scope of the proposed management options under consideration at the land use planning level. The BLM and Forest Service thoroughly explained their consideration and analysis of cumulative effects in the Draft LUPA/EIS in Section 4.24, Cumulative Impacts. The Draft LUPA/EIS considered the present effects of past actions, to the extent that they are relevant, and present and reasonably foreseeable (not highly speculative) federal and nonfederal actions, taking into account the relationship between the proposed alternatives and these reasonably foreseeable actions. This discussion summarizes CEQ guidance from June 24, 2005, stating that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. Information on the current conditions is more comprehensive and more accurate for establishing a useful starting point for cumulative effects analysis. The BLM and Forest Service explicitly described their assumptions regarding proposed projects and other reasonably foreseeable future actions. On National Forest System lands, reasonably foreseeable actions are those that would occur under their current land use plans from a broad-scale perspective. Additionally, as the analysis is broad scale, it is not limited to effects on just federally-administered lands, but looks across jurisdictional boundaries. While decisions made from this EIS will only apply to BLM-administered and National Forest System lands, the analysis was conducted statewide regardless of land status to facilitate statewide planning.

The Draft LUPA/EIS contains a qualitative discussion of cumulative effects at the WAFWA Management Zone scale to set the stage for a more quantitative analysis contained in the Proposed LUPA/Final EIS. Additional quantitative cumulative analysis was added to the Proposed LUPA/Final EIS in **Section 5.4**, Special Status Species – Greater Sage-Grouse.

Per 40 CFR 1503, the BLM provided cooperating agencies the opportunity to comment on cumulative impacts and reasonably foreseeable future actions during both the comment period for the administrative draft LUPA/EIS and the public comment period for the Draft LUPA/EIS.

All reasonably foreseeable future actions that cooperating agencies provided were added to **Table 5.2**, Reasonably Foreseeable Future Actions, in the Proposed LUPA/Final EIS.

Section 4.9 - Monitoring and Mitigation

Summary

1. BLM and Forest Service need to release the monitoring strategy for public comment and produce a supplemental EIS to address this change.
2. The Proposed LUPA/Final EIS needs to clarify the relationship between the disturbance thresholds and the monitoring framework.

Response

The Draft LUPA/EIS included a description of the monitoring framework, mitigation strategy, and adaptive management in Chapter 2, Alternatives. The Draft LUPA/EIS also included a monitoring framework and mitigation strategy in the Appendices. These sections of the Proposed LUPA/Final EIS have been revised with more detailed information (**Sections 2.7.1**, Adaptive Management Plan, **2.7.2**, Monitoring for the Greater Sage-Grouse Planning Strategy, and **2.7.3**, Regional Mitigation, and **Appendix B**, Adaptive Management, **Appendix C**, Greater Sage-Grouse Monitoring Framework, and **Appendix D**, Mitigation Strategy Utah Greater Sage-Grouse LUPA).

The Greater Sage-Grouse Monitoring Framework in **Appendix C** of the Proposed LUPA/Final EIS outlines the methods that the BLM and Forest Service will use to monitor, and evaluate, the implementation and effectiveness of the planning strategy and the land use plans to conserve the species and its habitat. The regulations for the BLM (43 CFR 1610.4-9) and the Forest Service (36 CFR 219.12) 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.

Implementation monitoring results will provide information to allow the BLM and Forest Service to evaluate the extent that the decisions from the BLM resource management plans and Forest Service land and resource management plans to conserve GRSG and their habitat have been implemented. Effectiveness monitoring will provide the information to evaluate whether BLM and Forest Service actions achieve the objective of the planning strategy (BLM IM 2012-044) and the conservation measures contained in the land use plans to conserve GRSG populations and their habitats.

Monitoring efforts will include data for measurable quantitative indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions. This information will assist the BLM and the Forest Service with identifying whether or not they are achieving their land use plan goals and objectives, reaching an adaptive management soft or hard trigger, as well as providing information relative to the disturbance cap. Specifically, habitat degradation (percent of human activity in a biologically significant unit), habitat availability (percent of sagebrush in a biologically significant unit), and habitat degradation intensity (density of energy facilities and mining locations) were gathered to inform the disturbance cap objective (MA-GRSG-3 of the BLM Proposed Plan Amendment, and GRSG-GEN-ST-001 of the Forest Service-Utah Proposed Plan Amendment).

Mitigation will be applied to all implementation actions/decisions that take place on federal lands within GRSG habitat during the life of this plan amendment. The mitigation strategy (**Appendix D** of the Proposed LUPA/Final EIS) was developed to follow the BLM's Regional Mitigation Manual MS-1794, Forest Service Handbook FSH 1909.15, and CEQ 40 CFR 1508.20.

The Mitigation Strategy, through the mitigation hierarchy, guides the BLM and Forest Service. The hierarchy direction is to first, avoid impacts entirely by not taking a certain action or parts of an action, second, if unable to avoid, minimize impacts by limiting the degree or magnitude of an action or parts of an action, and lastly, if avoidance or minimizing is not possible, compensate impacts associated with future implementation actions. If residual impacts to GRSG from implementation-level actions remain after applying avoidance or minimization measures, then compensatory mitigation projects will be used to offset the residual impacts in an effort to achieve the land use plan goals and objectives. As articulated in **Appendix D** of the Proposed LUPA/Final EIS, compensatory mitigation will occur on sites that have the potential to yield the greatest conservation benefit to the GRSG, regardless of land ownership. These sites should be sufficiently "durable." According to BLM Manual 1794, durability is defined as "the administrative, legal, and financial assurances that secure and protect the conservation status of a compensatory mitigation site, and the ecological benefits of a compensatory mitigation project, for at least as long as the associated impacts persist.

Specific mitigation strategies, based on the Mitigation Strategy Utah Greater Sage-Grouse LUPA (**Appendix D**), will be developed by regional teams (at the WAFWA Management Zone level) within one year of the issuance of the ROD. These strategies will guide the application of the mitigation hierarchy to address GRSG impacts within that WAFWA Management Zone. The WAFWA Management Zone Regional Mitigation Strategy will be applicable to BLM-administered and National Forest System lands within the Zone's boundaries. Subsequently, the BLM and Forest Service's NEPA analyses for implementation-level decisions that might impact GRSG will include analysis of mitigation recommendations from the relevant WAFWA Management Zone Regional Mitigation Strategy(ies).

Section 5 - FLPMA

Summary

The alternatives are overly focused on protecting GRSG, would unnecessarily restrict energy development, and they don't meet FLPMA's multiple use mandate requirement. BLM and Forest Service must comply with the provisions in FLPMA and the Multiple-Use Sustained-Yield Act of 1960 (16 USC 528–531) related to closing areas of 5,000 and 100,000 acres to minerals or other uses.

Response

As stated on page 2-3 of the Draft LUPA/EIS, the alternatives "meet the purpose and need for the LUPA." The LUPA is a targeted amendment specifically addressing goals, objectives, and conservation measures to conserve GRSG and respond to USFWS's *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* that the GRSG is "warranted" to be listed under the Endangered Species Act (see Proposed LUPA/Final EIS **Section 1.2**, Purpose and Need).

FLPMA (Section 103(c)) defines "multiple use" as the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. Accordingly, the BLM is responsible for the complicated task of striking a balance among the many competing uses to which public lands can be put. The BLM's multiple-use mandate does not require that all uses be allowed on all areas of the public lands. The purpose of the mandate is to require the BLM to evaluate and choose an appropriate balance of resource uses which involves tradeoffs between competing uses. The FLPMA also directs the BLM to develop and periodically revise or amend its resource management plans, which guide management of BLM-administered lands, and provides an arena for making decisions regarding how public lands would be managed and used.

Consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 USC 528–531), the Forest Service manages National Forest System land to sustain the multiple use of its renewable resources in perpetuity while maintaining the long-term health and productivity of the land. Resources are managed through a combination of approaches and concepts for the benefit of human communities and natural resources. Land management plans guide sustainable, integrated resource management of the resources within the plan area in the context of the broader landscape, giving due consideration to the relative values of the various resources in particular areas. The Forest Service is required by statute to have a national planning rule: the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, requires the Secretary of Agriculture to issue regulations under the principles of the Multiple-Use Sustained-Yield Act of 1960 for the development and revision of land management plans.

Both the BLM's and Forest Service's planning processes allowed for analysis and consideration of a range of alternatives in the Draft LUPA/EIS that identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. The Draft LUPA/EIS includes alternatives that provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights.

The BLM is aware of their requirements to notify the US Congress under Sections 202 and 204 of FLPMA. When the BLM makes a decision on such actions, which will occur when the ROD is finalized, the appropriate notifications related to the decision made at that time will be submitted to the US Congress, as necessary.

Section 5.1 - Inventories

Summary

The BLM should complete detailed habitat assessments on a project-by-project basis since the data is not at a fine enough scale to determine where non-GRSG habitat exists in mapped habitat areas.

Response

As part of the LUPA process, the BLM and Forest Service will make land use planning decisions and utilize data appropriate for that scale of planning and analysis. Conducting field investigations prior to construction is a standard requirement at the implementation level, with involvement of

private industry, the BLM or Forest Service, and other appropriate parties. The LUPA/EIS does not define who will conduct these investigations since this decision will be made at the implementation level. See response in **Section 4.9**, Monitoring and Mitigation, of this comment report for details on the monitoring framework and mitigation strategy.

Section 5.2 - Consistency with Other State, County, or Local Plans

Summary

The BLM's actions considered in the alternatives conflict with local and state agency plans and policies; furthermore, the BLM did not coordinate with agencies to ensure that conservation measures are as consistent as possible with other planning jurisdictions. A request was made for BLM to provide a detailed listing of every federal law that overrides county plans with an accompanying description of the limits of the law and its impacts on county plan, program, and policy.

Response

To the extent possible under existing law, the BLM's land use plans must be consistent with officially approved or adopted resource-related plans of Indian tribes, other Federal agencies, and State and local governments (see 43 CFR 1610). The BLM has worked closely with State and local governments during preparation of the Draft LUPA/EIS. The Draft LUPA/EIS lists the cooperating agencies actively involved in the planning process in Section 5.3, Cooperating Agencies. As described in Section 5.4, Coordination and Consistency, of the Draft LUPA/EIS, the BLM requested the state, county, and tribal government cooperating agencies assist in the consistency reviews by reviewing the range of alternatives associated with the Draft LUPA/EIS, and identify potential inconsistencies between the alternatives and each agency's applicable plans. This allows the state, local, and tribal cooperating agencies to use their special expertise regarding the familiarity with their own state, local, or tribal plans. On the local level, it is a county's responsibility to accurately identify and communicate any inconsistencies between that county's plan and the proposed alternative.

The BLM works to find a balance among uses and needs as reflected in these local government plans, and has done so in the preparation of the LUPA/EIS; a list of these plans can be found in Section 1.8, Relationship to Other Policies, Plans, and Programs, of the Draft LUPA/EIS. The BLM is aware that there is specific State or local laws relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA requires that BLM's land use plans be consistent with State and local plans "to the extent…practical." In a situation where State and local plans conflict with federal law, there will be an inconsistency that cannot be resolved. Thus, while State, county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations. While the BLM is not obligated to seek consistency, the agency is required to describe the inconsistencies between the proposed action and the other plans, policies, and/or controls within the EIS, so that the State and local governments have a complete understanding of the impacts of the Proposed Plan on State and local management options. This information has been updated in the Proposed LUPA/Final EIS in **Section 1.8**, Relationship to Other Policies, Plans, and Programs.

The BLM coordinates with cooperating agencies commensurate with each agency's recognized jurisdiction or expertise. In areas where the State of Utah has clear jurisdiction, such as wildlife populations, the BLM has worked closely with that State agency. In cases where a county or agency has expertise, such as local county socioeconomic information, the BLM has worked closely with the group to incorporate the information into the EIS.

State of Wyoming Executive Order 2013-3 identifies GRSG core population areas, which are located across the state. The Executive Order also identifies the management actions and allowable uses within GRSG core habitat and noncore habitat areas in the State of Wyoming. This strategy is the basis of Alternative E2 being considered in the Draft LUPA/EIS. The Utah Greater Sage-Grouse Proposed LUPA/Final EIS will be consistent with the Wyoming Greater Sage-Grouse Proposed LUPA/Final EIS.

Section 5.4 - Forest Service Planning Role

Summary

Forest Service should have used the 2012 planning regulations and must explain why they used the 1982 regulations.

Response

The BLM and the Forest Service began working together to address conservation of GRSG and its habitat in 2010. At that time, the Forest Service's 2012 Planning Rule was not final; it became final May 9, 2012. For plan amendments initiated before May 9, 2012, the Forest Service may complete and approve the amendments under the prior planning regulations, including its transition provisions (36 CFR part 219, published at 36 CFR parts 200 to 299, revised as of July 1, 2010). Land use plan amendments associated with the GRSG conservation effort are using the 1982 planning rule procedures that are allowed under the transition procedures of the prior planning rule. The 1982 planning rule procedures may be found in 36 CFR parts 200 to 299, Revised as of July 1, 2000 or at http://www.fs.fed.us/emc/nfma/includes/nfmareg.html.

Section 6 - Other Laws

Summary

The BLM has failed to document how the EIS and/or actions considered in the EIS comply with other laws, including the Surface Mining Control and Reclamation Act, Data Quality Act, Regulatory Flexibility Act, Onshore Orders regulating oil and gas development, Energy Policy Act of 2005, Energy Policy and Conservation Act of 2000, Mining and Minerals Policy Act of 1970, Federal Advisory Committee Act, 2000 Defense Department Appropriations Act, and the Taylor Grazing Act.

Response

In Section 1.8.1, Planning Criteria, of the Draft LUPA/EIS, there is a criterion stating that all alternatives would comply with existing laws, regulations, and policies. The BLM and Forest Service have reviewed all actions in the Proposed LUPA/Final EIS and found them to be consistent and within the bounds of all required laws, regulations, and policies.

Section 7 – Greater Sage-Grouse

Section 7.1 - NTT Report/Findings

Summary

Commenters had two opposing views regarding the NTT report. One group suggested that the BLM and Forest Service should not use the NTT report for various reasons, including that it:

- Is not based on local conditions.
- Has methodological and technical errors.
- Was not peer-reviewed.
- Has authors with conflicts of interests.

In addition, BLM IM 2012-044 directing consideration of the NTT report expired in September 2013, prior to the release of the Draft LUPA/EIS, and thus the NTT report does not need to be considered. The agencies have not justified the need for using the NTT report as the basis for GRSG management direction.

Another group suggested that the BLM and Forest Service did not go far enough in conserving GRSG by weakening the recommendations of the NTT report; the findings in the NTT report should have been used as is, without any changes.

Response

The NTT report was not the sole source of management decisions for the range of alternatives. A NTT was formed as an independent, science-based team to ensure that the best information about how to manage the GRSG is reviewed, evaluated, and provided to the BLM and Forest Service in the planning process. The group produced a report in December 2011 that identified science-based management considerations to promote sustainable GRSG populations. The NTT report was intended to be used at a programmatic scale and may not reflect local conditions. The NTT report was a synthesis of peer-reviewed literature. The NTT report cited 122 references including published papers from formal scientific literature such as Journal of Wildlife Management, Conservation Biology, Biological Conservation, Wildlife Biology, BioScience and others, as well as graduate theses and dissertations, conservation strategies, USFWS 2010 finding, and others representing the best available science.

GRSG conservation measures in *A Report on National Greater Sage-grouse Conservation Measures* (NTT 2011) were used to form the BLM and Forest Service management direction under Alternative B, which is consistent with the direction provided in BLM IM 2012-044 and Forest Service Interim Conservation Recommendations for Greater Sage-Grouse and Greater Sage-Grouse Habitat (2012). The BLM IM required the BLM to consider all applicable conservation measures developed by the NTT in at least one alternative in the land use planning process. Forest Service recommendations provided similar guidance for National Forest System lands until the RODs are signed.

The BLM is implementing IM 2012-044 through the National GRSG planning effort. When an IM expires without being superseded, it can still be applicable and provide guidance to the BLM.

The fact that IM 2012-044 expired does not mean the BLM has no authority to continue to analyze the conservation measures identified in the NTT report. The BLM is appropriately considering and evaluating the measures in the NTT report, in addition to any other relevant science, through the National GRSG planning process.

Section 7.3 – COT Report

Summary

Commenters felt that the USFWS Conservation Objectives report (COT report) was flawed for various reasons, including:

- Data quality issues and not representing the best available information.
- Subjectivity and overly biased.
- Not being comprehensive.
- Conflict of interest among peer reviewers.

As a result, commenters felt it should not have been used as the basis of the EIS alternatives.

Response

In March 2012, the USFWS initiated a collaborative approach to develop range-wide conservation objectives for the GRSG to inform the 2015 decision about the need to list the species and to inform the collective conservation efforts of the many partners working to conserve the species. In March 2013, this team of state and USFWS representatives released the COT report based upon the best scientific and commercial data available at the time that identifies key areas for GRSG conservation, key threats in those areas, and the extent to which they need to be reduced for the species to be conserved. The report serves as guidance to federal land management agencies, state GRSG teams, and others in focusing efforts to achieve effective conservation for this species. The USFWS will use the COT report to evaluate the alternatives and measure the sufficiency of regulatory mechanisms in reducing threats for the various priority areas for conservation.

Additionally, none of the alternatives in the Draft LUPA/EIS are exclusively based on the COT report recommendations. For example, Alternative D incorporates adjustments to the NTT report (NTT 2011) based on interdisciplinary team and cooperating agency input, and addresses local ecological site variability to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. During development of the Proposed LUPA/Final EIS, the BLM and Forest Service have continued to work with the USFWS to ensure the proposed plan meets the COT objectives to the extent possible.

Section 7.4 - Policy Guidance

Summary

The BLM and Forest Service failed to acknowledge that the agencies already have existing guidance and policies to manage for special status species, including candidate species such as GRSG.

Response

The BLM and Forest Service do have existing laws, regulations, and guidance for special status species including GRSG. These are listed in Section 1.7.1, Preliminary Planning Criteria, and Section 1.8, Relationship to Other Policies, Plans, and Programs, of the Draft LUPA/EIS. While such relevant guidance does exist, the USFWS finding stated that "existing regulatory mechanisms are inadequate to protect the species. The absence of adequate regulatory mechanisms is a significant threat to the species, now and in the foreseeable future." This National GRSG planning process is intended to provide more specific, planning-level direction for land managers in order to conserve GRSG and by providing consistent regulatory mechanisms to further GRSG conservation.

Section 7.5 - Range of Alternatives

Summary

Commenters provided specific recommendations to meet the COT report objectives. Commenters had specific issues with the range of management actions specific to GRSG:

- The need for changes or additions to the existing alternatives and maps, such as the noise level considerations, requirements for review by a GRSG implementation working group, and survey requirements.
- Management actions are arbitrary, without scientific backing. Commenters also suggested new literature that should be included in the alternatives.
- The BLM needs to provide more details on various aspects of the alternatives for clarification, including wintering habitat, buffers, and disturbance cap.
- The BLM considered an insufficient range of alternatives.
- The BLM needs to explain the scientific basis and methodology for its identification of PPMA and PGMA [now known as PHMA and GHMA].
- Site-specific decisions (Conditions of Approval [COAs]) should be removed from the Proposed LUPA/Final EIS.

Response

As described in Sections 7.1, NTT Report/Findings, and 7.3, COT Report, in this comment report, the BLM and Forest Service used the best available scientific data, including recent sources such as published scientific literature, the COT report, NTT report, and the BER to develop management recommendations, strategies and regulatory guidelines to meet GRSG management objectives in the 2006 WAFWA Greater Sage-grouse Comprehensive Conservation Strategy.

Through this land use planning process, the BLM and Forest Service identified PHMA and GHMA. PHMA are BLM-administered and National Forest System lands identified to be managed as having the highest value to maintaining sustainable GRSG populations. GHMA are BLM-administered and National Forest System lands identified as requiring special management to sustain GRSG populations, but that are not as important as PHMA. The PHMA and GHMA are derived from and generally follow the preliminary priority habitat and preliminary general habitat boundaries, respectively, but have been modified in extent based on the objectives of

each alternative. Likewise, management strategies applied to the PHMA and GHMA may vary by alternative.

Several commenters provided additional citations, references, and information to be considered as part of the Draft LUPA/EIS. The BLM and Forest Service reviewed the suggested studies and references to determine if they presented new information that would need to be incorporated into the Proposed LUPA/Final EIS, were references already included in the Draft LUPA/EIS, or if the references provided the same information as already used or described in the Draft LUPA/EIS. Any study or reference that provided new relevant information was incorporated into the Proposed LUPA/Final EIS.

Impacts on wintering GRSG and habitats are discussed in Section 4.2, Special Status Species – Greater Sage-Grouse, of the Draft LUPA/EIS. Restoration of historical GRSG habitat is considered in that section.

As noted above in the response in **Section 4.3**, Range of Alternatives, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah GRSG LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The agencies considered a range of alternatives that would meet the purpose and need. Section 2.8, Alternatives Considered but Eliminated from Detailed Analysis, in the Draft LUPA/EIS, provides rationale regarding alternatives that would not meet the purpose and need. The alternatives developed support a broad-scale analysis of the planning area and are substantially different than the alternatives and information needed to support site-specific analysis of projects. COAs are an implementation level action but are appropriately disclosed at this programmatic planning level.

Also as previously noted, the relative emphasis given to particular resources and resource uses differs as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives. Meaningful differences among the five alternatives are described in Table 2.1, Description of Alternatives A, B, C1, C2, D, E1, and E2, of the Draft LUPA/EIS.

Section 7.6 - Best Available Information and Baseline Data

Summary

Commenters provided several references and studies that the BLM and Forest Service did not consider in the Draft LUPA/EIS but should include or consider in the Proposed LUPA/Final EIS. Also, commenters questioned the accuracy and validity of the NTT report.

Response

As described in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The LUPA/EIS data and information is presented in map and table form and is sufficient to support the broad-scale analyses required for land use planning.

Several commenters provided additional citations, references, and information to be considered as part of the Proposed LUPA/Final EIS. The BLM and Forest Service reviewed the suggested studies and references to determine if they presented new information that would need to be incorporated into the Proposed LUPA/Final EIS, were references already included in the Draft LUPA/EIS, or if the references provided the same information as already used or described in the Draft LUPA/EIS. Any study or reference that provided new relevant information was incorporated into the Proposed LUPA/Final EIS. The new information does not result in impacts not previously considered and analyzed within the spectrum of the alternatives in the Draft EIS, nor does it present a seriously different picture of the impacts.

Section 7.1, NTT Report/Findings, of this comment report details the accuracy and validity of the NTT report.

Section 7.7 - Impact Analysis

Summary

The BLM should revise some of their assumptions, including the assumption that the analysis did not include historic or potential habitat. The Draft LUPA/EIS fails to adequately analyze the impacts on GRSG and its habitat from other wildlife, infrastructure, grazing, and travel. The Draft LUPA/EIS fails to accurately describe the nature and type of effects to GRSG and their habitat from existing resource uses and activities. The Draft LUPA/EIS fails to analyze the effectiveness of current rangeland health standards. The BLM and Forest Service did not do enough analysis of impacts to GRSG outside PH and GH [now known as PHMA and GHMA]. The Draft LUPA/EIS is not consistent in its evaluation of indirect impacts associated with various disturbances. The thresholds concept is not adequately analyzed.

The BLM did not do enough analysis for actions in the priority habitat areas.

The Draft LUPA/EIS fails to analyze the impacts to GRSG from hunting.

Response

The Proposed LUPA/Final EIS provides an updated and expanded discussion of the environmental consequences, including the assumptions and disturbance thresholds, of the presented alternatives in **Section 4.3**, Special Status Species – Greater Sage-Grouse. As required by 40 CFR 1502.16, the Proposed LUPA/Final EIS provides a discussion of the environmental impacts of the alternatives including the proposed action, any adverse environmental effects that cannot be avoided should the alternatives be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources should the proposal be implemented. The Proposed LUPA/Final EIS provides sufficiently detailed information to aid in determining whether to proceed with the proposed plan in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1.

Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29; Forest Service Handbook 1909.12 – Land Management Planning). The LUPA/EIS contains only planning actions and does not include any implementation actions.

A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM and Forest Service will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

In its 12 month finding, the USFWS determined that the threat of hunting, "is not significant to the species such that it causes the species to warrant listing under the Act" (75 Federal Register 13966, March 23, 2010). Thus hunting was not analyzed in detail in the Draft LUPA/EIS. However, changes have been made to the Proposed LUPA/Final EIS to include more discussion regarding how the Utah Division of Wildlife Resources regulates hunting (**Section 1.6.3**, Issues Eliminated from Detailed Analysis), in addition to a description about hunting under applicable population areas (**Section 3.3.5**, Conditions in Population Areas).

Section 7.8 - Cumulative Impact Analysis

Summary

Commenters suggested that the BLM did not address the cumulative impacts of the GRSG actions on non-BLM-administered lands or non-National Forest System lands adequately. Commenters questioned the accuracy of cumulative impact analysis by WAFWA management zone.

Response

As described in **Section 4.7**, Cumulative Impacts, of this comment report, the BLM and Forest Service analyzed cumulative effects in the Draft LUPA/EIS in Section 4.24.3, Special Status Species – Greater Sage-Grouse. This discussion summarizes CEQ guidance from June 24, 2005, stating that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. Information on the current conditions is more comprehensive and more accurate for establishing a useful starting point for cumulative effects analysis. The CEQ interpretation was accepted by the Ninth in NW Envtl. Advoc. v. Nat'l Marine Fisheries Serv., 460 F.3d 1125, 1141 (9th Cir. 2006). The BLM and Forest Service explicitly described their assumptions regarding proposed projects and other reasonably foreseeable future actions. On National Forest System lands, reasonably foreseeable actions are those that would occur under their current land use plans from a broad-scale perspective.

The BLM and Forest Service have complied with the requirements of 40 CFR 1508.7 and prepared a cumulative impact analysis to the extent possible based on the broad nature and scope of the proposed management options under consideration at the land use planning level.

The cumulative effects analysis on GRSG has been updated in the Proposed LUPA/Final EIS (**Section 5.4**, Special Status Species – Greater Sage-Grouse) to include an expanded discussion of cumulative effects and a quantified analysis by WAFWA Management Zones.

Section 7.9 - Mitigation Measures

Summary

Commenters encouraged the BLM and Forest Service to incorporate in the LUPA management objectives and directive that permit development of an Enhanced Mitigation/Expanded Use Authorizations Program. More detail should be provided in the Proposed LUPA/Final EIS regarding the ways in which the disturbance caps would be monitored and implemented. The Draft LUPA/EIS failed to provide hard evidence that compensatory mitigation actually increases GRSG populations. The Draft LUPA/EIS failed to provide science describing effectiveness of proposed mitigation. The BLM needs to clarify how mitigation applies to private lands and valid existing rights.

Commenters also provided specific mitigation measures to be considered in the Proposed LUPA/Final EIS.

Response

The Draft LUPA/EIS included a description of the monitoring framework and mitigation strategy in Chapter 2. The Draft LUPA/EIS also included a monitoring framework and mitigation strategy in the appendices. These sections of the Proposed LUPA/Final EIS have been revised with more detailed information: **Sections 2.7.2**, Monitoring for the Greater Sage-Grouse Planning Strategy, and **2.7.3**, Regional Mitigation, and **Appendix C** and **Appendix D**. See **Section 4.9**, Monitoring and Mitigation, of this comment report for a detailed response to mitigation and monitoring.

Section 8 - Areas of Critical Environmental Concern

Section 8.1 - Range of Alternatives

Summary

The BLM can use administrative designations other than areas of critical environmental concern, such as Priority Areas, to protect GRSG.

Response

These types of designations are not in the BLM Land Use Planning Handbook (H-1601-1). The BLM has determined that, under any of the alternatives, management proposed to protect GRSG would be equivalent to protections afforded via an area of critical environmental concern or other designation.

Section 9 - Air Resources

Section 9.3 - Impact Analysis

Summary

The Draft LUPA/EIS failed to adequately analyze the effects to air quality from oil and gas development related to removing or restricting development of transmission lines in ROWs. Additionally, the Draft LUPA/EIS fails to adequately address the impacts to air quality from livestock grazing management actions.

Response

Section 4.4, Air Quality, in the Proposed LUPA/Final EIS has been updated to include additional analysis from removing or restricting development of transmission lines that are related to oil and gas development. The BLM and Forest Service have updated this information in the Proposed LUPA/Final EIS to provide the necessary information to make informed land use plan-level decisions. Specifically, within oil and gas development areas such as the Uinta Basin, limiting ROWs would limit the development of power lines to run oil and gas well production equipment. Absent a source of electricity, new and existing well equipment would continue to be powered by natural gas- and diesel-fired compressors and generators.

In regards to impacts from livestock grazing management actions, land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29; Forest Service Handbook 1909.12 – Land Management Planning). The Draft LUPA/EIS contains only planning actions and does not include any implementation actions. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM and Forest Service will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

Section 10 - Climate Change

Section 10.3 - Impact Analysis

Summary

The Draft LUPA/EIS does not adequately address the impacts of livestock grazing in conjunction with climate change on vegetation communities. Climate change effects in the southern part of the Panguitch Population Area should be eliminated or identified as speculative based on inconclusive models. A consistent method to determine droughts should be adopted, including adaptive management measures such as for changes in grazing management, and made publically available.

Response

As described in **Section 4.6**, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences of the presented alternatives in Section 4.3, Air Quality, of the Draft LUPA/EIS.

Per the requirements of NEPA as noted in **Section 4.6** of this comment report, the effects of livestock grazing on GRSG and GRSG habitat are discussed in Section 4.2, Special Status Species – Greater Sage-Grouse, under Impacts from Domestic Livestock Forage Use (Herbivory) (page 4-37 of the Draft LUPA/EIS), including the compounding effects of drought conditions on the herbivory (page 4-41 of the Draft LUPA/EIS).

Regional climate change projections were developed as part of the Colorado Plateau Rapid Ecological Assessment (Bryce et al. 2012) and are summarized in Section 3.4.1, Conditions

Statewide (Climate Change) of the Draft LUPA/EIS. The methodology for the regional modeling is described in Section 3.2.7 of the Rapid Ecological Assessment and the results of the modeling are contained in Section 5.4 of the Rapid Ecological Assessment; both sections are available online at: http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas/coloplateau.html. As described in Section 3.4.1 of the Draft LUPA/EIS (page 3-42), the northern part of the ecoregion may be considered transitional, while the southern part of the ecoregion to which the commenter refers is within the southwestern region subject to the influence of the summer monsoon.

Section 11 - Cultural Resources

Section 11.2 - Range of Alternatives

Summary

The Draft LUPA/EIS fails to provide management actions that address cultural resources and areas.

Response

The BLM regulations in 43 CFR 1600 and the NEPA process detailed in the CEQ regulations in 40 CFR 1500 guide preparation of plan amendments. As stated in Section 1.2, Purpose and Need, of the Draft LUPA/EIS, the purpose for the LUPA is to identify and incorporate appropriate conservation measures in LUPs to conserve, enhance and/or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. Because this LUPA is a targeted amendment to conserve GRSG, the alternatives in the Draft LUPA/EIS included management actions for resource programs that could conserve GRSG and its habitat. Impacts to local customs and culture are analyzed in Section 4.22, Social and Economic Impacts, of the Draft LUPA/EIS.

Section 11.3 - Best Available Information and Baseline Data

Summary

The BLM and Forest Service needs to update the cultural section to include a statement that the majority of cultural resources inventory has been associated with energy development projects.

Response

No cultural resource inventories were undertaken as part of this LUPA. Information from broad-scale assessments was used to help set the context for the decision-making process. As stated on page 3-140 of the Draft LUPA/EIS, new cultural resource discoveries have a progressive trend towards more sites being recorded and logged into the Utah State Historic Preservation Office's cultural resource database due to increases in actions permitted by federal agencies. Energy development is among the many "actions permitted by federal agencies" that increase discoveries.

Section 11.4 - Impact Analysis

Summary

The Draft LUPA/EIS failed to include the impacts on modern cultural resources that qualify as historic properties during the life of the plan from GRSG management actions.

Response
As stated in Section 4.11.1, Methods and Assumptions, (Draft LUPA/EIS, page 4-160) potential impacts on cultural resources and their settings from subsequent undertakings (implementation of the planning decisions or site-specific project proposals) require separate compliance with NEPA and Section 106, and result in the continued identification, evaluation, and mitigation of cultural resources to the National Register of Historic Places. Per the Utah Protocol, and standard BLM and Forest Service operating procedures, effects on cultural resources eligible for listing in the National Register of Historic Places and potentially eligible cultural resources would be mitigated. If previously undiscovered resources are identified during an undertaking, work would be suspended while the resource is evaluated and mitigated to avoid any further impact.

Section 12 - Fire and Fuels

Section 12.1 - Range of Alternatives

Summary
Commenters included information about the inclusion of fire in the disturbance cap and the effects of fire on sagebrush availability. Additionally, commenters questioned the use of various treatment types such as prescribed fire in GRSG habitats and appropriateness of best management practices.

Commenters suggested that Alternative D should be revised to meet the COT objectives for fire.

Response
The BLM and Forest Service considered a range of reasonable alternatives during the GRSG planning process in full compliance with the NEPA (see **Section 4.3**, Range of Alternatives, of this comment report, as well as **Chapter 2** of the Proposed LUPA/Final EIS).

Within the range of alternatives, fire is included as disturbance under Alternatives C and E. Fire is not counted as disturbance under Alternatives B or D. Under the proposed plan fire would not be counted as disturbance but would be taken into consideration when evaluating habitat availability-percent sagebrush on the landscape. The LUPA/EIS also considers a range of alternatives considering use of prescribed fire within PHMA and use of certain best management practices.

As discussed in **Section 4.9**, Monitoring and Mitigation, of this comment report, the BLM and Forest Service have updated the monitoring framework and adaptive management approach in the Proposed LUPA/Final EIS (Sections 2.7.1, Adaptive Management Plan, and 2.7.2, Monitoring for the Greater Sage-Grouse Planning Strategy, and **Appendix B** and **Appendix C**). The monitoring framework and adaptive management approach account for habitat losses due to natural causes (fire and invasives) and/or population declines at the appropriate localized scale.

As indicated by the USFWS COT report, many of the measures recommended are currently included within the preferred alternative in the Draft LUPA/EIS. In addition, many of these measures are already used by the BLM and Forest Service as part of standard fire management policy and procedures. Specific language that states GRSG must occupy an area for restoration to be considered successful is included in the range of alternative under Alternative C.

Section 12.2 - Best Available Information and Baseline Data

Summary

The Draft LUPA/EIS failed to include citations indicating that implementation of fuel breaks in sagebrush systems where herbaceous forage remained reduce the ignition potential or spread of fire.

Response

Section 4.14, Wildland Fire Management, in the Proposed LUPA/Final EIS has been updated to include clarifications to the use of fuelbreaks as a treatment method. New reference material cited in the revised section has been included to the list of references in the References section of the Proposed LUPA/Final EIS.

Section 13 – Fish and Wildlife

Section 13.3 - Other Special Status Species

Section 13.3.1 - Range of Alternatives

Summary

USFWS Utah prairie dog focus areas (under consideration) should be excluded from GRSG population areas and GRSG management.

Response

The BLM and Forest Service would continue to cooperate with USFWS in order to determine and manage habitats to support the species. Site-specific analysis will occur at the implementation level.

Section 13.3.2 - Best Available Information and Baseline Data

Summary

Western banded gecko is not likely to occur in the Rich and Uintah population areas because the Mojave Desert, its habitat, is in the southwest part of Utah.

Response

The Western banded gecko is a Mojave Desert species and does not exist in sagebrush ecosystems; therefore, it is unlikely to be found in GRSG habitat. Western banded gecko has been removed from the **Table 3.34**, BLM and Forest Service Sensitive Species in the Planning Area, in the Proposed LUPA/Final EIS.

Section 14 - Lands and Realty

Section 14.1 - Range of Alternatives

Summary

The comments were focused on several issues related to the alternatives presented in the Draft LUPA/EIS:

1. Additions to the range of alternatives considered and provided information on the feasibility of the alternatives (e.g., implementation of the disturbance cap, perch

diverters, co-location, valid existing rights, overhead versus burying lines, and potential limitations on the expansion or modification of existing infrastructure).

2. ROW/SUP authorizations, including linear and site-type facilities.
3. The BLM and Forest Service must address both existing and future development, including foreseeable renewable energy development.
4. Management actions related to Title V ROWs in GRSG are not feasible; Title V ROWs maintain and improve roads for use by the public for safety and welfare. Commenters noted that Alternative D did not meet the "as is, where is" criteria for Title V.
5. Revisions to road and transmission line required design features (RDFs) in Appendix J of the Draft LUPA/EIS.

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The BLM and Forest Service complied with NEPA and the CEQ implementing regulations at 40 CFR 1500 in the development of alternatives for the Draft LUPA/EIS, including seeking public input and analyzing reasonable alternatives. The alternatives include management options for the planning area that would modify or amend decisions made in the LUPs, as amended, to meet the planning criteria, to address issues and comments from cooperating agencies and the public, or to provide a range of reasonable alternatives.

The impacts of the alternatives are adequately discussed in Chapter 4 of the Draft LUPA/EIS. None of the comments identified specific deficiencies in the existing analysis or provided additional information for inclusion in the impact analysis. Section 4.24, Cumulative Impacts, adequately discusses both existing and future development in the Draft LUPA/EIS.

As stated in the Draft LUPA/EIS in Section 1.7, Development of Planning Criteria, the LUPA will recognize all valid existing rights. **Section 4.19**, Lands and Realty, of the Proposed LUPA/Final EIS has been revised to include an analysis of any potential indirect effects to valid existing rights as a result of the alternatives.

Future ROW/SUP applications would be evaluated and approved on a case-by-case basis, based upon site-specific determination of ability to avoid, minimize, and/or mitigate impacts on GRSG habitat at the implementation phase, including application of current best management practices (e.g., Avian Power Line Interaction Committee guidelines). A proposed project's contribution to the amount of disturbance on the landscape will be evaluated during site-specific NEPA analysis.

The Proposed LUPA/Final EIS provides information related to the management of activities and mitigation measures in PHMA where the 3 percent disturbance cap applies. The process for determining existing disturbance is described in **Appendix L** and mitigation is further addressed in **Appendix D** of the Proposed LUPA/Final EIS.

In granting Title V ROWs, the BLM would follow current policy and regulations.

As discussed in the Draft LUPA/EIS, the placement of power lines underground may result in greater short-term GRSG habitat disturbance. Over the long term and following appropriate reclamation of the surface above underground lines, there would be less surface disturbance. See **Section 4.3**, Special Status Species – Greater Sage-Grouse, of the Proposed LUPA/Final EIS for a discussion of disturbance impacts from burying power lines.

RDFs in Appendix J of the Draft LUPA/EIS were clarified in the Proposed LUPA/Final EIS (see **Appendix G**, Required Design Features), where appropriate. In addition, the Draft LUPA/EIS identified instances where RDFs are appropriate for implementation on a case-by-case basis.

Section 14.2 - Best Available Information and Baseline Data

Summary

Commenters stated that the BLM and Forest Service did not provide sufficient affected environment information to meet NEPA requirements. For example, commenters noted there was no baseline disturbance inventory. In addition, commenters identified reasonably foreseeable lands and realty actions that should be considered as part of the affected environment.

In addition, commenters raised concerns with the baseline assumption (as noted in Ellis 1984 and Connelly et al. 2000) that power lines and other vertical structures increase perching opportunities for raptors and increase the potential for GRSG to abandon leks).

Commenters also suggested that the BLM and Forest Service should have considered several additional references in their analysis, related to the relationship between GRSG and transmission lines. For example, commenters noted the Draft LUPA/EIS did not include studies that found underground power lines have more environmental impacts than overhead power line placement.

Response

As described in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The LUPA/EIS data and information is presented in map and table form, and is sufficient to support the broad-scale analyses required for land use planning.

A baseline disturbance inventory (**Appendix L**) has been completed and data from the inventory has been incorporated in the affected environment (**Chapter 3**) and environmental consequences (**Chapter 4**) sections of the Proposed LUPA/Final EIS where appropriate.

Several commenters provided additional citations, references, and information to be considered as part of the Draft LUPA/EIS. The BLM and Forest Service reviewed the suggested studies and references to determine if they presented new information that would need to be incorporated into the Proposed LUPA/Final EIS, were references already included in the Draft LUPA/EIS, or if

the references provided the same information as already used or described in the Draft LUPA/EIS. Any study or reference that provided new relevant information was incorporated into the Proposed LUPA/Final EIS.

Section 14.3 - Impact Analysis

Summary

Commenters stated that impacts on valid existing rights and state lands from lands and realty decisions needed to be clarified. Commenters noted the need to discuss impacts of lands and realty decisions on private lands, and the indirect effects on mineral and renewable energy development.

Response

As described in Section 4.6, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives.

As specific actions that may affect the area come under consideration, the BLM and Forest Service will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

Impacts of lands and realty decisions on renewable energy development are discussed in Section 4.19, Renewable Energy, of the Draft LUPA/EIS. Discussion of impacts of lands and realty decisions on nonfederal lands has been added to the Proposed LUPA/Final EIS in **Section 4.19**, Lands and Realty.

As stated in Section 1.7 of the Draft LUPA/EIS, the LUPA will recognize all valid existing rights, and will provide reasonable access to mineral leases. The potential impacts on valid existing mineral rights from lands and realty management decisions in this plan amendment are further discussed in **Section 4.21**, Minerals, and **Appendix R** of the Proposed LUPA/Final EIS.

Section 14.4 - Cumulative Impact Analysis

Summary

Commenters expressed concern that the BLM and Forest Service did not consider the cumulative impacts of lands and realty decisions in the Utah planning area across the GRSG range.

Commenters also noted that the BLM and Forest Service did not adequately consider reasonably foreseeable conditions regarding renewable energy on all lands.

Response

As the decisions under consideration by the BLM and Forest Service are programmatic in nature and would not result in on-the-ground planning decision or actions (e.g., the BLM is not approving an application for permit to drill to start drilling), the scope of the analysis was conducted at a regional, programmatic level. The analysis focuses on the direct, indirect, and

cumulative impacts that could potentially result from on-the-ground changes. This analysis identifies impacts that may result in some level of change to the resources.

As described in Section 4.7, Cumulative Impacts, of this comment report, the Draft LUPA/EIS contains a qualitative discussion of cumulative effects at the WAFWA Management Zone scale to set the stage for a more quantitative analysis contained in the Proposed LUPA/Final EIS. Additional quantitative cumulative analysis was added to the Proposed LUPA/Final EIS in **Chapter 5**, Cumulative Impacts.

The Draft LUPA/EIS included a Reasonably Foreseeable Development (RFD) scenario for wind projects in GRSG habitat (see Section 4.19, Renewable Energy, of the Draft LUPA/EIS). A list of specific reasonably foreseeable future actions proposed in GRSG habitat is also included in Table 4.55, Reasonably Foreseeable Future Actions, of the Draft LUPA/EIS.

Section 15 - Leasable Minerals

Section 15.1 - Range of Alternatives

Summary

The comments were focused on several issues related to the alternatives presented in the Draft LUPA/EIS:

1. The Draft LUPA/EIS violates valid existing rights by applying unreasonable additional restrictions to existing mineral leases.
2. The Draft LUPA/EIS should not apply blanket restrictions in this programmatic document. Site-specific restrictions tailored to individual circumstances are more appropriate.
3. The restrictions on leasable mineral development proposed in the Draft LUPA/EIS are too vague to be consistently enforced.
4. The restrictions on leasable mineral development proposed in the Draft LUPA/EIS are too burdensome and will have unintended negative consequences, including environmental compliance, economic, and adverse safety impacts. Other measures would work just as well and provide more flexibility for developers.
5. The restrictions on leasable mineral development proposed in the Draft LUA/EIS are not stringent enough to adequately protect GRSG.

Response

As noted previously in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The BLM and Forest Service complied with NEPA and the CEQ implementing regulations at 40 CFR 1500 in the development of alternatives for this Draft LUPA/EIS, including seeking public input and analyzing reasonable alternatives. The alternatives include management options for the planning area that would modify or amend decisions made in the LUPs, as amended, to meet the planning criteria, to

address issues and comments from cooperating agencies and the public, or to provide a range of reasonable alternatives.

As stated in Section 1.7, Development of the Planning Criteria, of the Draft LUPA/EIS, the LUPA will recognize all valid existing rights. The potential impacts on valid existing rights from management decisions in this plan amendment are further discussed in the Minerals sections of **Chapters 4** and **5** of the Proposed LUPA/Final EIS.

The range of alternatives analyzed in Section 2.6, Detailed Comparison of Alternatives, of the Draft LUPA/EIS included alternatives that focus on both site-specific and broad restrictions, and the impacts of these varying types of restrictions are analyzed in Section 4.20, Minerals, of the Draft LUPA/EIS. In appropriate cases where broad restrictions are applied, exceptions ensure that these restrictions are only applied where appropriate. Additionally, off-site mitigation is included as a way to improve habitat, in addition to other means to eliminate or minimize impacts.

Where appropriate, clarification has been added to explain how restrictions will be applied. The Proposed Plans include stipulations, lek buffer requirements, disturbance cap, energy density requirements, and RDFs, among other things. These are described in **Chapter 2** and **Appendix E**, **Appendix F**, Applying Lek Buffer Distances, **Appendix G**, and **Appendix K**, Stipulations Associated with Fluid Mineral Leasing, of the Proposed LUPA/Final EIS.

The Draft LUPA/EIS evaluate a range of reasonable alternatives. The impacts of these alternatives on leasable mineral development are discussed in Section 4.20.2. The applicability of the RDFs depends on the alternative being considered. For example, under Alternative D, an RDF would not be applied if the RDF is not applicable given the site-specific conditions (see the Draft LUPA/EIS at Table 2.1, MA-MIN-30: "The RDFs identified in Appendix J, Required Design Features for Fluid Minerals, would be attached as mandatory COAs during development of a lease, unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: - A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; - A proposed design feature or best management practices is determined to provide equal or better protection for GRSG or its habitat; - Analyses conclude that following a specific feature will provide no more protection to GRGS or its habitat than not following it, for the specific project being proposed.").

Section 15.2 - Best Available Information and Baseline Data

Summary

The Draft LUPA/EIS needs to clarify that the RFD scenario does not place any limits on future development.

A new mineral report needs to be written for the Utah planning area because the one used for this plan did not follow the requirements in BLM Manual 3060 and is inaccurate in its assessment of occurrence and potential.

The Draft LUPA/EIS failed to discuss the existing known phosphate leasing area within GRSG habitat.

The data on coal occurrence and development potential in the planning area is inadequate.

Response

Section 3.21.7, Trends, of the Proposed LUPA/Final EIS have been clarified to describe that future development is not limited under the RFD scenario.

The RFD scenario included in the Draft LUPA/EIS is not a mineral potential report and therefore is not subject to the requirements of BLM Manual 3060. By law, a mineral potential report is not required for land-use planning efforts (see BLM Manual 3031, Energy and Mineral Resource Assessment). The BLM has collected sufficient information to support the analysis in this broad-scale planning document. For the Utah Greater Sage-Grouse Draft LUPA/EIS, including the RFD scenario, the BLM used a modified version of the oil and gas potential map contained in the US Geological Survey publication *Summary of Science, Activities, Programs, and Policies That Influence the Rangewide Conservation of Greater Sage-Grouse* (Centrocerceus urophasianus), also known as the BER. This map was originally included in a peer reviewed document titled *Mapping Oil and Gas Development Potential in the US Intermountain West and Estimating the Impacts to Species* (Copeland et al. 2009[1]). During development of the Draft LUPA/EIS, the baseline map was reviewed by qualified BLM mineral specialists, including geologists and petroleum engineers, in the BLM Utah State Office. Numerous changes were made to the map to more accurately reflect oil and gas potential in the planning area. For example, approximately 3,339,234 acres of additional moderate potential, and 265,278 acres of additional high potential were identified. A modified version of the map developed by Copeland et al. was used for the Draft LUPA/EIS because it estimates oil and gas potential for all GRSG habitat in the planning area, and there are few if any products similar to this available. Oil and gas potential maps were included in the mineral reports completed for the Cedar City, Price, Vernal, Richfield, and Kanab Resource Management Plans; these maps were not used because the combination of these maps does not provide information on oil and gas potential covering all GRSG habitat located in the Utah planning area. In addition, these mineral potential reports, which were completed for individual planning units were not edge-matched, meaning when the layers were placed side-by-side there were inconsistencies. Finally, these maps (Cedar City excepted) were created between approximately 2000 and 2005 and therefore, also do not include up-to-date information given new information and technologies.

A description of the known phosphate leasing area has been added to **Section 3.21.2**, Nonenergy Leasable Minerals, of the Proposed LUPA/Final EIS and the map showing gilsonite and phosphate occurrence and development potential (**Map 3.21-5**, Gilsonite and Phosphate Occurrence and Development Potential, of the Proposed LUPA/Final EIS) has been updated to show the known phosphate leasing area (see **Appendix A**, Maps, of the Proposed LUPA/Final EIS). The entire known phosphate leasing area is included within the area identified as having high phosphate potential. The high development potential area also includes areas where there are expressions of interest and permit applications for prospecting. The analysis of impacts on high potential areas adequately discloses impacts on the known phosphate leasing area in the Proposed LUPA/Final EIS.

[1] Copeland H. E., K.E. Doherty, D. E. Naugle, A. Pocewicz A, and J. M. Kiesecker. 2009. Mapping Oil and Gas Development Potential in the US Intermountain West and Estimating Impacts to Species. PLoS ONE 4(10): e7400.

Information on coal potential included in the Draft LUPA/EIS provides an adequate baseline to be able to analyze the potential impacts of the decisions being considered. The coal potential map included in the Draft LUPA/EIS was reviewed by BLM mineral specialists including BLM's mining engineers. Areas shown as having occurrence potential but no development potential are outside GRSG habitat and are not expected to be developed within the 15-20 year timeframe covered by the LUPA.

Section 15.3 - Impact Analysis

Summary

The impact analysis in the Draft LUPA/EIS should include oil shale and tar sands because existing leases will be impacted by these management actions. The analysis should consider the fact that fluid mineral extraction operations can only be relocated where resources exist and are accessible.

The impacts of the management actions, including seasonal restrictions, proposed in the Draft LUPA/EIS on leasable minerals will be more severe than those discussed in the document based on the totality of the restrictions that would be applied.

The Draft LUPA/EIS incorrectly assumes that horizontal drilling can be used in all cases to economically reach areas subject to a no surface occupancy (NSO) 4-mile radius stipulation. Technology and geology limit the use of this technology to reach resources and could result in wasting of mineral resources. Due to this incorrect assumption, the impacts stated in the socioeconomic section should also be revised.

Response

Analysis of impacts of the management actions proposed under this LUPA/EIS on oil shale and tar sands has been added to **Section 4.21.6**, Oil Shale and Tar Sands, of the Proposed LUPA/Final EIS. No oil shale or tar sands development is allowed in GRSG habitat per the 2012 Programmatic EIS, except for in the Asphalt Ridge Special Tar Sands Area and the White River Oil Shale Research, Development, and Demonstration site and Preference Lease Right Area. The BLM needs to disclose the impacts of these operations on GRSG and the impacts of GRSG management on these two operations. Potential impacts on these operations could occur from lands and realty management decisions (ROW exclusion/avoidance precluding access) and mitigation requirements. The White River Oil Shale Research, Development, and Demonstration site and Preference Lease Right Area operations constitute a valid existing right.

The Draft LUPA/EIS assumed that technological advancements, such as directional drilling, could lead to changes in levels of fluid mineral development potential throughout the planning area as additional resources become more easily accessible.

Impact analysis has been revised as appropriate to discuss additional impacts of seasonal limitations, closures, and RDFs (see **Section 4.21.1**, Oil and Gas, of the Proposed LUPA/Final EIS).

Section 4.21.1, Oil and Gas (Alternative A) of the Proposed LUPA/Final EIS recognizes that there are technical limitations on both horizontal and directional drilling and that the use of these technologies may not provide access to all formations containing fluid mineral resources.

Language has been added to the RFD scenario describing the current limitations and potential future conditions of directional and horizontal drilling technology. The RFD scenario predicts economically feasible development over a period of 15-20 years and, at times, assumes that technological advances (such as improved drilling methods) will continue to occur. Therefore, estimated future well development in the RFD scenario is not necessarily tied to current limitations of directional and horizontal drilling. Clarification has been added to the Proposed LUPA/Final EIS noting that horizontal drilling may not be technologically feasible in all cases.

Section 15.4 - Cumulative Impact Analysis

Summary

The Draft LUPA/EIS fails to adequately analyze the cumulative impacts of the other GRSG LUPAs/EISs on the Western Phosphate Field.

Response

Additional information on the cumulative impacts to the Western Phosphate Field has been added to **Section 5.22.2**, Nonenergy Leasable Minerals, of the Proposed LUPA/Final EIS.

Section 15.5 - Mitigation Measures

Summary

Requiring off-site mitigation regardless of site-specific circumstances is contrary to current BLM mitigation policy.

The BLM needs to modify its language on exceptions, waivers, and modifications of stipulations to ensure adequate protection for the GRSG when exceptions, waivers, and modifications are awarded. The Proposed LUPA/Final EIS needs to clarify the insurance of protection to GRSG when exceptions are made to stipulations.

Response

Mitigation has been further defined and is detailed in **Appendix D** of the Proposed LUPA/Final EIS. See **Section 4.9**, Monitoring and Mitigation, of this comment report for additional information on updates to the mitigation strategy.

The conditions under which the BLM or Forest Service would exempt, modify, or waive a stipulation are specific to the stipulation in question and are outlined in the tables in **Appendix K**. **Table K.6**, BLM Proposed Plan Fluid Minerals Stipulations and Exception, Modification, and Waiver Criteria, **Table K.7**, US Forest Service – Utah Proposed Plan Fluid Minerals Stipulations and Exception, Modification, and Waiver Criteria, and **Table K.8**, US Forest Service – Wyoming Proposed Plan Fluid Minerals Stipulations and Exception, Modification, and Waiver Criteria, outline the criteria for waivers, exceptions, and modifications to all stipulations in the Proposed Plan. Specifically, under the Proposed Plan, NSO stipulations will be included in new fluid mineral leases at the time of leasing only and may not be applied to existing fluid mineral leases that did not include NSO stipulation at the time of leasing. No waivers or modifications to a fluid mineral lease NSO stipulation will be granted except for narrow criteria as defined in the Proposed LUPA/Final EIS.

Section 16 - Livestock Grazing

Section 16.1 - Range of Alternatives

Summary

Several commenters requested an alternative that reduces or eliminates livestock grazing on public lands. However other commenters asserted the benefits of grazing in terms of fuel reduction and preservation of GRSG habitat, and/or stated that it was not proven that grazing damages GRSG habitat, or that there was any benefit to reducing grazing adjacent to burned areas.

Several recommendations were made regarding the use of rangeland health standards, specifically whether they would be based on Connelly and Hagen's research, how clearly those standards and objectives would be stated, and how they would be enforced. Two commenters suggested using reference areas to judge habitat recovery or impacts of no grazing, and others suggested adaptive management and monitoring of grazing controls.

Commenters provided a broad range of specific recommendations for implementation of grazing management.

Commenters stated that the BLM has no authority to retire or terminate grazing permits.

Response

As noted previously in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The range of alternatives in the Draft LUPA/EIS identified GRSG habitat objectives, percent cover, residual cover, and grasses and forb heights. Alternative C1 eliminates grazing entirely within occupied habitat and Alternative C2 reduces grazing in occupied habitat accordingly. Increased grazing and associated animal unit months (AUMs) was considered in Section 2.8.1, Increased Livestock Grazing, in the Draft LUPA/EIS, but was eliminated from detailed analysis.

Livestock grazing is identified by USFWS as a threat to GRSG in the March 23, 2010 Federal Register Notice, and therefore it is addressed in this LUPA. Existing regulatory mechanisms, including the fundamentals for rangeland health, would continue to provide the basis for managing grazing in GRSG habitat. However, the preferred alternative would provide additional consistency in application of rangeland health standards relative to GRSG habitat, and would provide additional guidance for prioritizing land health assessments and review of grazing permits to ensure that grazing management is compatible with attainment of GRSG habitat objectives within the planning area. In addition, best management practices would be adopted to reduce effects of range improvements and livestock trailing across public lands.

Habitats will be managed to meet habitat guidelines from scientific literature (e.g., Connelly et al. 2000 and Hagen et al. 2007), where appropriate based on site potential. Adjustments from the guidelines may be made, but must be based on documented regional variation of habitat characteristics (e.g., sagebrush type, ecological site potential), quantitative data from population and habitat monitoring, and evaluation of applicable research. Information on implementation of

grazing management is provided in Sections 2.6, Proposed Plan Amendments, and 2.10, Detailed Description of Draft Alternatives, in the Proposed LUPA/Final EIS. Blanket, one-size-fits-all standards and objectives would not be imposed on existing permits under the amended LUPs. As described in **Section 2.6.2**, BLM Proposed Plan Amendment (Livestock Grazing/Range Management), of the Proposed LUPA/Final EIS, the NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on the GRSG Habitat Objectives Table (Objective GRSG-3) and BLM Utah Public Land Health Standards and defined responses that will allow the authorizing officer to make adjustments to livestock grazing without conducting additional NEPA. The Utah Sub-regional Adaptive Management Strategy outlines additional measures that would be implemented if GRSG populations or habitat are reduced to the extent that it is necessary to protect GRSG from impacts of livestock grazing (see **Appendix B** of the Proposed LUPA/Final EIS).

FLPMA grants the Interior Secretary the authority to make land use planning decisions, taking into consideration multiple use and sustained yield, areas of critical environmental concern, present and potential uses of the land, relative scarcity of values, and long-term and short-term benefits, among other resource values (43 USC 1711 Sec 201 (a)). 43 CFR 4100.0-8 provides that the BLM shall manage livestock grazing on public lands in accordance with applicable land use plans. Further, the BLM may designate lands as "available" or "unavailable" for livestock grazing through the land use planning process (H-1601, Land Use Planning Handbook, Appendix C).

Section 16.2 - Best Available Information and Baseline Data

Summary

Commenters disagree on whether science has determined if livestock grazing damages GRSG habitat or affects wildfire frequency; commenters on both sides of the question offer references and citations, and/or claim there is no science supporting the opposing position. Multiple commenters call for a comprehensive peer-reviewed study to answer the question before the BLM and Forest Service implements any changes to grazing management.

Several commenters emphasize site-specific data: The BLM should not average grazing utilization across pastures, ecosystems and time, and should disclose and analyze grazing uses and impacts more specifically. Grazing conditions should depend on specific habitat assessments, using Grazing Response Index scores.

Several comments refer to the Duck Creek Office of Hearing and Appeals ruling, in which the BLM's rangeland health assessments and grazing management decisions were found to be legally insufficient.

Response

As noted in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, before beginning the Utah Greater Sage-Grouse Draft LUPA/EIS and throughout the planning effort, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. Any proposed changes to grazing management would be analyzed through site-specific NEPA and would utilize best available science.

All comments related to the Duck Creek Office of Hearing and Appeals ruling are out of scope for the Utah Greater Sage-Grouse LUPA/EIS planning process.

Section 16.4 - Cumulative Impact Analysis

Summary

Commenters stated the Proposed LUPA/Final EIS should address effects on management of checkerboard land, particularly related to fencing of such lands if grazing is limited or prohibited.

Response

Section 4.16.4, Livestock Grazing (Alternatives C1 and C2) of the Proposed LUPA/Final EIS was revised to discuss the potential time and cost impacts (particularly in areas with checkerboard land ownership) if fencing is required due to limiting or prohibiting grazing on public lands.

Section 17 - Locatable Minerals

Section 17.1 - Range of Alternatives

Summary

Commenters noted that the alternatives should take site-specific conditions into account when prohibiting or allowing locatable mineral activities.

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The BLM and Forest Service complied with NEPA and the CEQ implementing regulations at 40 CFR 1500 in the development of alternatives for the Draft LUPA/EIS, including seeking public input and analyzing reasonable alternatives. The alternatives include management options for the planning area that would modify or amend decisions made in the LUPs, as amended, to meet the planning criteria, to address issues and comments from cooperating agencies and the public, or to provide a range of reasonable alternatives.

The Draft LUPA/EIS considered a broad range of alternatives that considers variations in PHMA and GHMA as well as different restrictions on locatable mineral development.

Section 17.4 - Cumulative Impact Analysis

Summary

The Draft LUPA/EIS fails to adequately analyze the cumulative impact of locatable mineral withdrawals across the GRSG range.

Response

Due to the variation in types of minerals and occurrence and development potential across the range, the types of data available for the planning area compared to the entire GRSG range, and uncertainty in which alternative from the Draft LUPA/EIS would be selected, cumulative impact analysis across the entire GRSG range would not provide meaningful, appropriate analysis. The total number of acres proposed for withdrawal under certain alternatives is included in each of

the Great Basin sub-region Draft LUPA/EISs. The Draft LUPA/EIS has met the NEPA/CEQ requirements for cumulative impacts analysis in each of the respective sub-regional EISs. Information explaining the rationale behind the chosen geographic extent of the cumulative impact analysis area has been added to **Section 5.22.4**, Locatable Minerals, of the Proposed LUPA/Final EIS.

Section 18 - National Trails

Section 18.2 - Best Available Information and Baseline Data

Summary

Garfield County has not been contacted regarding management of National Historic Trails.

Response

The Draft Comprehensive Management Plan for the Old Spanish Trail is being prepared under a separate planning process and is not part of the Utah Greater Sage-Grouse LUPA/EIS planning process.

Section 20 - Recreation

Section 20.1 - Range of Alternatives

Summary

Commenters stated that various alternatives are inadequate to protect GRSG from the impacts of recreation (e.g., antler collection, camping, and OHV travel) and that more stringent measures should be put in place. Additional comments suggested changes to the noise restrictions included in the Draft LUPA/EIS as they affect recreational activities.

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA.

The Draft LUPA/EIS considers an adequate range of alternatives to protect GRSG, including varying levels of restriction on recreational activities. The State of Utah regulates antler collection in the planning area, and the BLM does not allow cross-country motorized travel for collection of antlers in areas that are limited or closed to such travel. Under all action alternatives, GRSG habitat would be designated as at least limited to existing routes until route designation is completed. Noise restrictions in the EIS only apply to discretionary activities (e.g., special recreation permits for competitive events) and would not apply to dispersed recreational use. The noise standards included in the Draft LUPA/EIS were developed based on the best available science regarding the impacts of noise on GRSG.

Section 20.2 - Best Available Information and Baseline Data

Summary

Commenters stated that the BLM and the Forest Service did not sufficiently incorporate local recreation plans into the Draft LUPA/EIS. Additionally, commenters were concerned that the

BLM and Forest Service did not take appropriate baseline recreation opportunities into account in the Draft LUPA/EIS.

Response
Garfield County has not identified any specific instances in which this plan amendment conflicts with recreational decisions in local plans.

Section 3.17, Recreation, of the Draft LUPA/EIS recognizes that GRSG population areas overlapping Garfield County (i.e., Panguitch and Parker Mountain) contain a designated route network. Travel management plans completed for Kanab, Richfield, Grand Staircase-Escalante National Monument, and Dixie National Forest identified this network. The BLM and Forest Service are not proposing changes to this route network as part of this planning effort. Additional information has been added to Sections 3.17.1, Conditions in Population Areas, of the Proposed LUPA/Final EIS discussing recreational opportunities in the Parker Mountain and Panguitch population areas.

Section 20.3 - Impact Analysis
Summary
The Draft LUPA/EIS failed to adequately analyze the impacts of the alternatives on recreation.

Response
As described in **Section 4.6**, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives.

Recreation was not identified as a threat to GRSG in the USFWS 2010 listing determination. As such, very few decisions affecting recreation are being considered in the LUPA/EIS. Given that the BLM and Forest Service are considering few decisions affecting recreation management, the level of analysis required to adequately assess the impacts of those decisions is minimal. Those decisions that would impact recreation, such as restrictions on special recreation permits, are analyzed in Section 4.16, Recreation of the Draft LUPA/EIS according to the BLM's Land Use Planning Handbook.

Section 22 - Socioeconomics and Environmental Justice

Section 22.2 - Best Available Information and Baseline Data
Summary
The Draft LUPA/EIS fails to adequately describe the current local and regional socioeconomic conditions in the planning area. Economic data used in the analysis is from 2009, when communities were hard hit from the recession. Socioeconomic data in Chapter 4 is not consistent with data provided in Chapter 3. The Draft LUPA/EIS fails to recognize the cultural values and uses of the land of the local population. Religious groups and the rural population may be considered minorities in comparison to national and statewide trends and the subjects of environmental justice. Analysis ignores other readily available data.

Response

The BLM and Forest Service used the best available data at the time of preparation of the Draft LUPA/EIS. Most data are from 2010 and provide a snapshot of data at the time. The analysis of economic impacts of management alternatives through effects on the oil and gas industry is based on projected development over the 2014-2028 fifteen year period, not on the baseline data used. The baseline data serves as a reference for the relative magnitude of impacts, and the BLM and Forest Service do not expect the difference in impacts across alternatives to be meaningfully altered by updating the baseline. However, the BLM and Forest Service expanded and updated the baseline information in **Section 3.23**, Social and Economic Conditions (including Environmental Justice), of the Proposed LUPA/Final EIS, to the extent needed to support an expanded discussion of the geographic distribution of impacts and to avoid data that may not accurately reflect long term trends, due to the recession of 2008 and 2009.

The BLM and Forest Service followed CEQ guidance in the definition and identification of minority and low-income populations for the purpose of environmental justice analysis. However, in response to comments, the BLM and Forest Service expanded the discussion of cultural values and uses of public lands in the study area in **Section 3.23** of the Proposed LUPA/Final EIS, recognizing rural and religious characteristics of the population.

The BLM and Forest Service reviewed the suggested studies and references put forth by the commenters and incorporated to the extent that they presented new and high quality information that would need to be incorporated into the Proposed LUPA/Final EIS.

All agencies participating as cooperating agencies have been given opportunities to participate during various steps of the planning process, including regular briefings, requests for input on draft alternatives and the administrative draft EIS, and identification of issues and data during scoping and during the Draft LUPA/EIS comment period, as required by 40 CFR 1503.2 and 40 CFR 1506.10. Based on the coordination efforts describe above, the BLM and Forest Service have met the legal and regulatory requirements for coordination to date, as described in **Section 4.2**, Cooperating Agency Relationships, of this comment report. As the planning process moves towards the Proposed LUPA/Final EIS and ROD, additional coordination will continue with cooperating agencies.

Section 22.3 - Impact Analysis

Summary

The Draft LUPA/EIS analysis underestimates/understates the economic hardships that restrictive management actions would impose on planning area operators, communities, and services. The analysis was overly generalized and did not provide county specific impacts. No effort is made to identify the size or intensity of impacts listed in the document. County land use plans were not considered in the analysis. The authors failed to recognize the cultural impacts associated with the alternatives (some counties have designated grazing as an activity of historic and cultural significance). The analysis is biased in favor of nonmarket valuation methods based on questionable methodology.

With respect to socioeconomic impacts of management alternatives through effects on specific resources:

1. The Draft LUPA/EIS does not adequately analyze the impacts of management alternatives on recreation, lands and realty and travel management;
2. The Draft LUPA/EIS does not adequately analyze the impacts of management alternatives on locatable minerals and mineral materials. The analysis fails to address the consequences from eliminating access to phosphate minerals;
3. The RFD scenario for oil and gas overestimates the number of oil and gas wells that would be developed from existing leases under each alternative. Therefore, the socioeconomic analysis on the impacts of this development is flawed;
4. The analysis underestimates impacts to wind resources. The action alternatives would create a substantial increase in ROW exclusion and avoidance areas, making it difficult to transmit power from wind farms to markets.

Other aspects missing that must be analyzed are:

1. The specific economic effect on school trust lands from making federal lands unavailable for various resource uses;
2. Impacts on private land owners;
3. Other costs of management alternatives including administrative costs and additional impacts to recreation, natural resources, the value of land and beauty;
4. The economic calculus for the Proposed Plan must be accounted for in all of the agency plans in the GRSG range.

Response

As required by 40 CFR 1502.16, the Draft LUPA/EIS provides a discussion of the environmental impacts of the alternatives including the proposed action, any adverse environmental effects that cannot be avoided should the alternatives be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. The Draft LUPA/EIS describes the methodology and assumptions used for conducting the socioeconomic impact analysis (see Section 4.22.2, Methodology and Assumptions, and Appendix W, Economic Impact Analysis Methodology, of the Draft LUPA/EIS). The methodology and assumptions provide a starting point for discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. As required by 40 CFR 1502.24, the Draft LUPA/EIS identified methodologies used and made reference to the scientific and other sources relied upon for conclusions in the analysis. Based on these methodologies and assumptions, the Draft LUPA/EIS provided sufficiently detailed information to aid in determining whether to proceed with the preferred alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1.

Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29; Forest Service Handbook 1909.12 – Land Management Planning). The Draft LUPA/EIS contains only planning actions and does not include any implementation actions. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM and Forest Service will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

Socioeconomic impacts assessed include impacts on output, employment, earnings and tax revenues in the affected area, nonmarket values, population and public services, specific groups and communities as well as environmental justice impacts. See Section 4.22, Social and Economic Impacts (Including Environmental Justice) of the Draft LUPA/EIS.

In response to comments, BLM and Forest Service revised the impact analysis in **Section 4.23** of the Proposed LUPA/Final EIS as follows:

- Additional discussion of impacts to counties was included where possible and appropriate;
- An expanded discussion of the potential social impacts of the loss of public lands for various uses, including grazing;
- The explanation of the potential socioeconomic impacts of management alternatives through recreation was expanded;
- A discussion of the potential socioeconomic impacts of management alternatives through lands and realty, and travel management was inserted, including a discussion of the potential impacts of power line restrictions on energy ratepayers;
- A discussion of the potential socioeconomic impacts of management alternatives through mining of locatable an saleable minerals was included, as was a discussion of phosphate minerals;
- The oil and gas RFD scenario was revised to recognize impacts of management alternatives on current leases;
- The discussion of potential impacts on wind energy was expanded;
- Information on the socioeconomic impact on school trust lands from making surrounding BLM-administered and National Forest System lands unavailable for various uses has been added;
- A discussion of the economic impacts of shifting development from federal to private lands was added;
- A brief explanation of impacts on BLM administrative costs was included;

- The socioeconomic analysis was expanded to include a qualitative discussion of impacts cumulative with those of GRSG habitat management alternatives being considered for other western states.

The BLM considers that several aspects commented on are appropriately addressed in the Draft LUPA/EIS. In particular, the treatment of nonmarket values in this EIS is consistent with BLM guidance (see BLM IM 2013-131). Only those nonmarket values that could reasonably be expected to be meaningfully affected by the choice of management alternatives were discussed.

Section 23 - Soil

Section 23.2 - Best Available Information and Baseline Data

Summary

Commenters specifically request verification of the information and identification of any cropland within County boundaries.

Response

As noted in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, before beginning the Utah Greater Sage-Grouse Draft LUPA/EIS and throughout the planning effort, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. As stated in Section 3.5.2, Conditions in Population Areas, of the Draft LUPA/EIS, available data on prime farmland, unique farmland, and farmland of statewide importance is not of sufficient accuracy to add value to this discussion or to the related impact analysis. Any future site-specific projects would require an evaluation of soil types.

Section 23.3 - Impact Analysis

Summary

The Draft LUPA/EIS failed to adequately analysis of the impacts of livestock on soils and soil processes.

Response

As described in **Section 4.6**, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives.

Section 4.5.2, Alternatives Analysis, in the Draft LUPA/EIS discusses the effects of livestock grazing on vegetation (ground cover) and the elevated potential for soil erosion.

Section 24 - Travel Management

Section 24.1 - Range of Alternatives

Summary

Commenters questioned how this LUPA/EIS would apply to the pending Cedar City Field Office Resource Management Plan revision. Commenters were divided on what changes would need to be made to alternatives. Some commenters requested more restrictive measures be added to

the Proposed LUPA/Final EIS to protect GRSG; while some commenters felt the management actions in the Draft LUPA/EIS were too restrictive to travel opportunities. Commenters emphasized the need for the BLM and Forest Service to prioritize implementation-level travel management planning. They also questioned how this implementation-level planning would occur and expressed dissatisfaction with the BLM and Forest Service's approach for moving to a limited-to-designated route system from the current OHV area designations. Commenters also noted the importance of allowing administrative access for valid existing rights.

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA.

The GRSG management decisions being considered in this EIS will be incorporated into the Cedar City Field Office Resource Management Plan revision. Cedar City's implementation-level travel management plans will be consistent with guidance included in the LUPs.

The BLM has complied with its travel and transportation policy in identifying areas that are open, limited, and closed to motorized vehicle travel. All areas currently identified as open in GRSG habitat would be changed to limited to existing routes until route designations are complete. The BLM has established priorities for completing travel plans in GRSG habitat based on the amount of motorized vehicle use and the value of the habitat. The BLM has added decisions to the Proposed LUPA/Final EIS (see **Chapter 2**) explaining the process that will be used in moving from a limited to existing routes category to a limited to designated routes category. The BLM has also added a decision that provides guidance to be taken into consideration when completing route designations. Decisions on seasonal closures, route purpose, and avoiding harassment and disruption of wildlife and their habitat will be addressed during the implementation-level travel planning process. Addressing these issues at the implementation level allows the BLM and Forest Service to take new information into account as it becomes available.

Needs for administrative access to valid existing rights, grandfathered uses, or permitted activities would be taken into consideration during site-specific NEPA analysis. Restrictions applied to recreational OHV use may not apply to permitted administrative uses.

The BLM and Forest Service have not added a restriction that would limit road densities to less than 0.09 kilometers per kilometer squared (Wisdom et al. 2011) in GRSG habitat because the threshold established by Wisdom used coarse road data. When taking into consideration actual road density information collected at a site-specific level, use of this threshold is not appropriate which was developed using a route network dataset collected at a west-wide scale. The BLM and Forest Service have included surface disturbance thresholds, which would restrict the density of disturbance tied to new and existing roads in GRSG habitat.

Section 24.2 - Best Available Information and Baseline Data

Summary

Commenters requested that the Proposed LUPA/Final EIS take existing travel management plans and route networks into consideration.

Response

As noted in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, before beginning the Utah Greater Sage-Grouse Draft LUPA/EIS and throughout the planning effort, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The Draft LUPA/EIS considered information from completed BLM and Forest Service travel management plans in the planning area. With the exception of Alternative C, the BLM and Forest Service are not proposing any changes to those existing plans as part of this planning process. Under Alternative C, the BLM and Forest Service have identified potential closed areas. Within these areas, some existing or designated routes could be affected. Consistency with local plans is addressed in Section 1.8, Relationship to Other Policies, Plans, and Programs, and Section 5.4, Coordination and Consistency, of the Draft LUPA/EIS.

Section 24.4 - Cumulative Impact Analysis

Summary

The Draft LUPA/EIS fails to adequately identify specific or cumulative impacts from OHV uses in a way that clearly conveys consequences to the public.

Response

As described in **Section 4.7**, Cumulative Impacts, of this comment report, the BLM and Forest Service analyzed cumulative effects in the Draft LUPA/EIS in Section 4.24.18, Comprehensive Travel and Transportation Management. This analysis included an analysis of the impacts of OHVs, as defined in the Glossary of the Draft LUPA/EIS. This discussion summarizes CEQ guidance from June 24, 2005, stating that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. Information on the current conditions is more comprehensive and more accurate for establishing a useful starting point for cumulative effects analysis. The CEQ interpretation was accepted by the Ninth in NW Envtl. Advoc. v. Nat'l Marine Fisheries Serv., 460 F.3d 1125, 1141 (9th Cir. 2006). The BLM and Forest Service explicitly described their assumptions regarding proposed projects and other reasonably foreseeable future actions. On National Forest System lands, reasonably foreseeable actions are those that would occur under their current land use plans from a broad-scale perspective.

The BLM and Forest Service have complied with the requirements of 40 CFR 1508.7 and prepared a cumulative impact analysis to the extent possible based on the broad nature and scope of the proposed management options under consideration at the land use planning level.

Section 25 - Tribal Interest

Summary

The Draft LUPA/EIS fails to address populations of GRSG on tribal lands throughout the West and how these populations could impact anticipated USFWS action under the Endangered Species Act.

Response

As stated in Section 1.3.1, Planning Area Overview, of the Draft LUPA/EIS, the planning area for the Utah Greater Sage-Grouse LUPA/EIS is the geographic area within which the BLM and Forest Service will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction; however, the BLM and Forest Service only make decisions on lands that fall under their respective jurisdiction. Tribal surface estate with Tribal mineral estate is not considered part of the decision area. However, the cumulative effects analysis for all topics in the Draft LUPA/EIS included an analysis of cumulative effects at the planning area level, including past, present, and reasonably foreseeable future actions on tribal lands. As described in **Section 4.7**, Cumulative Impacts, of this comment report, the BLM and Forest Service have complied fully with the requirements of 40 CFR 1508.7 and prepared a cumulative impact analysis to the extent possible based on the broad nature and scope of the proposed management options under consideration at the land use planning level.

Section 25.1 - Consultation Requirements

Summary

Commenters requested the BLM and Forest Service consider updating consultation with Indian Tribes in the Proposed LUPA/Final EIS to include: Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, Executive Order 13007 Indian Sacred Sites, and the Department of the Interior Policy on Consultation with Indian Tribes.

Response

Specific references to Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, Executive Order 13007 Indian Sacred Sites, and the Department of the Interior Policy on Consultation with Indian Tribes have been added to **Section 3.24**, Tribal Interests, in the Proposed LUPA/Final EIS.

Section 26 - Vegetation Sagebrush

Section 26.1 - Range of Alternatives

Summary

Commenters stated that the Draft LUPA/EIS failed to consider a full range of alternatives. Commenters provided specific suggestions to meet the objectives related to the COT report.

Commenters provided additional measures that should be considered in the alternatives, including,

- Pinyon-juniper restoration
- Specific objectives to measure success

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA.

During the development of the Proposed LUPA/Final EIS, the BLM and Forest Service coordinated with cooperating agencies, including the USFWS, to determine changes to the management actions and mitigation measures. The outcome from these meetings resulted in noted clarifications and edits to the alternatives in **Chapter 2** and impacts analysis related to pinyon-juniper in **Section 4.8**, Vegetation (Including Noxious Weeds; Riparian; and Wetlands), of the Proposed LUPA/Final EIS.

Specific habitat objectives have been included in the Proposed Plans, including the identification of percentages and heights for sagebrush, grasses and forbs. This is consistent with Draft LUPA/EIS Objective GRSG-2, which notes that "desired cover percentages and heights for sagebrush, grasses and forbs in seasonal habitats will be managed to meet habitat guidelines from scientific literature (e.g., Connelly et al. 2000 and Hagen et al. 2007)." The Draft LUPA/EIS also noted that "adjustments from the guidelines may be made, but must be based on documented regional variation of habitat characteristics…" Based on public comments requesting the guidelines from literature be included, as well as public and internal comments related to the timing of setting habitat objectives, the Proposed Plans incorporate a table that quantifies the objective contained in the Draft LUPA/EIS. As described in the Draft LUPA/EIS, the objectives included in the Proposed Plans are based on scientific literature, with any adjustments based on local GRSG use patterns as documented through on-the-ground research.

Section 26.2 - Best Available Information and Baseline Data

Summary

Commenters requested the Proposed LUPA/Final EIS be consistent with local GRSG management plans. The Proposed LUPA/Final EIS should use more accurate habitat mapping and scientific literature. The Draft LUPA/EIS fails to provide adequate baseline information.

Response

As described in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land use plan-level. The BLM and Forest Service reviewed suggested studies and references to determine if they presented new information that would need to be incorporated into the Proposed LUPA/Final EIS, were references already included in the Draft LUPA/EIS, or if the references provided the same information as already used or described in the Draft LUPA/EIS. Any study or reference that provided new relevant information was incorporated into the Proposed LUPA/Final EIS.

Section 26.3 - Impact Analysis

Summary

Commenters requested the BLM to analyze each contiguous block of occupied habitat and publish in the Proposed LUPA/Final EIS the percentage of sagebrush cover in that block. The

scientific findings for impacts to GRSG from reduced juniper encroachment are contradictory to the impacts in the Draft LUPA/EIS.

Response
As described in **Section 4.6**, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. As specific actions that may affect the area come under consideration, the BLM and Forest Service will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known.

The discussion of juniper treatment on page 4-90 of the Draft LUPA/EIS acknowledges the term "limited" only refers to the USFWS's empirical evidence that treatments haven't really increased populations. The term "limited" acknowledges one or two successful treatments but also recognizes other conflicting reports.

Section 26.5 - Mitigation Measures
Summary
Commenters requested clarification on several mitigation measures including what would be desirable nonnative seeds, how livestock grazing is managed post vegetation treatment, and how reclamation is counted towards disturbance thresholds.

Response
Mitigation has been further defined and is detailed in **Appendix D** of the Proposed LUPA/Final EIS. See **Section 4.9**, Monitoring and Mitigation, of this comment report for additional information on updates to the mitigation strategy.

Specific mitigation strategies, based on the Mitigation Strategy, will be developed by regional teams within one year of the issuance of the ROD and will be consistent with the BLM's Regional Mitigation Manual MS-1794, Forest Service Handbook FSH 1909.15, and CEQ regulations at 40 CFR 1508.20.

The Authorized officer at implementation will determine, "where probability of success of adapted seed availability is low", what other seeds could be acquired as to compete with nondesirable species, provide soil stability and as referenced in the same section, support GRSG habitat objectives. The specific type of desired seed would vary by site, elevation, precipitation and as mentioned availability. Mitigation measures for specific projects are implementation level decisions and will be included in site-specific analysis which is outside the scope of this EIS.

Monitoring efforts, as part of the Greater Sage-Grouse Monitoring Framework (**Appendix C**) in the Proposed LUPA/Final EIS, will include data for measurable quantitative indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions. This information will assist the BLM and Forest Service with identifying whether or not they are achieving their land use plan goals and objectives, reaching an adaptive management soft or hard trigger, as well as providing information relative to the disturbance cap. Specifically, habitat degradation (percent of human activity in a biologically significant unit), habitat availability

(percent of sagebrush in a biologically significant unit), and habitat degradation intensity (density of energy facilities and mining locations) was gathered to inform the disturbance cap in the Proposed LUPA/Final EIS.

Section 27 - Vegetation Riparian

Section 27.1 - Range of Alternatives

Summary

The alternatives in the Draft LUPA/EIS fail to address riparian conditions adequately.

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. During the development of the Proposed LUPA/Final EIS, the BLM and Forest Service coordinated with cooperating agencies, including the USFWS, to determine changes to the management actions and mitigation measures. The outcome from these meetings resulted in noted clarifications and edits to the alternatives in **Chapter 2** related to riparian conditions of the Proposed LUPA/Final EIS.

Section 27.2 - Best Available Information and Baseline Data

Summary

The Proposed LUPA/Final EIS should note that current proper functioning condition assessment methods need to be modified to incorporate GRSG needs.

Response

Modifications to proper functioning condition assessment methods are outside the scope of this planning effort.

Section 27.3 - Impact Analysis

Summary

The Draft LUPA/EIS failed to adequately analyze the impacts of water developments on riparian areas.

Response

As described in **Section 4.6**, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives.

The Draft LUPA/EIS adequately considered impacts to riparian areas from water developments in Section 4.7, Vegetation (Including Noxious Weeds; Riparian Areas; and Wetlands).

Section 28 - Visual Resources

Summary

The Draft LUPA/EIS fails to incorporate Garfield County's Visual Resource Management plan in any discussion; therefore, the Draft LUPA/EIS is inconsistent with the County plan.

Response
The BLM land use plans and amendments must be consistent with officially approved or adopted resource-related plans of local governments to the extent that these resource-related plans comport with FLPMA and other federal laws and regulations (see 43 CFR 1610). The BLM worked closely with local governments during preparation of the Draft LUPA/EIS. The BLM works to find a balance among uses and needs as reflected in these local government plans and has done so in the preparation of the LUPA/EIS; a list of these plans can be found in Section 1.8, Relationship to Other Policies, Plans, and Programs, of the Draft LUPA/EIS. This list has been updated with Garfield County's Visual Resource Management Plan. While the BLM is not obligated to seek consistency, the agency is required to describe the inconsistencies between the proposed action and the other plans, policies, and/or controls within the EIS. Inconsistencies with County Plans are described in **Section 6.5.2**, Inconsistencies with County Plans, Policies, and Procedures.

Section 29 - Water

Section 29.1 - Range of Alternatives

Summary
The BLM and Forest Service must defer decisions with regard to the size of ponds to those private landowners.

Response
As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA.

Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs, including the RDFs in Appendix L, Required Design Features for Preventing West Nile Virus, of the Draft LUPA/EIS, by the BLM Authorized Officer and the authorized officer of the surface management agency when approving an application for permit to drill. Existing leases would be developed consistent with applicable laws and valid existing rights, using as many of the RDFs and conservation measures as possible while still allowing reasonable opportunities for development.

Section 29.2 - Best Available Information and Baseline Data

Summary
Comments stated that the BLM cannot violate Utah laws and requested more stringent and expanded assessments of rangeland health and proper functioning condition.

Response
As stated in Section 4.1.1, Analytical Assumptions, of the Draft LUPA/EIS, implementing actions from any of the LUPA alternatives would be in compliance with all valid existing rights, federal regulations, BLM and Forest Service policies, and other requirements.

Utah's Standards for Rangeland Health and Guidelines for Grazing Management were developed in accordance with 43 CFR-4180 to provide for conformance with the Fundamentals of

Rangeland Health. Through conformance and attainment of BLM Utah's Public Land Health Standards, the BLM assures that the Fundamentals of Rangeland Health are met. It is beyond the scope of this LUPA/EIS to revise existing guidelines for rangeland health or technical reports for riparian-wetland areas.

Section 29.3 - Impact Analysis

Summary

Commenters requested that the impacts on water from eroding soil and manure be analyzed for each alternative; supporting documentation that fluid mineral development can have an adverse impact on water quality; and a description of how pinyon/juniper encroachment affects water resources.

Response

Section 4.6, Water Resources, of the Draft LUPA/EIS identifies impacts on water from eroding soil. A discussion of manure impacts on water resources was added to the Proposed LUPA/Final EIS in **Section 4.7**, Water Resources. Additional language on how pinyon/juniper encroachment affects water resources was added to **Sections 3.7**, Water Resources, and **4.7**, Water Resources, of the Proposed LUPA/Final EIS. Statements of energy development impacts on water resources have been revised in **Section 3.7**, Water Resources, in the Proposed LUPA/Final EIS.

Section 30 - Wild Horse and Burros

Summary

The commenters wanted the 25 percent reduction evaluated again based on the fact that only 2 percent of the GRSG habitat overlapped with herd management areas (HMAs).

Commenters suggested that the preferred alternative specifically identify the processes (i.e., NEPA) through which management activities will be considered and implemented (i.e., from Alternative B—MA-WHB-3, MA-WHB-4, MA-WHB-6).

Commenters also identified that passages from the Wild and Free-Roaming Horses and Burros Act were misquoted or edited not to reflect the intent of the act and requested revision to the text.

Response

As noted above in the response in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA.

The BLM protects, manages, and controls wild horses in accordance with the Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195, as amended), the purpose of which is to "manage wild horses and burros within HMAs designated for their long-term maintenance, in a manner designed to achieve and maintain a thriving natural ecological balance and multiple use relationships." The FLPMA directs the BLM to manage wild horses and burros as one of numerous multiple uses including mining, recreation, domestic grazing, and fish and wildlife. It also required a current inventory of wild horses and burros. Additional guidance is

found in 43 CFR 4700, Protection, Management, and Control of Wild Free-roaming Horses and Burros.

Several comments were related to decision making that falls outside the scope of the Utah Greater Sage-Grouse LUPA/EIS. Reducing the appropriate management level (AML) does fall within the legal mandate of the BLM to protect wild horses and burros. Through monitoring and data analysis, AMLs have been established and will continue to be adjusted based on the analysis of data. AMLs can be adjusted based on the limitations and capability of the range, including the four habitat components, while managing for healthy populations of wild horses and burros in balance with other uses and resources (including GRSG).

The current proportion of wild horse and burro AUMs compared to permitted livestock AUMs is fairly small across all HMAs. Many allotments reflect AMLs in which the AUMs are only a small percentage of the total AUMs allocated. In addition, despite the fact that the AML AUMs are much lower than the livestock AUMs, actual use by wild horses and burros has almost always exceeded the AML on average. Additionally, livestock operators generally do not use all of the available AUMs on an annual basis. Therefore, it is not valid to compare wild horse and burro AUMs and livestock AUMs.

Misquoted Wild and Free-Roaming Horses and Burros Act text has been revised in the Proposed LUPA/Final EIS where applicable.

Section 30.1 - Best Available Information and Baseline Data

Summary

Commenters requested documentation of critical genetic data on each of the wild horse and burro herds in the planning area to identify which HMAs would not be feasible to place AML reductions on while maintaining genetically viable herds.

Commenters stated that the NTT and COT reports did not clearly identify the differences between livestock and wild horse and burros, and their impacts on GRSG. Therefore, by using these two reports and their approach, the BLM and Forest Service wrongly categorized livestock and wild horses together under the description of livestock.

Commenters also stated that the National Academy of Sciences' 2013 recommendations for reform of federal wild horse management program did not appear to be utilized in this LUPA/EIS.

Response

As described in **Section 4.4**, Best Available Information and Baseline Data, of this comment report, the BLM and Forest Service considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land use plan-level.

The National Academy of Sciences' 2013 report has been considered in the development of the Proposed LUPA/Final EIS for actions appropriate to the land management planning level. Findings of the report would be considered under separate site-specific NEPA actions.

Genetic documentation of wild horses and burros is an ongoing implementation level process used to monitor the genetic health of the BLM's wild horse and burro populations (see IM 2009-061).

The USFWS did identify grazing as a threat in the NTT and COT reports, but did not specifically delineate between domestic and wild horse and burro grazing. However within the Draft LUPA/EIS, the BLM did analyze impacts on wild horses and burros, and domestic livestock grazing separately and also analyzed the impacts on GRSG from wild horses and burros, and domestic livestock grazing separately. Impacts to GRSG from wild horses and burros, and domestic livestock grazing are identified in Section 4.2, Special Status Species – Greater Sage-Grouse, of the Draft LUPA/EIS. Impacts on wild horses and burros from GSRG management strategies are identified in Section 4.10, Wild Horse and Burro Management, of the Draft LUPA/EIS.

Section 30.2 - Impact Analysis

Summary

The majority of commenters were concerned that the alternatives do not adequately protect wild horses and burros per BLM mandate. Commenters state that genetic impacts of the proposed plan must be thoroughly examined including scientific data to justify the claim that any removal and upheaval would not negatively affect the genetic diversity of wild horses and burros, and that any wild horses and burros allowed to remain would be adequate for the genetic viability and future survival of a self-sustaining population.

Commenters are also concerned that the analysis to GRSG from wild horses and burros are not distinguished from livestock, which inaccurately increases the threat. Specifically, wild horse HMAs impact 2 percent of the total mapped GRSG occupied habitat in the planning area, while livestock grazing occurs in 55 percent of the mapped GRSG occupied habitat.

Commenters identified contradictions in the Draft LUPA/EIS such as where the document states that "Under all alternatives, no direct change would occur to areas allocated as HMAs/wild horse and burro territories for wild horses and burros", then the Draft LUPA/EIS proceeds to summarize how every single alternative would restrict wild horse and burro usage in their own federally designated habitats.

Finally, commenters would like the BLM to take into account the social impacts by considering any alternative that could result in a reduction of wild horse and burro population numbers.

Response

As described in Section 4.6, Indirect Impacts, of this comment report, the Draft LUPA/EIS provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives.

Genetic documentation of wild horses and burros is an ongoing implementation level process used to monitor the genetic health of the BLM's wild horse and burro populations (IM 2009-061).

The BLM did analyze impacts to wild horse and burros, and domestic livestock grazing separately. The BLM also analyzed the impacts to GRSG from wild horse and burros, and domestic livestock grazing separately. Impacts to GRSG from wild horse and burros, and domestic livestock grazing are identified in Section 4.2, Special Status Species – Greater Sage-Grouse, of the Draft LUPA/EIS. Impacts to wild horse and burros from GSRG management strategies are identified in Section 4.10, Wild Horse and Burro Management, of the Draft LUPA/EIS. The BLM appropriately analyzed the impacts to wild horse and burros from actions not related to changes in AML.

Text in **Section 4.11.2**, Alternatives Analysis, has been reviewed and revised to clarify the distinction between direct impacts on HMAs from changes in AML numbers or acreages (which would occur only under Alternative C2) and indirect impacts on HMAs from restrictions on other uses in those areas.

Socioeconomic impacts are considered in Section 4.22, Social and Economic Impacts (Including Environmental Justice) of the Draft LUPA/EIS. The analysis in the Draft LUPA/EIS concluded that implementing management actions in the Utah Greater Sage-Grouse LUPA/EIS would have negligible social or economic impacts related to wild horse and burro management.

Section 31 – Wilderness Areas/Wilderness Study Areas

Summary

The BLM has not fully lived up to its obligations under Manual 6320, undertaking the process required for the planning and management of Lands with Wilderness Characteristics.

Response

BLM Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process, requires the BLM to update and maintain a wilderness inventory consistent with BLM wilderness characteristics inventory guidance. It also directs the BLM to use the land use planning process to determine how to manage lands with wilderness characteristics as part of the BLM's multiple-use mandate. However, BLM Manual 6320 also states, "In some circumstances, consideration of management alternatives for lands with wilderness characteristics may be outside the scope of a particular planning process (As dictated by the statement of purpose and need for the planning effort). For example, a targeted amendment to address a specific project or proposal may not in all circumstances require consideration of an alternative that would protect wilderness characteristics. In these situations, the NEPA document associated with the plan amendment must still analyze effects of the alternatives on lands with wilderness characteristics."

Inventories for wilderness characteristics were conducted from 1979 to the present and reflect the most up-to-date lands with wilderness characteristics baseline information for this planning area. In addition to the inventories conducted for the purposes of land use planning, lands with wilderness characteristics inventories will be updated for site-specific project NEPA analyses that are conducted in the planning area to determine if a project will have impacts on lands with wilderness characteristics identified through previous or updated inventory efforts.

As noted on page 1-4 of the Draft LUPA/EIS, the purpose of and need for the national GRSG planning effort is limited to making land use planning decisions specific to the conservation,

enhancement, and/or restoration of GRSG habitat specifically by reducing, eliminating, or minimizing threats to that habitat. No decisions related to the management of lands with wilderness characteristics will be made as part of this planning effort; therefore, management of lands with wilderness characteristics is considered outside the scope of this plan amendment process. Impacts on lands with wilderness characteristics from the alternatives being analyzed for this planning effort are presented in Section 4.14, Wilderness Characteristics, of the Draft LUPA/EIS.

Wilderness characteristics assessments are not applicable to National Forest System lands.

Section 32.1 - Predation

Summary

The Draft LUPA/EIS failed to adequately address impacts to GRSG from predation.

Response

As stated in Section 1.6.3, Issues Eliminated from Detailed Analysis, of the Draft LUPA/EIS, adding management actions specifically to manage predators is outside the scope of the amendment. However, the BLM and Forest Service have authority to manage the habitat and have provided numerous management actions to address predation risk across the range of alternatives (see **Sections 2.6**, Proposed Plan Amendments, and **2.10**, Detailed Comparison of Draft Alternatives, in the Proposed LUPA/Final EIS). For example, altering the sagebrush habitat of the GRSG can create an influx of predators into an area and lead to a GRSG population decline. Roads, fences, power lines, trails and other disturbances may make access easier for potential predators and increase risks to GRSG. The Draft LUPA/EIS describes the effects of predation on GRSG in Section 4.2, Special Status Species – Greater Sage-Grouse. A detailed description of predator conditions has been added to **Section 3.3.5**, Conditions in Population Areas, and **Appendix M**, Predation of Greater Sage-Grouse in the Utah Sub-Regional Planning Area, in the Proposed LUPA/Final EIS.

Section 32.2 - Noise

Summary

The BLM and Forest Service failed to provide the science behind how noise level criteria in the alternatives were determined. The BLM and Forest Service must provide the methodology for determining how background ambient noise levels are to be measured or evaluated.

Response

The Draft LUPA/EIS includes analysis on the effects of noise to GRSG in several areas in Chapter 4, including many references to scientific research specifically addressing the effects of noise on GRSG. The BLM and Forest Service LUP decisions do not include specific methodologies identifying how monitoring is to occur or how various indicators are to be measured. Incorporating such detail in a land use plan would require amendments whenever new approaches or technologies are developed. Such detail is best developed during implementation of the LUP where advances in technologies can be best incorporated on a site-specific level and applied as part of managing to the goals, objectives, desired conditions, and management actions identified in the LUPs.

Section 32.3 - Weeds

Summary

The Draft LUPA/EIS failed to adequately provide the baseline information of cheatgrass infestation and also failed to consider County designated noxious weeds. Commenters provided specific management actions to meet the COT report objectives.

Response

The Draft LUPA/EIS adequately described baseline conditions for cheatgrass infestations in the planning area; Section 3.2.2, Conditions in Population Areas, describes cheatgrass infestations by GRSG populations while Section 3.**7**, Vegetation (Including Noxious Weeds and Riparian and Wetlands Ecosystems, describes the baseline invasive vegetation conditions in the planning area.

As stated in Section 3.7.1, Conditions Statewide, of the Draft LUPA/EIS, the BLM and Forest Service work cooperatively with other federal, state, and county agencies as well as private landowners to prevent and control the spread of noxious weeds.

As noted above in **Section 4.3**, Range of Alternatives, of this comment report, Section 1.5, Planning Processes, of the Draft LUPA/EIS describes how the Utah Greater Sage-Grouse LUPA/EIS planning team employed the BLM and Forest Service planning process to develop a range of reasonable alternatives for the LUPA. The alternatives include management options to address the issue of invasive plants and during the development of the Proposed LUPA/Final EIS, the BLM and Forest Service coordinated with cooperating agencies, including USFWS, to determine changes to the management actions and mitigation measures. As such, no changes were warranted in the Proposed LUPA/Final EIS.

COMMENTER LIST

State and Local Governments, Organizations, and Businesses

American Bird Conservancy
American Exploration & Mining Association
American Petroleum Institute
American Wild Horse Preservation Campaign
Anadarko Petroleum
Avian Power Line Interaction Committee
Bear River Watershed Council
Beaver County
Blue Ribbon Coalition
Bowie Resource Partners, LLC
Bridgerland Audubon Society
Business Development CB Technologies, Inc.
C.E. Brooks & Associates, P.C.
Capital Trail Vehicle Association
Carbon County
Castle Country Adaptive Resource Management Group
Chew Livestock, Inc./Chew Ranch LLC;
Coalition of Local Governments

Community- Based Conservation Program
ConocoPhillips
Defenders of Wildlife
Department of the Air Force
Deseret Land and Livestock
Devon Energy Production Company L.P.
DreamCatcher Wild Horse and Burro Sanctuary
Duchesne County
Emery County
Enefit American Oil
EOG Resources, Inc.
Foundation for Quality Resource Management
Garfield County
Garkane Energy
Great Salt Lake Audubon
Harold Selman Inc.
Holsinger Law, LLC
Independent Petroleum Association
Industrial Minerals Association- North America
Ingham Springs LLC
International Mountain Bicycling Association
Iron County
Iron County Commission
J.R. Simplot Company
Johnson and Livestock LLC
Kane County Commission
Mom and Pop Products Co.
Motorcycle Industry Council
National Mining Association
National Park Service
Office of Governor Matthew Mead
Office of the Governor
Pearson Ranch
Petroleum Association of Wyoming
Piute County
Price River Watershed Conservation District
Public Lands Advocacy of America
Public Lands Council/ National Cattlemen's Beef Association
Public Lands Policy Coordination Office
QEP Energy Company
Randolph Land and Livestock
Rich County
Rocky Mountain Power
Sagebrush Habitat Conservation Fund
Sanpete County
Scholes

Sevier County
Sierra Club
Simplot Livestock
Snell & Wilmer L.L.P.
South Central Communications
Stevenson Intermountain Seed, Inc
Sweetwater County
The Nature Conservancy
The State of Wyoming
The Wilderness Society
TransWest Express LLC
US Fish and Wildlife Service
Uintah County
Utah Association of Counties
Utah Cattlemen's Association
Utah Farm Bureau Federation
Utah Mining Association
Utah Phosphate Company
Utah Reclamation Mitigation & Conservation Commission
Utah State University Extension
Vantage Energy Uinta, LLC
Wasatch Audubon Society
Wayne County
Western Counties Alliance
Western Energy Alliance
Western Watersheds Project
Wild Horse Education
Wild Utah Project
WildEarth Guardians
William Marsing Livestock, Inc.
Wintch Livestock Co.

Individuals

Auld, Misty
Barnard, Sue
Beattie, Jane
Belles, Mark
Berman, Kimberly
Blaisdell, Vickey
Bodker, Greg
Bredesen, Rhonda
Bremner, Brian
Brendemuehl , James
Bryant, Anna
Butera, Julie
Christensen, Kyle
Cushing, Georganna

Danielsen, Kim
Degraw, Catherine
Devlin, Marybeth
Dickey, Terry
Doane, Margaret
Dott, Cynthia
Eliason, David
Finn, Christie
Gardner, Elyse
Goodwin, Russell
Gregg, Kathleen
Griffiths, Sue
Hamilton, Danie
Hennessy, Eileen
Hill, Scott
Howell, Ryan
Hughes, Arlin
Jamison, Vickie
Johnson, Brian
Johnson, Ed
Johnson, Redge
Kershaw, Byard
Kunzler, Del Dee
Larsen, Jess
Larsen, Royce
Levi, Judy
Lish, Christopher
Long, Randall
Lynch, Janet
Marshall, Kent
Maxfield, Brien
McFarland, Mary Lou
McKee, Norman
McMullin, Bryant
Morell, Mack
Murphy, Jon
Nevin, Kandace
Newbold, Edward
O. Livingston, Thomas
Olsen, Dave
Oster, Sherry
Plover, Egret
Prescott, Lynne
Proubasta, Dolores
Public, Jean
Ramadorai, Kari

Robb, Albert
Rocklein, Christian
Rovner, Jeffrey
Ryan
Sanders, W Fred
Santerre, Gay and David
Schieron, Nanette
Schulthess, Wallace
Scott, William
Seal, Thom
Sendelbach, Barbara
Seyrig, Maria
Spackman, Ken
Spates, Georgeanne
Stone, Jeff
Suppers, Nora and Terry
Taft, Andrew
Tanner, Diane
Taroli, Gary
Thomlinson, John
Thompson, Larry
Waide, Sandra
Warr, Kelly
West, Logan
West, Reid
White, Sally
Wintch, Barbara
Wintch, Paul
Zeleny, Heather
Zocco, Rachelle

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