Utah Greater Sage-Grouse

Draft Land Use Plan Amendment and Environmental Impact Statement

Volume IV: Appendices G - W

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 Forest Service mission 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 G

Detailed No Action Alternative

APPENDIX G
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 1 (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.

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 H

Required Design Features for Fire and Fuels

APPENDIX H
REQUIRED DESIGN FEATURES FOR FIRE AND FUELS

FIRE OPERATIONS

1. Compile District/Forest level information into state-wide GRSG tool boxes. Tool boxes will contain maps, listing of resource advisors, contact information, local guidance, and other relevant information for each District/Forest, which will be aggregated into a state-wide document.
2. Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.
3. Assign a resource advisor who has GRSG expertise or access to GRSG expertise to all extended attack fires in or near GRSG habitat. Prior to the fire season, provide training to GRSG resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve state wildlife agency expertise in fire operations through:
    - instructing resource advisors during preseason trainings
    - qualification as resource advisors
    - coordination with resource advisors during fire incidents
    - contributing to incident planning with information such as habitat features or other key data useful in fire decision making
4. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in GRSG habitat areas.
5. As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines in order to minimize fire spread.
6. During periods of multiple fires, ensure line officers are involved in setting priorities.

7. To the extent possible, locate wildfire suppression facilities (e.g., base camps, spike camps, drop points, staging areas, and heli-bases) in areas where physical disturbance to GRSG habitat can be minimized. These include disturbed areas, grasslands, near roads/trails, or other areas where there is existing disturbance or minimal sagebrush cover.
8. Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and all-terrain vehicles prior to deploying in or near GRSG habitat areas to minimize noxious weed spread.
9. Minimize unnecessary cross-country vehicle travel during fire operations in GRSG habitat.
10. Minimize burnout operations in key GRSG habitat areas by constructing direct fireline whenever safe and practical to do so.
11. Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack.
12. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.
13. Adequately document fire operation activities in GRSG habitat for potential follow-up coordination activities.

FUELS MANAGEMENT

1. Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns that most benefit GRSG habitat.
2. Provide training to fuels treatment personnel on GRSG biology, habitat requirements, and identification of areas utilized locally.
3. Use burning prescriptions which minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion).
4. Ensure proposed sagebrush treatments are planned with full interdisciplinary input pursuant to the NEPA and coordination with state fish and wildlife agencies, and that treatment acreage is conservative in the context of surrounding GRSG seasonal habitats and landscape.
5. Where appropriate, ensure that treatments are configured in a manner that promotes use by GRSG.
6. Where applicable, incorporate roads and natural fuel breaks into fuel break design.
7. Power-wash all vehicles and equipment involved in fuels management activities, prior to entering the area, to minimize the introduction of undesirable and/or invasive plant species.
8. Design vegetation treatments in areas of high fire frequency that facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to GRSG habitat.

Additionally, develop maps for GRSG habitat which spatially display existing fuels treatments that can be used to assist suppression activities.

9. Give priority for implementing specific GRSG habitat restoration projects in annual grasslands, first to sites which are adjacent to or surrounded by preliminary priority management areas (PPMAs) or that reestablish continuity between priority habitats. Annual grasslands are a second priority for restoration when the sites are not adjacent to PPMA, but within 2 miles of PPMA. The third priority for annual grassland habitat restoration projects are sites beyond 2 miles of PPMA. The intent is to focus restoration outward from existing, intact habitat.
10. As funding and logistics permit, restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs or one of that referenced in land use planning documentation.
11. Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
12. Remove standing and encroaching trees within at least 110 yards of occupied GRSG leks and other habitats (e.g., nesting, wintering, and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit.
13. Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.
14. Reduce the risk of vehicle- or human-caused wildfires and the spread of invasive species by installing fuel breaks and/or planting perennial vegetation (e.g., greenstrips) paralleling road rights-of-way.
15. Strategically place and maintain pre-treated strips/areas (e.g., mowing and herbicide application) to aid in controlling wildfire should wildfire occur near PPMA or important restoration areas (such as where investments in restoration have already been made).

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Appendix I

Best Management Practices for Locatable Minerals and Required Design Features for Other Solid Minerals

APPENDIX I
BEST MANAGEMENT PRACTICES FOR LOCATABLE MINERALS AND REQUIRED DESIGN FEATURES FOR OTHER SOLID MINERALS

All best management practices for locatable minerals and required design features for other solid minerals (e.g., coal, nonenergy leasable minerals, and mineral materials) are applicable to priority habitat.

ROADS

- Design roads to an appropriate standard no higher than necessary to accommodate their intended purposes.
- Locate roads to avoid important areas and habitats.
- Coordinate road construction and use among right-of-way or special use authorization holders.
- Construct road crossing at right angles to ephemeral drainages and stream crossings.
- Establish speed limits on BLM and Forest Service system roads or design roads to be driven at slower speeds to reduce vehicle/wildlife collisions.
- Do not issue rights-of-way or special use authorizations to counties on mining development roads, unless for a temporary use consistent with all other terms and conditions including this document.
- Restrict vehicle traffic to only authorized users on newly constructed routes (e. g., use signing and gates).
- Use dust abatement practices on roads and pads.
- Close and reclaim duplicate roads by restoring original landform and establishing desired vegetation.

OPERATIONS

- Cluster disturbances associated with operations and facilities as closely as possible.
- Place infrastructure in already disturbed locations where the habitat has not been restored.
- Restrict the construction of tall facilities and fences to the minimum number and amount needed.
- Site and/or minimize linear rights-of-way or special use authorizations to reduce disturbance to sagebrush habitats.
- Place new utility developments (e.g., power lines and pipelines) and transportation routes in existing utility or transportation corridors.
- Bury power lines.
- Cover (e.g., fine mesh netting or use other effective techniques) all pits and tanks regardless of size to reduce sage-grouse mortality.
- Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.
- Control the spread and effects of non-native plant species (Gelbard and Belnap 2003; Bergquist et al. 2007).
- Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007). See **Appendix I**, Required Design Features for Preventing West Nile Virus.
- Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat:
  - Overbuild size of ponds for muddy and non-vegetated shorelines.
  - Build steep shorelines to decrease vegetation and increase wave actions.
  - Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
  - Construct dams or impoundments that restrict down slope seepage or overflow.
  - Line the channel where discharge water flows into the pond with crushed rock.
  - Construct spillway with steep sides and line it with crushed rock.
  - Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
- Require sage-grouse-safe fences around sumps.
- Clean up refuse (Bui et al. 2010).
- Locate man camps outside of priority sage-grouse habitats.

RECLAMATION

- Include restoration objectives to meet sage-grouse habitat needs in reclamation practices/sites.
- Address post reclamation management in reclamation plans such that goals and objectives are to protect and improve sage-grouse habitat needs.
- Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.
- Restore disturbed areas at final reclamation to pre-disturbance landform and desired plant community
- Irrigate interim reclamation as necessary during dry periods. Utilize mulching techniques to expedite reclamation.

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Appendix J

Required Design Features for Fluid Minerals

APPENDIX J
REQUIRED DESIGN FEATURES FOR FLUID MINERALS

ROADS

Priority Habitat

- Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
- Locate roads to avoid important areas and habitats.
- Coordinate road construction and use among right-of-way or special use authorization holders.
- Construct road crossings at right angles to ephemeral drainages and stream crossings.
- Establish speed limits on BLM and Forest Service system roads to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
- Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition).
- Do not issue rights-of-way or special use authorizations to counties on newly constructed energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.
- Restrict vehicle traffic to only authorized users on newly constructed routes using signage, gates, etc.
- Use dust abatement on roads and pads.
- Close and rehabilitate duplicate roads.

General Habitat

- Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.

- Do not issue rights-of-way or special use authorizations to counties on energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.
- Establish speed limits to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
- Coordinate road construction and use among right-of-way or special use authorization holders.
- Construct road crossings at right angles to ephemeral drainages and stream crossings.
- Use dust abatement practices on roads and pads.
- Close and reclaim duplicate roads by restoring original landform and establishing desired vegetation.

OPERATIONS

Priority Habitat

- Cluster disturbances, operations (e.g., fracture stimulation and liquids gathering), and facilities.
- Use directional and horizontal drilling to reduce surface disturbance.
- Place infrastructure in already disturbed locations where the habitat has not been fully restored.
- Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.
- Apply a phased development approach with concurrent reclamation.
- Place liquid gathering facilities outside of priority areas. Have no tanks at well locations within priority habitat areas to minimize truck traffic and perching and nesting sites for ravens and raptors. Pipelines must be under or immediately adjacent to the road (Bui et al. 2010).
- Restrict the construction of tall facilities and fences to the minimum number and amount needed.
- Site and/or minimize linear rights-of-way or special use authorizations to reduce disturbance to sagebrush habitats.
- Place new utility developments (e.g., power lines and pipelines) and transportation routes in existing utility or transportation corridors.
- Bury distribution power lines.
- Collocate powerlines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010).

- Design or site permanent structures which create movement (e.g. pump jack) to minimize impacts on Greater Sage-Grouse.
- Cover (with fine mesh netting or other effective techniques) all drilling and production pits and tanks regardless of size to reduce Greater Sage-Grouse mortality.
- Equip tanks and other above-ground facilities with structures or devices that discourage nesting of raptors and corvids.
- Control the spread and effects of non-native plant species by washing vehicles and equipment (Evangelista et al. 2011).
- Use only closed-loop systems for drilling operations and no reserve pits.
- Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).
- Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat:
  - Overbuild size of ponds for muddy and non-vegetated shorelines.
  - Build steep shorelines to decrease vegetation and increase wave actions.
  - Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
  - Construct dams or impoundments that restrict down slope seepage or overflow.
  - Line the channel where discharge water flows into the pond with crushed rock.
  - Construct spillway with steep sides and line it with crushed rock.
  - Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
- Limit noise to less than 10 decibels above ambient measures (20 to 24 decibels) at sunrise at the perimeter of a lek during active lek season (Patricelli et al. 2010; Blickley et al. In preparation).
- Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.
- Fit transmission towers with anti-perch devices (Lammers and Collopy 2007).
- Require sage-grouse-safe fences.
- Locate new compressor stations outside priority habitats and design them to reduce noise that may be directed towards priority habitat.
- Clean up refuse (Bui et al. 2011).
- Locate man camps outside of priority habitats.

General Habitat

- Cluster disturbances, operations (e.g., fracturing stimulation and liquids gathering), and facilities.
- Use directional and horizontal drilling to reduce surface disturbance.
- Clean up refuse (Bui et al. 2010)
- Restrict the construction of tall facilities and fences to the minimum number and amount needed.
- Cover (with fine mesh netting or other effective techniques) all drilling and production pits and tanks regardless of size to reduce sage-grouse mortality.
- Equip tanks and other above-ground facilities with structures or devices that discourage nesting by raptors or corvids.
- Use remote monitoring techniques for production facilities and develop a plan to reduce vehicular traffic frequency of vehicle use.
- Control the spread and effects from non-native plant species. (e.g., by washing vehicles and equipment.)
- Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007). See **Appendix I**, Required Design Features for Preventing West Nile Virus.

RECLAMATION

Priority Habitat

- Include objectives for ensuring habitat restoration to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.
- Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.
- Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.
- Irrigate interim reclamation if necessary for establishing seedlings more quickly.
- Utilize mulching techniques to expedite reclamation and to protect soils.

General Habitat

- Include restoration objectives to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plan such that goals and objectives are to enhance or restore sage-grouse habitat.

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Appendix K

Stipulations Associated with Land Use Authorizations

APPENDIX K
STIPULATIONS ASSOCIATED WITH LAND USE AUTHORIZATIONS

This appendix lists by alternative surface stipulations for new oil and gas leases referred to throughout this Draft Land Use Plan Amendment (LUPA) and Draft Environmental Impact Statement (EIS). In addition to oil and gas leases, these surface stipulations would also apply, where appropriate and practical, to other surface disturbing activities (and occupancy) associated with land use authorizations, permits, and leases issued on BLM-administered or National Forest System lands. The stipulations would not apply to other activities and uses where they are contrary to laws, regulations, or policy for specific land use authorizations. The intent is to manage other activities and uses in the same manner as oil and gas leasing.

Surface disturbing activities are those that normally result in more than negligible disturbance to public lands. These activities normally involve disturbance to soils and vegetation to the extent that reclamation is required. They include, but are not limited to, the use of mechanized earth-moving equipment; truck-mounted drilling equipment; geophysical exploration; off-road vehicle travel in areas designated as limited or closed to off-highway vehicle (OHV) use; placement of surface facilities such as utilities, pipelines, structures, and oil and gas wells; new road construction; and use of pyrotechnics, explosives, and hazardous chemicals. Surface disturbing activities would not include livestock grazing, cross-country hiking, driving on designated routes, and minimum impact filming permits.

DESCRIPTION OF SURFACE STIPULATIONS

Table K.1, Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria, shows the stipulations for Alternatives A, D, and E-1 including exceptions, modifications, and waivers by alternative. Three surface stipulations could be applied to land use authorizations: (1) no surface occupancy (NSO), (2) timing limitations (TL), and (3) controlled surface use (CSU). There are no stipulations included for Alternatives B and C because they are closed to all oil and gas activities. All stipulations for other resources, besides Greater Sage-Grouse (sage-grouse or GRSG), included in the existing land use plans would still be applicable.

Areas identified as NSO would be closed to surface disturbing activities. An NSO stipulation cannot be applied to locatable minerals without a withdrawal. A withdrawal is not a land use planning decision because it must be approved by the Secretary of the Interior.

Areas identified as TL would be closed to surface disturbing activities during identified time frames. TL areas would be open to operational and maintenance activities, including associated vehicle travel, during the closed period unless otherwise specified in the stipulation.

Areas identified as CSU would require proposals to be authorized only according to the controls or constraints specified. The controls would be applicable to all surface disturbing activities.

RELIEF FROM STIPULATIONS

With regard to oil and gas, surface stipulations could be excepted, modified, or waived by the authorized officer. An exception exempts the holder of the land use authorization document from the stipulation on a one-time (or case-by-case) basis. A modification changes the language or provisions of a surface stipulation, either temporarily or permanently. A waiver permanently removes the stipulation from the lease. The environmental analysis document prepared for site-specific proposals such as oil and gas development (i.e., master development plans applications for permit to drill or sundry notices) also would need to address proposals to exempt, modify, or waive a surface stipulation.

On National Forest System lands, this process would follow regulatory requirements at 36 CFR 228.104. This process includes ensuring compliance with NEPA, and assessing if the action would be consistent with applicable federal laws, the current land and resource management plan, and meet the management objectives.

On BLM-administered lands, to exempt, modify, or waive a stipulation, the environmental analysis document would have to show that (1) the circumstances or relative resource values in the area had changed following issuance of the lease, (2) less restrictive requirements could be developed to protect the resource of concern, and (3) operations could be conducted without causing unacceptable impacts.

With respect to granting relief to stipulations on other types of authorizations, such as solid mineral leases, land use authorizations, etc. any changes to the contractual nature of these instruments would require environmental review and coordination with the Lessee, permit or authorization holder when specific surface disturbing activities are proposed via an operation plan, permitting action or similar instrument.

STANDARD TERMS AND CONDITIONS

All surface disturbing activities are subject to standard terms and conditions. These include the stipulations that are required for proposed actions in order to comply with the Threatened and Endangered Species Act. Standard terms and conditions for oil and gas leasing provide for relocation of proposed operations up to 200 meters and for prohibiting surface disturbing operations for a period not to exceed 60 days. The stipulations addressed in **Table K.1** that are within the parameters of 200 meters and 60 days are considered open to oil and gas leasing subject to standard terms and conditions.

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
No surface occupancy within 1/2 mile of greater sage-grouse leks. Price Field Office	**Exception:** The authorized officer may grant an exception if an environmental analysis demonstrates that the action will not impair the function or utility of the site for current or subsequent reproductive display, including daytime loafing/staging activities, and/or will not result in development of a permanent aboveground structure within 1/2 mile of a lek. **Modification:** The authorized officer may modify the NSO area in extent if an environmental analysis finds that a portion of the NSO area is nonessential to site utility or function, or if further analysis shows that the size or location of the lek has changed, or that the proposed action could be conditioned to not impair the function or utility of the site for current or subsequent reproductive display including daytime loafing/staging activities. **Waiver:** A waiver may be granted if there are no active lek sites and it is determined the sites have been completely abandoned or destroyed or occur outside the initial identified area, as determined by BLM.
No surface occupancy for oil and gas leasing within 1/2 mile of greater sage-grouse leks. Richfield Field Office	**Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated. **Modification:** The authorized officer 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. **Waiver:** A waiver may be granted if there are no active lek site(s) in the leasehold and it is determined the site(s) have been completely abandoned or destroyed or occur outside current defined area, as determined by the BLM.
No surface-disturbing activities within 1/4 mile of active sage grouse leks year round. Vernal Field Office	**Exception:** None **Modification:** None **Waiver:** None
No surface occupancy within ½ mile of a greater sage-grouse lek site. Kanab Field Office	**Exception:** An exception may be granted by the Authorized Officer if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated. **Modification:** The Authorized Officer 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.

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
	Waiver: A waiver may be granted if there are no active lek site(s) in the leasehold and it is determined the site(s) have been completely abandoned or destroyed or occur outside current defined area, as determined by the BLM.
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. Uinta National Forest	**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) **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
No surface occupancy or use is allowed within 1 mile of sage-grouse leks (all habitats), and between 1 and 2 miles of sage-grouse leks within sagebrush habitat only. Dixie National Forest	**For the Purpose Of:** Protecting breeding and brood rearing sage grouse from predation, displacement, habitat fragmentation, and disturbance. Preventing any loss of viability to sage grouse populations. **Exception:** Seismic activities, including blasting, would be limited during the lekking period: March 1– May 15. A request for a waiver, exception, or modification (WEM) to the above lease stipulation may be requested along with the submission of a Surface Use Plan of Operations (36 CFR 228.104). Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).
In order to protect sage grouse strutting grounds, exploration, drilling, and other development activity will not be allowed during the period from March 1 through May 15. This limitation does not	**Exception:** Exceptions to this limitation in any year may be specifically approved in writing by the authorized officer of the BLM. **Modification:** None **Waiver:** None

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
apply to maintenance and operation of producing wells. Cedar City Field Office	
In order to protect sage grouse strutting grounds, exploration, drilling, and other development activity will not be allowed during the period from April 1 through June 15. This limitation does not apply to maintenance and operation of producing wells. Salt Lake Field Office	**Exception:** Exceptions to this limitation in any year may be specifically approved in writing by the authorized officer of the BLM. **Modification:** None **Waiver:** None
In order to protect sage grouse strutting grounds, exploration, drilling, and other development activity will not be allowed during the period from March 1 through May 15. This limitation does not apply to maintenance and operation of producing wells. Salt Lake Field Office	**Exception:** Exceptions to this limitation in any year may be specifically approved in writing by the authorized officer of the BLM. **Modification:** None **Waiver:** None
In order to protect crucial sage grouse breeding complexes, exploration, and drilling and other development activity within 0.5 mile radius of the complexes will be allowed from June 16 to March 14. This limitation does not apply to maintenance and operation of producing wells. Salt Lake Field Office	**Exception:** 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 Utah Division of Wildlife Resources (UDWR) and, if appropriate, the USF&WS. 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 UDWR that the population no longer used the complex and no longer requires protection from disturbing activities for fluid mineral leasing and exploration. **Modification:** None **Waiver:** None
In order to protect important seasonal sage grouse breeding areas, exploration, drilling, and other development activity will be allowed during the period from May 1 through March 14. This imitation does not apply to maintenance and operation of	**Exception:** Exceptions to this imitation in any year may be specifically authorized in writing by the authorized officer of the BLM. **Modification:** None **Waiver:** None

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
producing wells. Cedar City Field Office	
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. Uinta National Forest	**For the Purpose Of:** Protecting breeding and brood-rearing sage grouse from disturbance. **Exception:** None **Modification:** None **Waiver:** None
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. Uinta National Forest	**For the Purpose Of:** Protecting breeding and brood-rearing sage grouse from predation, habitat fragmentation, and disturbance. **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.
No surface disturbing or otherwise disruptive activities within 2 miles of a known greater sage-grouse lek from March 15 to July 15. Price Field Office	**Exception:** The authorized officer may grant an exception if an environmental analysis demonstrates that the action would not impair the function or utility of the habitat for nesting or early brood-rearing activities. **Modification:** Season may be adjusted depending on climatic and habitat conditions. Disturbance could occur if the activity were proposed to occur within the buffer, but would occur in non-sagebrush habitat, i.e., the activity could be allowed if it was not in sage-grouse habitat and did not in some other way disturb nesting or brood-rearing activity.

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
	Waiver: This stipulation may be waived if, in cooperation with UDWR, it is determined that the site has been permanently abandoned or unoccupied for a minimum of 5 years.
No surface disturbing or otherwise disruptive activities within 2 miles of a greater sage-grouse lek from March 15 to July 15 to protect sage grouse breeding and brood-rearing habitat. Richfield Field Office	**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 authorized officer 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 authorized officer 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.
No surface-disturbing activities within 2 miles of active sage grouse leks in mapped brood rearing and nesting habitat from March 1 - June 15. Vernal Field Office	**Exception:** None **Modification:** None **Waiver:** None
Within 1/2 mile 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. Vernal Field Office	**Exception:** None **Modification:** None **Waiver:** None
No permanent facilities or structures would be allowed within 2 miles sage grouse leks when possible. Vernal Field Office	**Exception:** None **Modification:** None **Waiver:** None
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	**Exception:** None **Modification:** None **Waiver:** None

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
to maintenance and operation of producing wells. Salt Lake Field Office	
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). Uinta NF	**For the Purpose Of:** Protecting sage grouse during the critical breeding and brood-rearing season. **Exception:** An exception may be granted if the proposed activity is at least 4 miles from any lek, there are no practical alternatives, and the authorized officer determines through analysis and in consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources that the nature of the actions, as proposed or conditioned, could be fully mitigated. **Modification:** A modification may be granted if the authorized officer determines thru new habitat studies, coordinated with the U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources, that a portion of the leasehold affected by this stipulation does not contain sage grouse breeding or brood-rearing habitat. **Waiver:** A waiver may be granted if the authorized officer determines thru new habitat studies, coordinated with the U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources, that the entire lease area affected by this stipulation does not contain any sage grouse breeding or brood-rearing habitat.
Surface occupancy or use is subject to the following special operating constraints: 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.	**For the Purpose Of:** To avoid a substantial loss of sage grouse brooding habitat and to ensure brood rearing success and to avoid a loss of viability to sage grouse populations on the Dixie National Forest. A request for a waiver, exception, or modification (WEM) to the above lease stipulation may be requested along with the submission of a Surface Use Plan of Operations (36 CFR 228.104). Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
No surface disturbing or otherwise disruptive activities (e.g., construction and maintenance) nesting and brood-rearing habitat from March 15 to July 15 within 2 miles of a greater sage-grouse lek. Kanab Field Office	**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 authorized officer 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 authorized officer 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.
No permanent structures or facilities (i.e., lasting more than 1 year) in winter habitat. Uinta NF	**For the Purpose Of:** Protecting wintering sage grouse from predation, habitat fragmentation, and disturbance. **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.
Protecting sage grouse during the critical winter 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).	**For the Purpose Of:** Protecting sage grouse during the critical winter season. **Exception:** An exception may be granted if there are no practical alternatives, and the authorized officer determines through analysis and in consultation with the U.S. Fish and Wildlife Service and coordination with the Utah Division of Wildlife Resources that the nature of the actions, as proposed or conditioned, could be fully mitigated. **Modification:** A modification may be granted if the authorized officer determines thru new habitat studies, coordinated with the U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources, that a portion of the leasehold affected by this

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative A – Stipulations	
Stipulation	**Stipulation Description**
Uinta National Forest	stipulation does not contain sage grouse winter habitat. **Waiver:** A waiver may be granted if the authorized officer determines thru new habitat studies, coordinated with the U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources, that the entire lease area affected by this stipulation does not contain any sage grouse winter habitat.
No surface disturbing or otherwise disruptive activities in greater sage-grouse winter habitat from December 1 to March 14. Kanab Field Office	**Exception:** An exception could be granted if surveys determine that the greater sage-grouse 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 authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be avoided, sufficiently minimized, or adequately mitigated. **Modification:** The authorized officer 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.
No surface disturbing or otherwise disruptive activities within Greater sage-grouse winter habitat areas seasonally from December 1 to March 14. Price Field Office	**Exception:** Upon review and monitoring, the Authorized Officer may grant exceptions because of climatic and/or habitat conditions if certain criteria are met and if activities would not cause undue stress to wintering greater sage-grouse. **Modification:** Season may be adjusted depending on climatic and habitat conditions. **Waiver:** This stipulation may be waived if, in cooperation with the State wildlife agency, it is determined that the site has been permanently abandoned or unoccupied for a minimum of 5 years.
No surface disturbing or otherwise disruptive activities in greater sage-grouse winter habitat from December 15 through March 14. Richfield Field Office	**Exception:** An exception could be granted if surveys determine that the Greater sage-grouse 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 authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be avoided, sufficiently minimized, or adequately mitigated. **Modification:** The authorized officer 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.

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Alternative A – Stipulations	
Stipulation	**Stipulation Description**
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. Salt Lake Field Office	**Exception**: Exceptions to this limitation in any year may be specifically approved in writing by the authorized officer of the BLM. **Modification:** None **Waiver:** None

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Priority Habitat – Alternative D	
Stipulation	**Stipulation Description**
No surface occupancy in areas outside of GRSG habitat but within one mile of an occupied lek, when the lek is located within PPMAs.	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG in proximity of the lek from habitat loss and GRSG populations from disturbance inside and out of priority habitat areas. **Exception:** Exceptions to the NSO could be granted by the Authorized Officer if the following conditions are met: access through GRSG habitat to the activity in the non-habitat area occurs only on existing routes, and no new roads, maintenance, or improvements to roads would be required within GRSG habitat; no activity would be permitted or authorized if it would establish a valid existing right that would subsequently require construction of new routes within GRSG habitat for access; access to the activity for construction, maintenance, etc. would be required to avoid applicable GRSG sensitive seasons (i.e., breeding, brood-rearing, winter) and time periods (2-hours before sunrise to 2-hours after sunrise near leks during breeding season); the non-habitat does not provide important connectivity between habitats; impacts to areas adjacent to PPMAs can be reduced or eliminated (e.g., sound, tall structures). **Modification:** None **Waiver:** A waiver may be granted if the lek is determined to be unoccupied as determined by DWR.
No surface occupancy occupied habitat within 4 miles of a lek located within PPMAs.	**Purpose:** To protect occupied GRSG leks and associated seasonal habitat, life-history, or behavioral needs of GRSG in proximity to leks, from habitat fragmentation and loss and GRSG populations from disturbance inside priority habitat areas and connectivity habitat areas. **Exception:** Exceptions to the NSO could be granted by the Authorized Officer if the following conditions are met: access through GRSG habitat to the activity in the non-habitat area occurs only on existing routes, and no new roads, maintenance, or improvements to roads would be required within GRSG habitat; no activity would be permitted or authorized if it would establish a valid existing right that would subsequently require construction of new routes within GRSG habitat for access; access to the activity for construction, maintenance, etc. would be required to avoid applicable GRSG sensitive seasons (i.e., breeding,

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Priority Habitat – Alternative D	
Stipulation	**Stipulation Description**
	brood-rearing, winter) and time periods (2-hours before sunrise to 2-hours after sunrise near leks during breeding season); the non-habitat does not provide important connectivity between habitats; impacts to areas adjacent to PPMAs can be reduced or eliminated (e.g., sound, tall structures). **Modification:** None **Waiver:** A waiver may be granted if the lek is determined to be completely abandoned, destroyed or occur outside the initial identified area, as determined by the BLM and DWR.
No surface disturbance allowed between November 15 – March 14, in winter habitat.	**Purpose:** To seasonally protect GRSG winter habitat areas from disruptive activities within priority habitat areas. **Exception:** Exceptions to the seasonal restrictions could be granted by the Authorized Officer under the following conditions: if the project plan and NEPA document demonstrate the project would not impair the function of seasonal habitat, life-history, or behavioral needs of GRSG; if the potential short-term impacts from vegetation treatment are off-set by long-term improvement to the quantity or quality of habitat (e.g., seedings, juniper reduction). **Modification:** The Authorized Officer may modify the seasonal restrictions and use restrictions under the following conditions: if portions of the area do not include winter habitat (lacking the principle habitat components of winter GRSG habitat) or are outside the current defined winter GRSG areas, as determined by the BLM/FS in discussion with the UDWR, and indirect impacts would be mitigated; if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None
No surface disturbance allowed between April 15 – July 15, in GRSG brood-rearing habitat.	**Purpose:** To seasonally protect brood-rearing GRSG habitat from disruptive activity. **Exception:** Exceptions to the seasonal restrictions could be granted by the Authorized Officer under the following conditions:

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Priority Habitat – Alternative D	
Stipulation	**Stipulation Description**
	if surveys determine that the lek is not active that year (based on UDWR lek survey protocol), and the proposed activity will not result in a permanent disturbance and will not take place beyond the season being excepted; if surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; if the project plan and NEPA document demonstrate the project would not impair the function of seasonal habitat, life-history, or behavioral needs of GRSG; if the potential short-term impacts from vegetation treatment are off-set by long-term improvement to the quantity or quality of habitat (e.g., seedings, juniper reduction). **Modification:** The Authorized Officer may modify the seasonal restrictions under the following conditions: if portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the defined area, as determined by the BLM/ Forest Service in discussion with the State of Utah, and indirect impacts would be mitigated; if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None
No surface disturbance allowed between Feb. 15 – June 15, within breeding and nesting habitat (4-miles of a lek).	**Purpose:** To seasonally protect breeding and nesting GRSG habitat from disruptive activity in priority habitat areas. **Exception:** Exceptions to the seasonal restrictions could be granted by the Authorized Officer under the following conditions: if surveys determine that the lek is not active that year (based on UDWR lek survey protocol), and the proposed activity will not result in a permanent disturbance and will not take place beyond the season being excepted; if surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; if the project plan and NEPA document demonstrate the project would not impair the function of seasonal habitat, life-history, or behavioral needs of GRSG;

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Priority Habitat – Alternative D	
Stipulation	**Stipulation Description**
	if the potential short-term impacts from vegetation treatment are off-set by long-term improvement to the quantity or quality of habitat (e.g., seedings, juniper reduction). **Modification:** The Authorized Officer may modify the seasonal restrictions under the following conditions: if portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the defined area, as determined by the BLM/ Forest Service in discussion with the State of Utah, and indirect impacts would be mitigated; if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None
Surface occupancy or use within the 4-mile buffer of a lek outside of PPMAs is subject to the following operating constraints: the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season) and the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography).	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG of the lek from habitat loss and populations from disturbance outside of PPMAs. **Exception:** None **Modification:** None **Waiver:** A waiver may be granted if the lek is determined to be unoccupied as determined by DWR.
Surface occupancy or use in occupied habitat is subject to the following operating constraints:	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG from habitat loss and GRSG populations from disturbance in PPMAs.

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Priority Habitat – Alternative D	
Stipulation	**Stipulation Description**
the development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season) the development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography)	**Exception:** None **Modification:** None **Waiver:** None
Operators must submit a site-specific plan of development for roads, wells, pipelines and other infrastructure prior to any development being authorized; this plan should outline how development on the lease will limit habitat fragmentation before surface occupancy or use is allowed in habitat.	**Purpose:** To protect PPMAs and the life-history needs of GRSG from habitat loss and GRSG populations from disturbance and limit fragmentation in PPMAs. **Exception:** None **Modification:** None **Waiver:** None
Surface occupancy or use is not allowed within PPMAs unless the area has not exceeded the 5% disturbance limit.	**Purpose:** To protect PPMAs and the life-history needs of GRSG from habitat loss and GRSG populations from disturbance and limit fragmentation in PPMAs. **Exception:** Small localize disturbance may exceed 5% if discrete disturbances are consolidated and localized and it is shown through an environmental compliance document that the total areas with discrete disturbances does not exceed 5% in the identified disturbance calculation area and that the consolidation of the disturbance in the area would be beneficial to the GRSG population. This could result in small areas where existing and proposed disturbances exceed 5% if total disturbances in the identified disturbance calculation area equals or is less than 5%. **Modification:** None

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Priority Habitat – Alternative D	
Stipulation	**Stipulation Description**
	Waiver: None
Surface occupancy or use is subject to the following special operating constraints: Development is required to incorporate all design features identified in Appendix D (of the NTT Report).	**Purpose:** To protect occupied GRSG habitat and the life-history needs of GRSG from habitat loss, fragmentation and to limit GRSG habitat disturbance. **Exception:** An exception to this stipulation could be granted by the Authorized Officer unless one of the following is demonstrated through an environmental compliance document 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 practice 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 GRSG or its habitat than not following it, for the specific project being proposed. **Modification:** None **Waiver:** None

General Habitat – Alternative D	
Stipulation	**Stipulation Description**
No surface disturbance within one mile of an occupied lek located within PGMAs. This stipulation applies whether or not the area is within GRSG habitat.	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG in proximity of the lek from habitat loss and GRSG populations from disturbance inside and out of PGMAs. **Exception:** The authorized officer may grant an exception in coordination with UDWR during project implementation and if best management practices (e.g., anti-perch devices for raptors, etc.) are implemented. **Modification:** None **Waiver:** This stipulation within PGMAs could be waived, except for within the seasonal stipulations, if off-site mitigation coordinated with the Authorized Officer and the State of Utah is successfully completed in PPMAs.
No surface disturbance allowed between November 15 – March 14.	**Purpose:** To seasonally protect winter GRSG habitat from disruptive activity in PGMAs. **Exception:** Exceptions to the seasonal restrictions could be granted Authorized Officer under the following conditions: if the project plan and NEPA document demonstrate the project would not impair the function of seasonal habitat, life-history, or

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General Habitat – Alternative D	
Stipulation	**Stipulation Description**
	behavioral needs of GRSG; if the potential short-term impacts from the action are off-set by long-term improvement to the quantity or quality of habitat (e.g., seedings, juniper reduction) **Modification:** the Authorized Officer may modify the seasonal restrictions under the following conditions: if portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the current defined area, as determined by the BLM/Forest Service in discussion with the State of Utah, and indirect impacts would be mitigated; if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** The Authorized Officer may waive the timing limitation if off-site mitigation is successfully completed in PPMAs, following discussion with BLM/Forest Service and the State of Utah. Even in situations where use restrictions are waived in PGMAs, to avoid direct disturbance and/or mortality of birds, disturbances would not be approved during the sensitive seasons.
No surface disturbance allowed between April 15 – July 15, in brood-rearing habitat.	**Purpose:** To seasonally protect brood-rearing GRSG habitat from disruptive activity in PGMAs. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted Field Manager/Forest Supervisor under the following conditions: if surveys determine that the lek is not active that year (based on DWR lek survey protocol), and the proposed activity will not take place beyond the season being excepted; if surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; if the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated; **Modification:** Additionally, the Field Manager/Forest Supervisor may modify the seasonal restrictions and use restrictions under the following conditions: if portions of the area do not include habitat (lacking the principle habitat components of brood-rearing GRSG habitat) or are outside

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General Habitat – Alternative D	
Stipulation	**Stipulation Description**
	the current defined brood-rearing area, as determined by the BLM/FS in discussion with the UDWR, and indirect impacts would be mitigated; if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
No surface disturbance allowed between Feb. 15 – June 15.	**Purpose:** To seasonally protect breeding and nesting GRSG habitat from disruptive activity in PGMAs. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted Field Manager/Forest Supervisor under the following conditions: if surveys determine that the lek is not active that year (based on DWR lek survey protocol), and the proposed activity will not take place beyond the season being excepted; if surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; if the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated; **Modification:** Additionally, the Field Manager/Forest Supervisor may modify the seasonal restrictions and use restrictions under the following conditions: if portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the current defined breeding and nesting habitat area, as determined by the BLM/FS in discussion with the UDWR, and indirect impacts would be mitigated; if documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None
Surface occupancy or use in occupied habitat is subject to the following operating constraints:	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG of the lek from habitat loss and GRSG populations from disturbance outside of PGMAs.

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General Habitat – Alternative D	
Stipulation	**Stipulation Description**
the activity meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from two hours before to two hours after sunrise and sunset during breeding season); the activity meets permanent (structure persists through subsequent breeding season) tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography);	**Exception:** None **Modification:** None **Waiver:** Application of the above use restrictions and meeting objectives within PGMAs may be waived by the Field Manager/Forest Supervisor if off-site mitigation is successfully completed in PPMAs or opportunity areas, following discussion with BLM/FS and UDWR. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.
Surface disturbing activities within GRSG would require coordination with UDWR during project implementation and implementation of best management practices (e.g., anti-perch devices for raptors, etc.)	**Purpose:** To minimize disturbance to GRSG within PGMAs. **Exception:** None **Modification:** None **Waiver:** Application of the above use restrictions and meeting objectives within general habitat may be waived by the Field Manager/Forest Supervisor if off-site mitigation is successfully completed in priority habitat or opportunity areas, following discussion with BLM/FS and UDWR. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.

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Alternative E-1	
Stipulation	**Stipulation Description**
No surface occupancy within 1 mile of an occupied lek if the lek is located within a SGMA	**Purpose:** To minimize disturbance to breeding and nesting GRSG. **Exception:** If the Authorized Officer may grant an exception if the disturbance or activity is not visible to the GRSG using the lek or if there is no other feasible placement for that activity. While the NSO stipulation may be excepted, minimization and/or mitigation would be required for development in these areas. **Modification:** None **Waiver:** None
Surface occupancy or use in occupied habitat is subject to the following operating constraints: Under certain circumstances, a general limit on new permanent disturbance of 5% of habitat on state or federally managed lands within any particular State of Utah SGMA..	**Purpose:** The fundamental purpose of this provision is to limit the effects of a large amount of disturbance to the existing habitat or activities of the GRSG **Exception:** If the SGMA crosses a county line then the 5% limitation would be apportioned to each county in proportion to the total amount of GRSG within the larger area. **Modification:** If it should become sufficiently apparent through an interagency review effort coordinated by the PLPCO to insure consistency in interpretation throughout the state that an accurate determination of the base for the limitation calculation is not feasible, then the interagency coordination effort may propose and seek approval for an alternative measurement of, or technique to measure, the cumulative effects of disturbance. **Waiver:** None
Surface occupancy or use in winter habitat is subject to the following operating constraints: Avoid activities (construction, vehicle noise, etc.) that will disturb GRSG use of the seasonal area from November 15 – March 15.	**Purpose:** The purpose of this stipulation is to limit disturbance to the seasonal use of GRSG winter habitat. **Exception:** The specific time and distance determinations for the winter seasonal stipulation would be based on site-specific conditions, in coordination with the local UDWR biologist. **Modification:** None. **Waiver:** None
Surface occupancy or use in nesting and brood-rearing areas are subject to the following operating constraints: Avoid activities (construction, vehicle noise, etc.) that will disturb GRSG use of the seasonal area from April 1 – Aug. 15.	**Purpose:** The purpose of this stipulation is to limit disturbance to the seasonal use of GRSG nesting and brood-rearing areas. **Exception:** The specific time and distance determinations for the nesting and brood-rearing seasonal stipulation would be based on site-specific conditions, in coordination with the local UDWR biologist. **Modification:** None. **Waiver:** None

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative E-1	
Stipulation	**Stipulation Description**
Surface occupancy or use in the area of the lek is subject to the following operating constraints: Avoid activities (construction, vehicle noise, etc.) that will disturb GRSG use of the seasonal area from Feb. 15 – May 15.	**Purpose:** The purpose of this stipulation is to limit disturbance to the seasonal use of GRSG lek. **Exception:** The specific time and distance determinations for the seasonal stipulation for the GRSG lek would be based on site-specific conditions, in coordination with the local UDWR biologist. **Modification:** None. **Waiver:** None
Surface occupancy or use in winter habitat is subject to the following operating constraints: Avoid disturbance within the area, if possible. Project proponents must demonstrate why avoidance is not possible. If avoidance is not possible, minimize as appropriate to the area. Minimization provisions include, for example, the location of development in habitat of least importance, of by locating development to take advantage of topographic screening. If minimization is not sufficient, mitigation is required (see mitigation section below).	**Purpose:** The purpose of this stipulation is to limit disturbance to GRSG winter habitat. **Exception:** None **Modification:** None **Waiver:** None
Surface occupancy or use in nesting and brood-rearing areas are subject to the following operating constraints: Avoid disturbance within these areas, if possible. Project proponents must demonstrate why avoidance is not possible. If avoidance is not possible, use minimization as appropriate to the area (e.g., try to minimize effects by locating development in habitat of the least importance, take advantage of topographic features to screen the disturbance, or maintaining and enhancing wet	**Purpose:** The purpose of this stipulation is to limit disturbance GRSG nesting and brood-rearing areas. **Exception:** None **Modification:** None **Waiver:** None

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Alternative E-1	
Stipulation	**Stipulation Description**
meadow and riparian vegetation to provide food and shelter). If minimization is not sufficient, mitigation is required (see mitigation section below). Employ noise stipulations which allow no more than 10 db rise above ambient noise levels at the edge of the lek.	
Surface occupancy or use in the area of a lek is subject to the following operating constraints: Avoid disturbance within this area, if possible. Project proponents must demonstrate why avoidance is not possible. If avoidance is not possible, use minimization as appropriate to the area. If minimization is not sufficient, mitigation is required (see mitigation section below). New permanent disturbance, including structures, fences, and buildings, should not be located within the lek itself. No permanent disturbance within one mile of the lek, unless it is not visible to the sage-grouse using the lek. Fences should not be located on or adjacent to leks where bird collisions would be expected to occur. If required, the construction of any fences near the lek should follow the standards identified in the NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes").	**Purpose:** The purpose of this stipulation is to limit disturbance to the seasonal use of GRSG leks. **Exception:** None **Modification:** None **Waiver:** None

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative E-1	
Stipulation	**Stipulation Description**
A disturbance outside the lek should not produce noise which rises more than 10 db above the background level at the edge of the lek during breeding season. Implement time-of-day stipulations during the season when the lek is occupied (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise).	
Surface occupancy or use in the other GRSG habitats are subject to the following operating constraints: Avoid disturbance in the area if possible. Project proponents must demonstrate why avoidance is not possible. If avoidance is not possible, minimize as appropriate to the area. Minimization provisions include, for example, the location of development in habitat of least importance, or by locating development to take advantage of topographic screening. If minimization is not sufficient, mitigation is required (see mitigation section below). Mitigation must produce lands capable of supporting GRSG as habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the mitigation conditions have been met. Manage the lands to avoid barriers to migration, if applicable.	**Purpose:** The purpose of this stipulation is to limit disturbance to the GRSG habitat within SGMAs but which is not part of the lek, nesting or wintering areas. **Exception:** None **Modification:** None **Waiver:** None

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Alternative E-1	
Stipulation	**Stipulation Description**
Surface occupancy or use in GRSG habitats are subject to the following operating constraints: New permanent disturbance, including structures, fences, and buildings, should not be located within the occupied lek itself. No permanent disturbance within 1 mile of an occupied lek, unless it is not visible to the sage-grouse using the lek. New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek. A disturbance outside the lek should not produce noise which rises more than 10 db above the ambient (background) level at the edge of the lek during breeding season. Apply time-of-day stipulations when the lek is active (e.g., no activity from 2-hours before sunrise to 2-hours after sunrise)	**Purpose:** The purpose of this stipulation is to limit disturbance to the GRSG habitat within SGMAs but which is not part of the lek, nesting or wintering areas. **Exception:** None **Modification:** None **Waiver:** None

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Alternative E-2	
Stipulation	**Stipulation Description**
Occupied sage-grouse leks inside priority habitat areas and connectivity habitat areas. This area encompasses occupied sage-grouse leks inside priority habitat areas and connectivity habitat areas. No surface occupancy or use is allowed within a six-tenths (0.6) mile radius of the perimeter of occupied sage-grouse leks inside priority habitat areas and connectivity habitat areas	**Purpose:** To protect occupied sage-grouse leks and associated seasonal habitat, life-history, or behavioral needs of Greater sage-grouse in proximity to leks, from habitat fragmentation and loss and Greater sage-grouse populations from disturbance inside priority habitat areas and connectivity habitat areas. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater sage-grouse. The Forest Service can and does grant exceptions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the area subject to the stipulation or the NSO criteria if an environmental record of review finds that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be Greater sage-grouse priority or connectivity habitat or sage-grouse are no longer a Forest Service sensitive or special status species and are not listed by the USFWS as threatened or endangered under the Endangered Species Act. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Greater sage-grouse priority habitat areas. This area encompasses Greater sage-grouse priority habitat areas. Surface occupancy or use will be	**Purpose:** To protect Greater sage-grouse connectivity areas from habitat fragmentation and loss. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as

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Alternative E-2	
Stipulation	**Stipulation Description**
restricted to no more than an average of one disturbance location per 640 acres, and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the Disturbance Density Calculation Tool (DDCT) Manual. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater sage-grouse priority habitat. The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within the priority habitat or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.	proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater sage-grouse. An exception to the stated limits may be granted when offsite mitigation is determined to provide an overall beneficial effect to sage-grouse habitat and populations. The Forest Service can and does grant exceptions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the area subject to the stipulation or surface occupancy criteria if an environmental record of review finds that a portion of the CSU area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be Greater sage-grouse connectivity habitat or sage-grouse are no longer a Forest Service sensitive or special status species and are not listed by the USFWS as threatened or endangered under the Endangered Species Act. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Greater sage-grouse connectivity areas. This area encompasses Greater sage-grouse connectivity areas. The cumulative value of all applicable surface disturbances (existing or future, and not limited to fluid mineral disturbances) must not exceed an average of 5 percent of the sagebrush habitat	**Purpose:** To protect Greater sage-grouse connectivity areas from habitat fragmentation and loss. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater sage-grouse. An exception to the stated limits may be granted when offsite mitigation is determined to provide an overall beneficial effect to sage-grouse

Table K.1
Draft RMP Oil and Gas Stipulations and Exception, Modification, and Waiver Criteria

Alternative E-2	
Stipulation	**Stipulation Description**
mapped within each Forest GIS database per 640 acres, as described in the Disturbance Density Calculation Tool (DDCT) Manual. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater sage-grouse priority habitat. The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within the priority habitat or surface disturbance created by other land users. The Forest Service may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.	habitat and populations. The Forest Service can and does grant exceptions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the area subject to the stipulation or surface occupancy criteria if an environmental record of review finds that a portion of the CSU area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be Greater sage-grouse connectivity habitat or sage-grouse are no longer a Forest Service sensitive or special status species and are not listed by the USFWS as threatened or endangered under the Endangered Species Act. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Occupied Greater sage-grouse leks in priority habitat areas or connectivity habitat areas. This area encompasses occupied Greater sage-grouse leks in priority habitat areas or connectivity habitat areas. No disruptive activity is allowed during 6:00 p.m. – 8:00 a.m., March 1 – May 15, within a six tenths (0.6) mile radius of the perimeter of occupied sage-grouse leks in priority habitat areas or connectivity habitat areas.	**Purpose:** To seasonally protect occupied Greater sage-grouse leks from disruptive activity in priority habitat areas or connectivity habitat areas. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable sage-grouse habitat may be exempted from this timing limitation. The Forest Service can and does grant exceptions to seasonal restrictions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan

Table K.1
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Alternative E-2	
Stipulation	**Stipulation Description**
	and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater sage-grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the described lands are no longer considered in the land use plan to be Greater sage-grouse priority or connectivity habitat or are incapable of serving the long-term requirements of sage-grouse nesting habitat and that these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Occupied Greater sage-grouse leks in priority habitat areas or connectivity habitat areas. This area encompasses occupied Greater sage-grouse leks in priority habitat areas or connectivity habitat areas. Noise levels may not exceed 10 dBA above ambient noise during 6:00 p.m. – 8:00 a.m., March 1 – May 15, within a six tenths (0.6) mile radius of the perimeter of occupied sage-grouse leks in priority habitat areas or connectivity habitat areas.	**Purpose:** To seasonally protect occupied Greater sage-grouse leks from disruptive activity in priority habitat areas or connectivity habitat areas. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable sage-grouse habitat may be exempted from this timing limitation. The Forest Service can and does grant exceptions to seasonal restrictions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and

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Stipulation	**Stipulation Description**
	2820.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater sage-grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the described lands are no longer considered in the land use plan to be Greater sage-grouse priority or connectivity habitat or are incapable of serving the long-term requirements of sage-grouse nesting habitat and that these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Greater sage-grouse nesting and early brood-rearing habitats inside priority habitat areas. This area encompasses Greater sage-grouse nesting and early brood-rearing habitats inside priority habitat areas. No surface use is allowed during March 15 – June 30, within Greater sage-grouse nesting and early brood-rearing habitats inside priority habitat areas, regardless of distance from the lek and independent of habitat suitability. This stipulation does not apply to operation and maintenance of production facilities.	**Purpose:** To seasonally protect Greater sage-grouse nesting and early brood-rearing habitats from disruptive activities inside priority habitat areas. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable sage-grouse habitat may be exempted from this timing limitation. The Forest Service can and does grant exceptions to seasonal restrictions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the size and

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Alternative E-2	
Stipulation	**Stipulation Description**
	shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater sage-grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the described lands are no longer considered in the land use plan to be Greater sage-grouse priority habitat or are incapable of serving the long-term requirements of sage-grouse nesting habitat and that these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Greater sage-grouse nesting and early brood-rearing habitat within connectivity habitat areas. This area encompasses Greater sage-grouse nesting and early brood-rearing habitat within connectivity habitat areas. No surface use is allowed during March 15 – June 30, in nesting and early brood-rearing habitats (independent of habitat suitability) inside connectivity habitat areas, within four miles of an occupied lek. This stipulation does not apply to operation and maintenance of production facilities.	**Purpose:** To seasonally protect Greater sage-grouse nesting and early brood-rearing habitats (independent of habitat suitability) inside connectivity habitat areas from disruptive activities, within four miles of an occupied lek. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable sage-grouse habitat may be exempted from this timing limitation. The Forest Service can and does grant exceptions to seasonal restrictions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater sage-grouse activities is greater or less than the stipulated

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Stipulation	**Stipulation Description**
	area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the described lands are no longer considered in the land use plan to be Greater sage-grouse connectivity habitat or are incapable of serving the long-term requirements of sage-grouse nesting habitat and that these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Greater sage-grouse nesting and early brood-rearing habitat outside priority habitat areas and connectivity habitat areas. This area encompasses Greater sage-grouse nesting and early brood-rearing habitat outside priority habitat areas and connectivity habitat areas. No surface use is allowed during March 15 – June 30, in Greater sage-grouse nesting and early brood-rearing habitats outside priority habitat areas and connectivity habitat areas, within two miles of an occupied lek. This stipulation does not apply to operation and maintenance of production facilities.	**Purpose:** To seasonally protect Greater sage-grouse nesting and early brood-rearing habitats from disruptive activities outside priority habitat areas and connectivity habitat areas, within two miles of an occupied lek. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable sage-grouse habitat may be exempted from this timing limitation. The Forest Service can and does grant exceptions to seasonal restrictions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater sage-grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for

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	maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the described lands are incapable of serving the long-term requirements of sage-grouse nesting habitat and that these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)
Greater sage-grouse winter concentration areas. This area encompasses Greater sage-grouse winter concentration areas. No surface use is allowed during December 1 – March 14, within Greater sage-grouse winter concentration areas in priority habitat, and outside priority habitat when supporting wintering sage-grouse that attend leks within priority habitat. This stipulation does not apply to operation and maintenance of production facilities.	**Purpose:** To seasonally protect Greater sage-grouse winter concentration areas from disruptive activities. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function and suitability of the winter concentration area, or it is determined that the winter concentration area is not occupied by concentrated populations of Greater sage-grouse during the period of concern. Actions designed to enhance the long-term utility or availability of suitable sage-grouse habitat may be exempted from this timing limitation. The Forest Service can and does grant exceptions to seasonal restrictions if the Forest Service, in consultation with the WGFD, feels that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater sage-grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater sage-grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation

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Stipulation	**Stipulation Description**
	will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.) **Waiver:** This stipulation may be waived over the entire lease if, in consultation with the State wildlife agency, it is determined that the described lands are incapable of serving the long-term requirements of sage-grouse winter habitat and that these ranges no longer warrant consideration as components of sage-grouse winter habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Forest Service Manuals 1950 and 2820.)

Appendix L

Required Design Features for Preventing West Nile Virus

APPENDIX L
REQUIRED DESIGN FEATURES FOR PREVENTING WEST NILE VIRUS

- Increase the size of fresh-water ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding *Cx. tarsalis* avoid (De Szalay and Resh 2000). This modification may reduce *Cx. tarsalis* habitat but could create larval habitat for *Culicoides sonorensis*, a vector of blue tongue disease, and should be used sparingly (Schmidtmann et al. 2000). Steep shorelines should be used in combination with this technique whenever possible (Knight et al. 2003).
- Build steep shorelines to reduce shallow water (more than 60 centimeters) and aquatic vegetation around the perimeter of impoundments (Knight et al. 2003). Construction of steep shorelines also will create more permanent ponds that are a deterrent to colonizing mosquito species like *Cx. tarsalis*, which prefer newly flooded sites with high primary productivity (Knight et al. 2003).
- Maintain the water level below that of rooted vegetation for a muddy shoreline that is unfavorable habitat for mosquito larvae. Rooted vegetation includes both aquatic and upland vegetative types. Avoid flooding terrestrial vegetation in flat terrain or low lying areas. Aquatic habitats with a vegetated inflow and outflow separated by open water produce 5- to 10-fold fewer Culex mosquitoes than completely vegetated wetlands (Walton and Workman 1998). Wetlands with open water also had significantly fewer stage III and IV instars which may be attributed to increased predator abundances in open water habitats (Walton and Workman 1998).
- 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 (Knight et al. 2003).
- 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, thus

precluding shallow surface inflow and accumulation of sediment that promotes aquatic vegetation.

- Line the overflow spillway with crushed rock, and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation.
- Fence pond site to restrict access by livestock and other wild ungulates that trample and disturb shorelines, enrich sediments with manure and create hoof print pockets of water that are attractive to breeding mosquitoes.

REFERENCES

De Szalay, F.A. and V.H. Resh. 2000. Factors influencing macroinvertebrate colonization of seasonal wetlands: responses to emergent plant cover. Freshwater Biology. 45: 295-308.

Knight, R.L., W.E. Walton, G.F. Meara, W.K. Riesen and R. Wass. 2003. Strategies for effective mosquito control in constructed treatment wetlands. Ecological Engineering. 21: 211-232.

Schmidtmann, E.T., R.J. Bobian, R.P. Beldin. 2000. Soil chemistries define aquatic habitats with immature populations of the *Culicoides variipennis* complex (Diptera: *Ceratopogonidae*). Journal of Medical Entomology. 37: 38-64.

Walton, W.E., and P.D. Workman. 1998. Effect of marsh design on the abundance of mosquitoes in experimental constructed wetlands in Southern California. Journal of the American mosquito control Association 14:95-107.

Appendix M

Draft Greater Sage-Grouse Wildland Fire and Invasive Species Assessment

APPENDIX M
DRAFT GREATER SAGE-GROUSE WILDLAND FIRE AND INVASIVE SPECIES ASSESSMENT

The following process is a suggestion for a consistent approach in conducting an assessment of the GRSG habitat and wildfire threat at the local planning area level. Variations to this approach may be made based on ID team discussion or unique issues in a given planning area. This example format is intended to portray the degree of specificity required for offices which will complete these assessments. Note that this process has similarities to watershed analysis and ecoregional assessments, and as such these documents may prove useful where they exist.

INTRODUCTION

Greater Sage-Grouse (GRSG) Wildfire and Invasive Species Habitat Assessments (hereafter referred to as "stepdown assessments") are interdisciplinary evaluations of the threats posed by wildfire and invasive species, as well as identification of priority areas/treatment opportunities for fuels management, fire management, and restoration. Priority areas are spatial delineations where treatments, management actions, or other emphasis should be placed due to factors such as habitat quality, threats, or opportunities to protect, enhance, and restore GRSG habitat. The stepdown assessments will serve as a bridge between RMPs and project level planning, and will position planning efforts to conduct project-scale NEPA following RMP Records of Decision.

The stepdown assessment process involves four steps, beginning with characterization of the planning area and concluding with spatial delineation of priority areas. The content and methods used by Forest Service and the Bureau of Land Management (BLM) in these documents should be consistent to ensure that priority areas are defined using similar criteria. These criteria and methods should be narratively described such that the US Fish and Wildlife Service (USFWS) and other audiences can understand the factors considered.

STEP 1: CHARACTERIZATION OF GREATER SAGE-GROUSE HABITAT

The purpose of this step is to broadly establish context of the planning area and sage-grouse habitat.

Location and Spatial Extent

- Describe the location of the planning area, and the relationship of GRSG habitat within the planning area.

Relationship to the Larger Scale Setting

- How does the planning area lie within the larger context of GRSG habitat?

Quantifying Habitat within Planning Area

- Brief description of GRSG habitat described in terms of acreage, habitat classes (e.g., PPH, PGH, and/or PACs)
- Note: A summary map showing the planning area with habitat features is appropriate in Step 1. A tabular summary may also be included.

STEP 2: ISSUES AND KEY MANAGEMENT QUESTIONS

The purpose of this step is to devise management questions related to the issues of fuels management, fire management, and restoration. Note that this step should not answer each management question. Rather, management questions are answered in Step 4 through specific, quantified data.

Overview

- In coordination with state wildlife agencies, the FWS, and your interdisciplinary team, develop an introductory section here which describes why fire or vegetation conditions pose a threat to GRSG in the local planning area. Describe where fire or vegetation conditions are a significant threat to GRSG habitat, and where fire, fuels, and restoration activities may help enhance habitat. In a brief paragraph or two, summarize the relationships between wildland fire, fuels management and invasive species/restoration in the planning area. Examples would include annual grass/wildfire cycle, juniper encroachment into GRSG habitat, recently disturbed areas, etc.

Key Management Questions

Issue #1: Fuels Management

- In narrative format, develop management questions such as:
    1. Based on fire risk to important GRSG habitats, what types of fuels treatments should be implemented that will reduce the risk? Where should fuels treatments be prioritized, and what's the amount of treatment acres/miles needed for long-term enhancement and protection of GRSG habitat?
    2. Based on opportunities for fire to improve/restore GRSG habitats, what types of fuels treatments should be implemented that will increase ability to allow fire? Where should fuels treatments be prioritized, and what amount of treatment is needed for long-term enhancement and protection of GRSG habitat?

3. What fuel reduction techniques will be most effective; including, but not limited to grazing, prescribed fire, chemical, biological and mechanical treatments?
4. What are the criteria for defining priority fuels management areas (example would be the intersection of high burn probability, PPH, lek locations, and established GRSG population)?
5. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries?
6. Are there areas where fuel treatments help restore GRSG habitat as well as reduce risk?

Issue #2: Fire Management

- In narrative format, develop management questions such as:

1. Where is the greatest wildfire risk, considering trends in fire occurrence, fuel conditions, and highly valued GRSG habitat?
2. Where will fire suppression resources be most successful to mitigate the risk and protect GRSG Habitats?
3. Where do opportunities exist that could enhance or improve suppression capability in important GRSG habitats?
    a. For example, increased water availability through installation of heli wells or water storage tanks.
    b. Decreased response time through pre-positioned resources or staffing remote stations.
4. Where should wildfire be managed to achieve LUP objectives for improving or restoring GRSG habitat (limiting juniper expansion)?
5. What are the criteria for defining priority fire management areas? An example would be the intersection of PPH, lek locations, and high burn probability.
6. How can fire management be coordinated across jurisdictional boundaries to reduce risk or to improve GRSG habitat?

Issue #3: Restoration

- In narrative format, develop management questions such as:

1. Are there opportunities for restoration treatments to protect, enhance or maintain GRSG habitat? Assume that funding is not a constraint, and describe which sites are biologically suitable for restoration to GRSG habitat in a reasonable period.
2. Considering the entire planning area, what are the site conditions, such as dominant vegetation, elevation, or precipitation zones, where restoration efforts have been proven to be most successful in the recent past? An

example would be mountain sagebrush sites over 5000' in elevation, and in a 16" or greater precipitation zone.

3. What are the criteria for defining priority restoration areas? An example would be recent burns, moderately disturbed sites, or recovering allotment pastures which have not crossed ecological thresholds or become highly degraded. These may or may not be covered by existing ESR plans.
4. Are there opportunities to utilize a coordinated approach across jurisdictional boundaries?

STEP 3: CURRENT CONDITIONS AND TRENDS

The purpose of this step is to develop information relevant to the issues and key questions identified in Step 2. It provides a snapshot of the present condition, statement of causal factors, and a summary of the trends which are occurring.

Biological Summary of Vegetation, Invasive Species, and Fire Regimes

[In this introductory section, provide a general biological summary of the planning area. Provide a narrative description of ecological trends, including description of plant communities, fire regimes, and other dominant biological factors affecting GRSG habitat.]

- Describe how fire has influenced current vegetation patterns. Are there large areas of even-aged communities, fine-scale mosaics, annual grass monocultures?
- Describe if fire regimes are intact, or if they are altered. If they are altered, describe why. Use fire regime variables such as fire frequency, severity, or size to elucidate your points.
- Describe dominant cover types making up the planning area. These can be broad seral stage groupings, general life forms, or more fine-scale information such as plant associations, habitat types, or ecological systems. Note: this information should be available in the RMP or FMP.
- What has been the impact of fire exclusion (e.g., increased conifer encroachment or decadent shrub communities)?
- What is the current extent of annual grasses and other invasive species?
- What are the effects of invasive species on land health? On trends in plant succession? On fire regimes?

Fuels Management

- Describe current fuels management practices within the planning area (what are the types of fuels treatments commonly applied to which management issues)?
- How has past fuels management influenced today's planning area (e.g., creation of mosaics, protecting certain features, or increasing invasive species)?
- What are causal factors which have created a need for fuels management practices?
- What are the trends in the fuels management program related to budget or capability?

Fire Management

- Describe the current fire suppression workload.
- Describe fire occurrence trends (include discussion of fire size, numbers of starts, ignition locations)
- Describe causal factors influencing suppression effectiveness.
- Describe suppression capabilities. Discuss types and numbers of resources within office, through interagency agreements, and through resource sharing

Restoration

- Describe invasive species which are present in the planning area
- Describe landscape conditions which may be suitable for restoration within the planning area, and the results of recent restoration efforts in the planning area
- Describe invasive species occurrence
- Describe causal factors influencing restoration needs.

Methodology

- What are the analysis methods to be utilized and analysis assumptions?

Use of best available Science

- Describe data sets used, such as the FSIM layer and local data. (Many data sets being used in RMPs will also be applicable to stepdown assessments).
- What are the elements of science used?

STEP 4: IDENTIFICATION OF TREATMENT OPPORTUNITIES, PRIORITY AREAS, AND ACTIONS

The purpose of this step is to utilize the information from steps 2 and 3 in order to quantify the overall need for treatment or other actions. Specifically, this step should spatially identify and quantify priority areas, using the criteria established in Step 2. Next, this step should identify treatment opportunities which fall within priority areas. Furthermore, treatments should be prioritized and an implementation schedule developed, reflecting the reality that not every acre in need of treatment can receive action within the planning horizon.

Fuels Management

- Spatially delineate priority areas for fuels management, based upon criteria established in Step 2. Fuels priority areas should be delineated by type, such as:
    - Linear fuel break along roads
    - Other linear fuel breaks to create anchor points
    - Prescribed burning
    - Mechanical (e.g., conifer removal)
    - Other mechanical, biological, or chemical treatment
- Quantify the number of acres of needed fuels treatments.

- If they exist, spatially delineate areas where fuel treatments would increase the ability to use fire to improve/enhance GRSG habitat?
    - Include tables, maps, or appropriate info.
- Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of fuels treatments.
- Quantify a projected level of treatment within fuels management priority areas.
- Identify treatments to be planned within fuels management priority areas.
- Include a priority or implementation schedule for proposed treatments.

Fire Management

- Spatially delineate priority areas for fire suppression, based upon criteria established in Step 2. Priority areas for fire management should be delineated by type, such as:
    - Initial attack priority areas
    - Resource pre-positioning and movement priority areas
    - Remote station staffing priority areas, if appropriate
    - Include tables, maps or other supporting information
- Quantify the number of acres of GRSG habitats for aggressive initial attack that were identified at highest risk from losing key habitat components.
- Quantify the number and type of suppression resources that will be staged or otherwise pre-positioned, as well as the associated conditions, in order to enhance initial attack capabilities.
- Spatially delineate areas where opportunities exist to enhance or improve suppression capability.
    - Include tables, maps or other supporting information.
- Spatially delineate areas where wildfire can be managed to achieve RMP objectives.
    - Include tables, maps or appropriate information.
- Quantify the number of acres within fire management priority areas.
- Include a priority or implementation schedule for fire suppression proposed actions.

Restoration

- Spatially delineate priority areas for restoration, using criteria established in Step 2. Priority areas for restoration should be delineated by type, such as:
    - Seeding priority areas (aerial, drill, broadcast, or other)
    - Invasive species priority areas (herbicide, mechanical, biological, combination)
    - Priority areas requiring combinations of treatments (e.g., herbicide followed by seeding)

    - Include tables, maps or appropriate info.
- Identify locations where post-fire restoration treatments should be focused.
    - Include tables, maps or appropriate info.
- Spatially identify invasive species occurrence
- Identify coordination needed between renewable resource, fire management, and fuels management staff to facilitate planning and implementation of restoration treatments.
- Quantify the projected level of treatment within restoration priority areas.
- Identify treatments to be planned within restoration priority areas.
- Include a priority or implementation schedule for proposed restoration treatments.

Annual Treatment Needs

1. Based on the information above and within the planning area, what are the annual needs based on the key questions and summary statements?

Annual Treatment Abilities

1. Putting GRSG habitat protection and enhancement into perspective with other high valued resources and important land management goals, how does the annual need relate to capabilities?
2. What are the realistic annual expectations in fire management, fuels management, and restoration for the next 5 years?

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Appendix N

Greater Sage-Grouse Habitat Baseline

APPENDIX N
GREATER SAGE-GROUSE HABITAT BASELINE

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 the Utah Sub-Region Greater Sage-Grouse Land Use Plan Amendments. 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 the BER Report, 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 grouse 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. 2003b, 2011; 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 use. The third-order (3) requires refinement from broad habitat delineations by specifying seasonal habitats (for example, nesting habitat), 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

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. 2003b) with individual movements up to 145 kilometers (90 miles; Smith 2012).

The State Conservation Plan identifies that currently, the state supports about 8 percent of the total range-wide population of GRSG, distributed throughout the northern, western, and central parts of Utah in a highly discontinuous habitat pattern. This habitat occupancy pattern is a result of the natural topography of Utah, and by the land use activities associated with, and necessary for, the human population.

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 habitat. Information on the habitat identification process followed in Utah was summarized 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 State 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), often referred to as the breeding bird density mapping. The breeding bird density mapping identified 4 density levels or parameters. The first parameter identified areas where 25 percent of the state's total spring breeding populations of GRSG are found. These areas symbolize the highest statewide density of breeding males and can also be viewed as high priority leks or those leks and associated habitats that individually contribute most to the state's GRSG total population. The second parameter identified areas where 50 percent of the state's total breeding populations of GRSG are found. This was repeated successively in order of all parameters until cumulatively 100 percent of all occupied leks were represented. Viewed from the converse, the total known spring GRSG statewide population was indicated by the combined area of all parameters. The wholesale application of the breeding bird density map was cautioned due to the migratory status of some populations and their associated broader habitat needs.

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 as reflected in the State Conservation Plan where the boundaries of each GRSG management area reflect the biological and geographical realities of areas currently occupied by a population or populations of GRSG 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 of Utah's Conservation Plan for Greater Sage-Grouse in Utah (April 2013) 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 charged 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 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.

Occupied GRSG habitat 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 broad GRSG habitat maps are intended to encompass GRSG habitats used throughout the year by known GRSG populations. Broad habitat maps 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 habitat 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 habitat 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 habitat in Utah telemetry data has been collected for a portion of the GRSG populations in the state. Telemetry data provides UDWR with site-specific data on how collared 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 the birds are identified and managed for protection of the population, if habitat types (i.e. alfalfa fields) are adjacent to telemetry locations, they are likely included in UDWR occupied GRSG habitat maps. Similarly, for populations where there is no telemetry data, the UDWR occupied GRSG habitat maps are intentionally broad in an attempt to include all possible sagebrush areas, adjacent or nearby, that may be used by the birds as habitat or movement corridors. Maps are refined as additional information on things such as habitat conditions, birds' 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 will be refined as gain more information is gained. Those maps currently include known use areas, historic use areas, as well as areas of non-habitat.

PLANNING REQUIREMENTS

For the interim management GRSG management guidance (BLM Washington Office IM 2012-043) and the LUPA process, the BLM is using the occupied GRSG habitat maps created by the UDWR. Though the BLM and Forest Service manage the habitat for wildlife species, the UDWR is the agency primarily responsible for managing GRSG in the State of Utah. As such, the UDWR has been the primary repository for information regarding GRSG habitat in the State of Utah. The habitat 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 habitat areas, the aforementioned other sources of information are used in conjunction to telemetry data to create the GRSG habitat maps. For BLM's purposes of maintaining and enhancing GRSG persistence on the landscape, all GRSG habitat identified and mapped by UDWR is included as the baseline for planning to ensure that all habitats that are may be necessary for long-term GRSG persistence are including for assessment an evaluation in the planning process.

HABITAT UPDATES

The planning schedule and analysis process required a cutoff point for any further consideration of additional habitat information which was the primary reason the February 2012 version of the UDWR occupied habitat was used as the baseline for the planning amendment. However, it is recognized that the identification and mapping of GRSG habitat is an ongoing effort due to the limitations of resources to a detailed inventory of all known and potential occupied habitat in the state. As stated in the 2009 Plan, habitat updates will be ongoing to continue and expand cooperative efforts to determine the presence/absence of GRSG, obtain baseline population data, including distribution and connectivity with other populations, identifying seasonal habitats and movements, identify and quantify sagebrush habitats, the condition of those habitats, and inter-connectedness' and map those key habitats and update UDWR seasonal and key habitat maps in GIS and provide updated maps and information to local land management agency offices and others.

As expressed in the State Conservation Plan the implementation of any plan should be accompanied by efforts to refine mapping of habitats. These efforts should be coordinated among federal, state and local agencies, and private landowners who may choose to participate. On-the-ground projects should also contribute to this refined mapping for the project area.

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Appendix O

Forest Service Draft Wildlife and Botany Specialist Report

Draft

U.S. Forest Service
Wildlife and Botany Specialist Report

for the

Greater Sage-Grouse Conservation Effort to Amend the Forest Plans in Utah

for the

Ashley, Fishlake, Manti - La Sal, Dixie, Uinta and Wasatch - Cache National Forest Plans

July 14, 2013

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1. INTRODUCTION

The purpose of this report is to identify the likely effects of the Greater Sage-Grouse (GRSG) Planning Decision specifically for the Ashley, Fishlake & Manti La Sal, Dixie, and Uinta-Wasatch-Cache National Forests on USDA Forest Service Region 4 sensitive species. Sensitive species for Region 4 are listed on the Regional Forester's sensitive species list and comprise plants, birds, mammals, amphibians, and fish. Species listed as threatened or endangered by the USFWS are addressed in the biological assessment prepared for this project.

This Wildlife Specialist Report addresses sensitive species that meet the following criteria:

1. Species that are known to occur on any of the National Forest system lands listed above based on confirmed sightings.

2. Species that may occur on any of the National Forest system lands listed above based on reliable unconfirmed sightings.

3. 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 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 three criteria:

1. 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.

2. 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.

3. 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:

1. To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or contribute to animal species or trends toward Federal listing of any species listed as sensitive by USDA Forest Service Region 2.

2. 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.

3. 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 is currently proposed for listing under the Endangered Species Act as "warranted, but precluded due to higher priorities" because of two primary factors: 1) the large-scale loss and fragmentation of habitats across the species range, and 2) a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to GRSG habitat are summarized in the listing decision. The two dominant threats are related to infrastructure associated with energy development in the eastern portion of the species range, and the conversion of sagebrush communities to annual grasslands associated with large uncharacteristic 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 (FS) manages approximately 8 percent of species habitat, with most of that occurring on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sage-brush habitats, with about 7.5 million acres occurring in the Intermountain Region. Most habitats on FS administered lands contribute to summer brood-rearing habitats, although some forests and grasslands do contribute important breeding and nesting habitat. Within the 5 Forests in Utah involved with this process, there are 845,508 acres of GRSG habitat, of which 91% is mapped as priority habitat, and 9% is general habitat.

In 2011 and 2012, the United States Fish and Wildlife Service (FWS) submitted letters to the BLM and FS recommending that the agencies amend 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 discussion the FS added an additional 10 Forest Plans that would be considered for amendment. The FS 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 occurs on BLM 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 provide direction in land management plans that conserve and protect GRSG habitat and to provide assurances to 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 clearly be implemented and are demonstrated to be effective in conserving the species.

EISs will be completed for seven GRSG planning sub-regions: 1) eastern Montana and portions of North and South Dakota, 2) Idaho and southwest Montana, 3) Oregon, 4) Wyoming, 5) northwest Colorado, 6) Utah, and 7) Nevada and northern California. The FS 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 Wildlife Specialist Report is being prepared in relation to the Utah EIS. All Forests in Utah are currently planning to amend their Land and Resource Management Plans for the Greater Sage-Grouse.

3. PURPOSE AND NEED

The purpose of the Land and Resource Management Plan amendment for the Greater Sage-Grouse, is to identify and incorporate adequate regulatory mechanisms to conserve, enhance, and/or restore GRSG habitat by reducing, eliminating, or minimizing threats to their 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 within 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 Plans amendment 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 of the alternatives 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 to which type(s) of designated habitat each alternative applies. Designated grouse habitat is divided into two main categories—preliminary priority management area (PPMA) and preliminary general management area (PGMA). PPMA is defined as areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. These areas include breeding, late brood-rearing and winter concentration areas. PGMA is defined as areas of occupied seasonal or year-round habitat outside of PPMA. A third category of linkage areas is also present. Within the document, all occupied habitat refers to all PPMA, PGMA, 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 NTT's 2011 report (Sage Grouse National Technical Team 2011) are considered and incorporated into this alternative. These conservation measures would apply only to PPMA. There would be a 3% cap on disturbance in these areas. Additional details about this alternative include: Travel construction would be limited in PPMA, minimum standards would be applied and there would

be no upgrading of roads. Recreation special use permits in PPMA would only be allowed if they are deemed to have a beneficial effect to the GRSG. Rights-of-way would be excluded in PPMA. The Forests would aim to keep and acquire PPMA. Grazing direction would be adjusted to improve management for GRSG. PPMA would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy buffer around leks. Wildfire/Fuels would aim to protect sagebrush habitats in PPMA. Habitat restoration would be a priority, with a focus on native species.

4.3 ALTERNATIVE C

During scoping, conservation groups had the opportunity to submit suggestions on how to define PPMA and PGMA areas and developed their own conservation measures that would be applied to those areas (proposing more stringent management). All of the reasonable conservation measures across the sage grouse range have been consolidated into one alternative which each sub region will analyze in detail. This alternative would apply to all designated GRSG habitat, including PPMA, PGMA and linkage areas. There would be a 3% cap on disturbance in these areas. PPMA would be closed to livestock grazing. Additional details about this alternative include: Travel construction would be limited in all designated habitat, and no new roads would be constructed within 4 miles of a lek or occupied habitat. Recreation would seasonally prohibit camping and non-motorized recreation within 4 miles of a lek. All designated habitat would be exclusion areas for rights-of-way and special use permits. The Forests would aim to keep and acquire all designated habitat. 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 no surface occupancy buffer around leks. Wildfire/Fuels would aim to protect and restore sagebrush habitats; areas would be closed to grazing after wildfire. All PPMA would be designated as Areas of Critical Environmental Concern (ACEC) or Zoological Areas.

4.4 ALTERNATIVE D

In this alternative, the Utah sub-regions 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 within PPMA. There would be a 5% cap on disturbance in these areas. Additional details about this alternative include: Travel construction would be limited in PPMA with a disturbance exception allowing the forests to exceed the 5% cap if GRSG populations are doing well. Recreation special use permits that do not adversely affect the GRSG would be allowed. Rights-of-way would be excluded in PPMA, with the exception of transmission lines. Grazing direction would be adjusted to improvement management for sage grouse in PPMA and other parts of all designated habitat. PPMA would be designated as a no surface occupancy for new fluid minerals leases; existing leases would have seasonal conditional surface use. Wildfire/Fuels would aim 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 the State of Utah (except GRSG habitat located on portions of the Sawtooth National Forest that fall within Utah) as well as lands administered by the Ashley National Forest located in the State

of 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, and would apply to all BLM- and FS-administered lands located in Utah. Alternative E-2 is based on the State of Wyoming's Governor's Executive Order 2011-5 with adjustments by the BLM IDT, which includes members of the Wyoming Governor's Office.

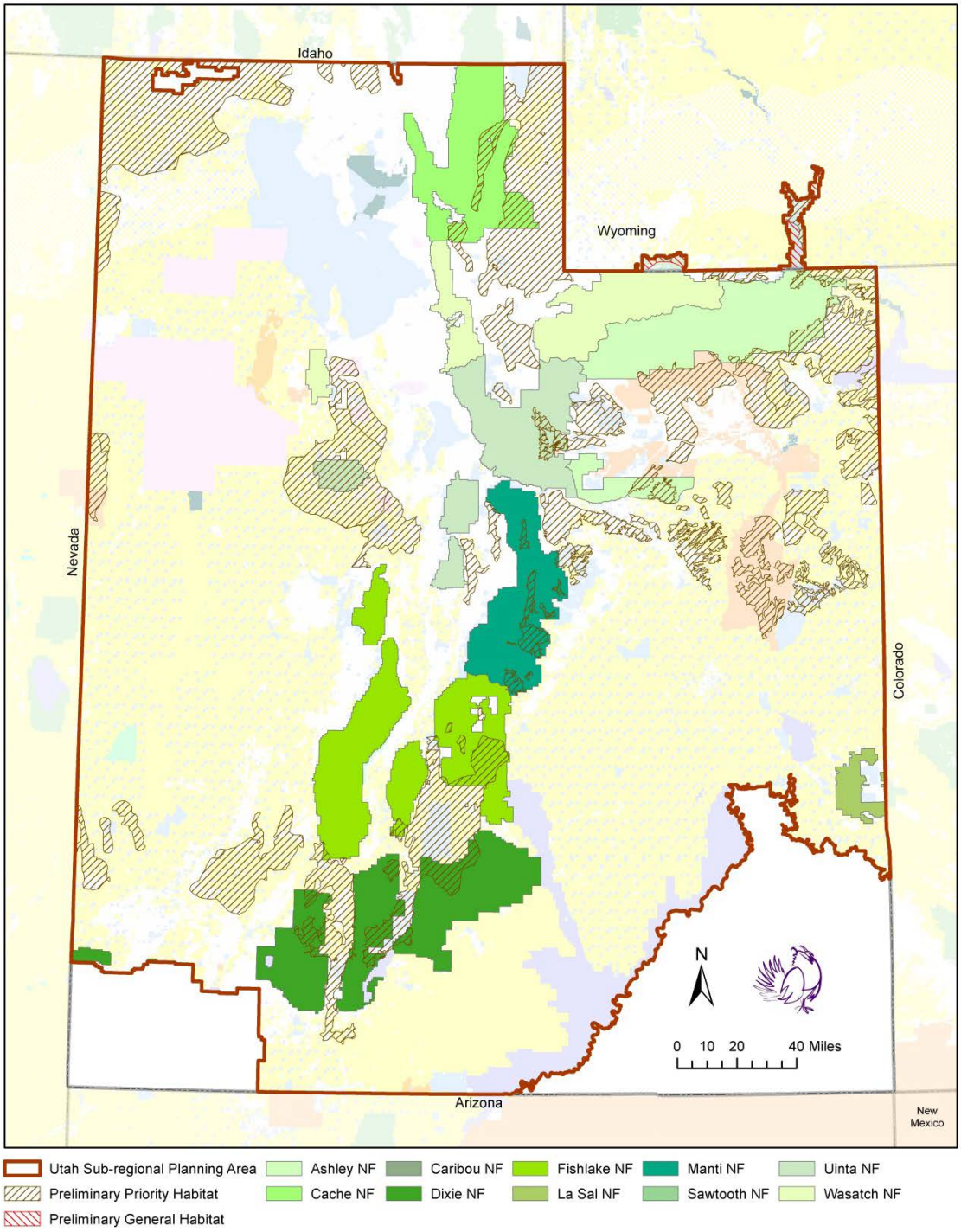
5. ANALYSIS AREA

The analysis area consists of National Forest system lands in Utah, including the Ashley, Fishlake & 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% of the 7,663,304 acres that comprise all Forest 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 Occupied Habitat	% 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**	**(Ave 11.4)**

Figure 1
Utah GRSG Planning Area with Forest Service Lands and Proposed Priority and General Habitat



6. SPECIES CONSIDERED IN THE ANALYSIS

The Region 4 sensitive species list is composed of plants, birds, mammals, amphibians and fish identified for that region. We conducted a review for Region 4 sensitive species that may occur or be affected by activities associated with the Planning EIS and subsequent Land and Resource Management Plan Forest Amendment for the Greater Sage-Grouse on National Forests in Utah. Existing occurrence information, as well as known or potential habitat, was reviewed by searching the Natural Resource Management (NRM) database. Sources of information contained in this database include 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 and candidate and proposed species and Forest Service sensitive species known 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 compared to the four criteria listed below. The four criteria were used to identify species that would experience "no impact" from the implementation of the action alternatives and could therefore be eliminated from detailed analysis. These numerical categories below are referred to in Table 2:

1. Suitable habitat and/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/effect on these species or their habitat.

3. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic or opportunistic visitors to the habitat(s) impacted by the proposal, but no affiliation or dependence upon these habitat(s) has been shown.

4. The associated conservation design or mitigations eliminate any potential for impact to the species.

Species in Table 2 are likely to occur within or near the analysis area, or with potential habitat in or near the analysis area that may be affected (negatively or positively, directly, indirectly and/or cumulatively) by implementation of an action alternative were it carried forward into Table 3, and a more detailed analysis of the project effects was subsequently conducted.

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 PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
MAMMALS				
Wolverine *Gulo gulo (luscus)*	Montane habitats in conifer, subalpine, and tundra zones.	N	2,3,4	No impact
Pygmy Rabbit *Brachylagus idahoensis*	Sage-steppe habitats.	Y	Not excluded	See detailed analysis below
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	No impact
Spotted Bat *Euderma maculatum*	Caves, mines, cliffs, abandoned buildings, and snags.	Y	3,4	No impact
Townsend's western big-eared bat *Corynorhinus townsendii*	Caves, mines, cliffs, abandoned buildings, and snags.	Y	3,4	No impact
Fisher *Martes pennanti*	Subalpine and montane coniferous habitats, with suspected historical presence in Utah.	N	1,3	No impact
Gray Wolf *Canis lupus*	Variety of habitats but very limited distribution in extreme northeastern Utah.	N	2,3	No impact
BIRDS				
Bald eagle *Haliaeetus leucocephalus*	Generally aquatic habitats and prefer fish for prey during nesting and carrion during winter.	Y	2,3	No impact
Boreal owl *Aegolius funereus*	Mature to late-successional Engelmann spruce and subalpine fir above 9,000 ft.	N	2,3	No impact

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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Flammulated owl *Otus flammeolus*	Forest owl that nests in cavities and caves from 6,000 to 10,000 feet	N	2,3	No impact
Great gray owl *Strix nebulosa*	Taiga forest nester, very infrequent winter visitor to Utah.	N	2,3,4,	No impact
Greater Sage-Grouse *Centrocercus urophasianus*	Sagebrush hills, with forbs and insects for broods below 8,400 ft.	Y	Not excluded	See detailed analysis below
Northern goshawk *Accipiter gentilis*	Mature forests, large trees on moderate slopes with open understories for nesting.	Y	3,4	No impact
Peregrine falcon *Falco peregrinus anatum*	Nest sites on cliffs with a wide view, low disturbance, and abundance of prey.	Y	3,4	No impact
Three-toed woodpecker *Picoides tridactylus*	Prefer nesting in mid to high elevation mature coniferous forests, especially abundant following wildfires.	Y	3,4	No impact
Yellow-billed cuckoo *Coccyzus americanus*	Open woodlands with an understory of dense vegetation, near water…generally below 5,000 ft.	Y	3	No impact
Mountain quail *Oreortyx pictus*	Dense vegetation on Coastal, Cascade, and Sierra Mtn Ranges. Historically in southern Idaho.	N	1	No impact
AMPHIBIANS				
Columbia spotted frog *Rana luteiventris*	Isolated springs and seeps in Central through Northern Utah.	Y	Not Excluded	No impact
Boreal Toad *Anaxyrus boreas boreas*	Wetlands at elevations from 7,000 to 11,880 ft.	Y	Not excluded	See detailed analysis below

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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
FISH				
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	Native to Bonneville Basin, in both higher and low elevation cool water systems.	Y	3,4	No impact
Colorado River cutthroat trout *Oncoryhnchus clarkii pleuriticus*	Native to upper Colorado River drainages. Prefers Cold, clean water environments within high elevation streams and lakes.	Y	3,4	No impact
Southern leatherside chub *Lepidomeda aliciae*	Native to streams and rivers of southeastern Bonneville Basin, especially southern Utah.	Y	3,4	No impact
Northern leatherside chub *Lepidomeda copei*	Native to streams and rivers of southeastern Bonneville Basin, especially central and northern Utah.	Y	3,4	No impact
PLANTS				
Wonderland Alice flower *Aliciella caespitosa*	Cliffs, crevices, rocky slopes, and arroyos of Navajo and Wingate sandstone. Wayne County, Utah.	N	1	No Impact
Chatterley onion *Allium geyeri* var. *chatterleyi*	Pinyon/juniper, mountain brush, ponderosa pine/manzanita. 6,600 to 8,200 ft.	N	1	No Impact
Sweet-flowered rock jasmine *Androsace chamaejasme* ssp. *cannata*	Alpine tundra. La Sal Mountains. 10,000 to 12,000 ft.	N	1	No Impact

Table 2
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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Wheeler's angelica *Angelica wheeleri*	Wet or boggy areas near seeps and springs. 5,000 to 10,000 ft.	Y	1,2	No Impact
Link Trail columbine *Aquilegia flavescens* var. *rubicunda*	Springs and seeps within the Mesa Verde formation with aspen, ponderosa pine, and spruce-fir. Wasatch Plateau, Utah. 6,900 to 8,500 ft.	N	1	No Impact
Graham columbine *Aquilegia grahamii*	Cliffs, ledges, and drip-lines of Weber sandstone. 7,300 to 8,000 ft.	N	1	No Impact
Petiolate wormwood *Artemisia campestris* ssp. *borealis* var. *petiolata*	Outcrops of Red Pine shale in mountain mahogany, manzanita, and ponderosa pine.	N	1	No Impact
Bicknell milkvetch *Astragalus consobrinus*	Volcanic gravel to barren stony hillsides Emery, Sevier and Garfield counties Utah.	N	1	No Impact
Dana milkvetch *Astragalus henrimontanensis*	Cool desert shrub. Wyoming and basin big sagebrush, low elevation black sagebrush, pinyon/juniper, and ponderosa pine. 7,000 to 8,000 ft.	N	1	No Impact
Isely's milkvetch *Astragalus iselyi*	Seleniferous and gypsiferous clays with pinyon/juniper and desert shrubs. 4,700 to 6,000 ft.	N	1	No Impact
Navajo Lake milkvetch *Astragalus limnocharis* var. *limnocharis*	Escarpment. Bristlecone, limber, and ponderosa pine. Shore of Navajo Lake.	N	1	No Impact
Table Cliff vetch *Astragalus limncharis* var. *tabulaeus*	Escarpments of limestone. Talus slopes, ridge crests and tops. Above 9,000 ft.	N	1	No Impact

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 PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Guard milkvetch *Astragalus zionis* var. *vigulus*	Chaparral, mountain brush, and pinyon/juniper. 6,300 to 9,500 ft.	N	I	No Impact
Dainty moonwart *Botrychium crenulatum*	Saturated soils seeps, springs, and streams in spruce forests, 3,000 to 6,000 ft.	N	I	No Impact
Slender moonwort *Botrychium lineare*	Riparian areas and mixed forests. Western states from California to Colorado. Above 9,000 ft.	N	I	No Impact
Paradox moonwort *Botrychium paradoxum*	High elevation moist or wet meadows on Aquarius Plateau, Utah. Also found in Idaho, Montana, Oregon, and Washington.	N	I	No Impact
Aquarius paintbrush *Castilleja aquariensis*	Alpine, sub-alpine meadows, silver sagebrush and high-elevation black sagebrush. 9,600 and 11,200 ft.	Y	Not excluded	See detailed analysis below.
Tushar paintbrush *Castilleja parvula* var. *parvula*	Alpine and sub-alpine meadows. Open escarpments. Tushar Mountains, Utah. 10,000 to 12,100 ft.	N	I	No Impact
Reveal paintbrush *Castilleja parvula* var. *revealii*	Escarpments of the Claron formation. Gravels and talus. 7,700 to 9,900 ft.	N	I	No Impact
Wasatch fitweed *Corydalis caseana* spp. *brachycarpa*	Along streams with montane forest communities. 6,200 to 10,000 ft.	N	I	No Impact
Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*	Shadscale, mat saltbrush, and scattered pinyon/juniper on Mancos shale. 5,200 to 6,500 ft.	N	I	No Impact

Table 2
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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Yellow-white catseye *Cryptantha 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 ft.	N	I	No Impact
Pinnate spring parsley *Cymopterus beckii*	Cliff crevices or sandy canyon bottoms of Navajo Sandstone.	N	I	No Impact
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 ft.	N	I	No Impact
Brownie ladyslipper *Cypripedium fasciculatum*	Duff of shaded coniferous forests, typically lodgepole pine. Western states; from California to Colorado. 8,100 to 9,600 ft.	N	I	No Impact
Lesser yellow lady's slipper *Cypripedium parviflorum*	Shaded, moist soils in forested areas; 4400-5,300 ft.	N	I	No Impact
Wasatch shooting star *Dodecatheon utahensis*	Shaded, moist cracks and crevices of rock outcrops or faces. Often in spray of waterfalls.	N	I	No Impact
Abajo Peak draba *Draba abajoensis*	Spruce, fir, or pine forests, sub-alpine meadows. Utah, Arizona, and New Mexico.6,200 to 12,400 ft.	N	I	No Impact
Wasatch draba *Draba brachystylis*	Moist areas on rocky slopes with aspen and fir communities. 5,500 to 9,800 ft.	N	I	No Impact
Burke's draba *Draba burkei*	Talus slopes of sub-alpine fir, Northern Utah mountains. 84,00 to 9,700 ft.	N	I	No Impact
Rockcress draba *Draba globosa*	Alpine slopes and summits. Idaho, Montana, Utah, and Colorado. Above 11,200 ft.	N	I	No Impact

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 PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Maguire draba *Draba maguirei*	Talus slopes and rocky outcrops. 5,400 to 8,700 ft.	N	I	No Impact
Mount Belknap draba *Draba ramulosa*	Alpine. Calcareous talus, rocks, or gravels. 10,800 to 12,000 ft.	N	I	No Impact
Santaquin draba *Draba santaquinensis*	Cracks and crevices of limestone or dolomite rock faces or cliffs in Santaquin and American Fork Canyons, Utah.	N	I	No Impact
Creeping draba *Draba sobolifera*	Alpine and sub-alpine meadows. Open escarpments of volcanic gravel or talus. Tushar Mountains, Utah. 10,000 to 12,000 ft.	N	I	No Impact
Nevada willowherb *Epilobium nevadense*	Pinyon/juniper and mountain brush communities on limestone outcrops.	N	I	No Impact
Pine Valley goldenweed *Ericameria crispa*	Tertiary rocks with aspen, mixed conifer, and mountain brush. Pine Valley Mountains, Utah. Above 7,500 ft.	N	I	No Impact
Carrington daisy *Erigeron carringtonae*	High elevation escarpment ridges of Flagstaff limestone. 10,000 to 11,000 ft.	N	I	No Impact
Cronquist daisy *Erigeron cronquistii*	Cliffs, crevices, and talus of limestone. 5,700 to 9,900 ft.	N	I	No Impact
Garrett's fleabane *Erigeron garrettii*	Moist limestone cliff faces and crevices. 8,850 to 12,500 ft.	N	I	No Impact
Kachina daisy *Erigeron kachinensis*	Sweeps, hanging gardens, and open slickrock. 5,300 to 8,400 ft.	N	I	No Impact
La Sal daisy *Erigeron mancus*	Alpine and sub-alpine grass/sedge and forb communities. 9,100 to 10,500 ft.	N	I	No Impact

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 PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Untermann daisy *Erigeron untermannii*	Open escarpments and sparsely vegetated ridge tops of shale, gravel, siltstone, and occasionally talus with scattered bristlecone and limber pine, Douglas fir, and pinyon/juniper.7,000 to 9,400 ft.	Y	1,2	No Impact
Widstoe buckwheat *Eriogonum aretioides*	Open escarpments of loams, gravels, and talus with cushion plants, bristlecone, limber, and ponderosa pine. 7,100 to 8,000 ft.	N	1	No Impact
Elsinore buckwheat *Eriogonum batemanii* var. *ostlundii*	Igneous outcrops and gravels in shadscale, sagebrush, ponderosa pine, mixed desert shrub, and pinyon/juniper communities. 5,500 to 6,500 ft.	N	1	No Impact
Logan buckwheat *Eriogonum loganum*	Rocky outcrops and sagebrush/bunchgrass communities. 4,800 to 7,80 ft.	Y	Not excluded	See detailed analysis below.
Canyon sweetvetch *Hedysarum occidentale* var. *acnone*	Open slopes in pinyon/juniper, mountain brush, and sagebrush. 5,000 to 8,000 ft.	Y	1,2	No Impact
Jones goldenaster *Heterotheca jonesii*	Crevices and sands of Navajo sandstone. 7,500 to 9,500 ft.	N	1	No Impact
Utah ivesia *Ivesia utahensis*		N	1	No Impact
Wasatch jamesia *Jamesia americana* var. *macrocalyx*	Cliffs and rocky places with mountain brush and spruce-fir.	N	1	No Impact
Zion jamesia *Jamesia americana* var. *zionis*	Hanging gardens and ledges of Navajo sandstone. 3,900 to 6,600 ft.	N	1	No Impact

Table 2
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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Wasatch pepperweed *Lepidium montanum* var. *alpinum*	Rocky, damp crevices at high elevations with mountain brush and spruce-fir. 6,600 to 10,000 ft.	N	I	No Impact
Neeses' pepperweed *Lepidium montanum* var. *neeseae*	Escarpments of sandstone with scattered pinyon/juniper, manzanita, and ponderosa pine. 6,400 to 9,500 ft.	N	I	No Impact
Garrett bladderpod *Lesquerella garrettii*	Talus and outcrops of limestone in alpine tundra, sub-alpine meadow, and coniferous forests. 9,000 to 12,000 ft.	N	I	No Impact
Canyonlands lomatium *Lomatium latilobum*	Entrada sandstone with pinyon/juniper and desert shrubs. 4,800 to 6,850 ft.	N	I	No Impact
Goodrich blazingstar *Mentzelia goodrichii*	Erosive escarpments and steep slopes of Green River formation. Scattered pinyon/juniper. Tavaputs Plateau, Utah. 7,200 to 8,600 ft.	N	I	No Impact
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	I	No Impact
Beaver Mountain groundsel *Packera castoreus*	Endemic to the Tushar Mountains on windswept ridges downward to spruce/fir communities in Piute County, Utah.	N	I	No Impact
Podunk groundsel *Packera malmstenii*	Open escarpments of gravels or talus with cushion plants, bristlecone, limber, and ponderosa pine. 8,300 to 10,400 ft.	N	I	No Impact

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Arctic poppy *Papaver radicatum* var. *pygmaeum*	Alpine ridge crests, saddles, and talus slopes of Red Pine Shale. Above 11,400 ft.	N	I	No Impact
Paria breadroot *Pediomelum pariense*	Open escarpments with pinyon/juniper and ponderosa pine. 5,600 to 8,000 ft.	N	I	No Impact
Stemless beardtongue *Penstemon acaulis*	Mixed desert shrub, black and Wyoming big sagebrush, pinyon/juniper. Utah, Wyoming, and Colorado. 5,500 to 8,200 ft.	Y	Not excluded	See detailed analysis below.
Red Canyon beardtongue *Penstemon bracteatus*	Open escarpments of gravel or talus in Claron formation with cushion plants, bristlecone, limber, and ponderosa pine. 6,900 to 8,300 ft.	N	I	No Impact
Cache beardtongue *Penstemon compactus*	Mountain brush and spruce-fir in or near outcrops of dolomite or limestone.	N	I	No Impact
Little penstemon *Penstemon parvus*	Dry open meadows, silver and high-elevation black sagebrush. 8,500 to 10,000 ft.	Y	Not excluded	See detailed analysis below.
Pinyon penstemon *Penstemon pinorum*	Pinyon/juniper and mountain brush communities of Pine Valley Mountains, Utah. 5,600 to 6,700 ft.	N	I	No Impact
Ward beardtongue *Penstemon wardii*	Clay semi-barrens with desert shrub, pinyon/juniper, sagebrush, shadscale, or pinyon/juniper. 5,200 to 8,000 ft.	N	I	No Impact
Angell cinquefoil *Potentilla angelliae*	Rocky subalpine meadows between 10,900 and 11,100 ft.	N	I	No Impact
Cottam cinquefoil *Potentilla cottamii*	Cracks and crevices of quartzite outcrops, often shaded. 7,500 to 10,400 ft.	N	I	No Impact

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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Arizona willow *Salix arizonica*	Wet meadows and streamside communities. Utah, New Mexico, and Arizona. 8,200 to 10,600 ft.	Y	Not excluded	See detailed analysis below.
Musinea groundsel *Senecio musiniensis*	Ridge tops, gravels, barrens, and talus slopes of Flagstaff limestone. 9,700 to 10,800 ft.	N	1	No Impact
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 ft.	N	1	No Impact
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 ft.	N	1	No Impact
Caespitose greenthread *Thelesperma caespitosum*	Escarpments and slopes of Green River and Uinta formations. Scattered pinyon/juniper, salina wildrye. Wyoming and Utah. 5,900 to 8,800 ft.	Y	1,2	No Impact
Uinta greenthread *Thelesperma pubescens*	Wind-swept ridges in mountain mahogany, Hickey Mountain vicinity. 8,100 to 8,900 ft.	Y	Not excluded	See detailed analysis below.
Bicknell thelesperma *Thelesperma subnudum* var. *alpinum*	Navajo sandstone and Carmel limestone between 7,300 and 9,000 ft.	N	1	No Impact
Barneby woody aster *Tonestus kingie* var. *barnebyana*	Mountain mahogany and oak communities on rock outcrops.	N	1	No Impact
Sevier townsendia *Townsendia jonesii* var. *lutea*	Salt desert shrub and juniper communities 5,500 to 6,300 ft.	N	1	No Impact

Table 2
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SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Smith violet *Viola franksmithii*	Shaded limestone cliffs and crevices with Douglas fir, maple, and mountain brush.	N	I	No Impact

[1]Analysis area is outside species' range.
[2]Potential habitat for the species does not exist within 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 habitat(s) impacted by the proposal, but no affiliation or dependence upon these habitat(s) has been shown.
[5]The associated conservation design or mitigations eliminate any potential for impact to 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		
Greater Sage-Grouse	*Centrocercus urophasianus*	S
Mammals		
Pygmy Rabbit	*Brachylagus idahoensis*	S
PLANTS		
Aquarius paintbrush	*Castilleja aquariensis*	S
Logan buckwheat	*Eriogonum loganum*	S
Stemless beardtongue	*Penstemon acaulis*	S
Little Penstemon	*Penstemon 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 EFFECTS ANALYSIS (DIRECT, INDIRECT, AND CUMULATIVE)

Because of the importance of GRSG and their habitat in this effort, they will be singled out and discussed specifically; while pygmy rabbits, Columbia spotted frog, and boreal toad were grouped together for this analysis due to the similar nature of the habitats they occupy in terms of association with sagebrush communities.

7.1 GREATER SAGE-GROUSE (*CENTROCERCUS UROPHASIANUS*)

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)) (Patterson 1952; Braun *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), the USFWS Final COT report (2013) and from the BLM draft EIS chapter 3.)

Habitat conditions and population information were largely taken from the USFWS FINAL COT report – Feb. 2013 and from the BLM draft EIS chapter 3. Populations identified in the Conservation Objectives Team Report (USFWS 2013)(COT) 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 Wasatch-Cache and Uinta). Table 4 displays the COT delineated populations along with their likelihood of persistence.

Table 4
Likelihood of Persistence of GRSG Populations within Management Zones and Populations on the National Forests in Utah Based on the COT Report (USFWS 2013)

Population Area	<200 Males/500 Birds	% Chance of <50 birds/20 males in 2037	% Chance of <500 birds/200 males in 2037	% Chance of <50 birds/20 males in 2107	% Chance of <500 birds/200 males in 2107
Management Zone II: Wyoming Basin	**NA**	**0.1**	**0.2**	**16.1**	**16.2**
9a – Wyoming Basin	No				
9b - Rich-Morgan - Summit (*WY Basin in UT*)	No	0	0	9.9	10.7
9c- Uintah (*WY Basin in UT*)	No				
Management Zone III: Southern Great Basin	**NA**	**0**	**0**	**6.5**	**7.8**
10a – Strawberry Valley (NE Utah)	Y	0.8	51.8	8.8	78.6
10b – Carbon Co. (NE Utah)	Y	0.8	51.8	8.8	78.6
11- Sheeprock (*UT,* aka *Tooele-Juab Counties*)	Y	56.6	100	100	100
12 - Emery (*UT, aka Sanpete- Emery Counties*)	Y	77.2	100	99.2	100
13a – Greater Parker Mt. (*Part of South Central UT*)	N	0.0	3.2	1.1	21.0
13b – Panguitch *(Part of South Central UT)*	N	0.0	3.2	1.1	21.0

7.1.2 Habitat and Population Condition by Forest

Ashley NF

The Ashley National Forest falls within the Uintah Sage-grouse Management Area. Throughout the area (not just on the Forest) there were an estimated 452 males on leks as of 2011. Within the northern portion of this area is the Diamond Mountain and Browns Park population, a significant population center for sage grouse 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. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was zero chance of the population dropping below 500 birds/200 males by 2037.

The central and southern portions of the management area contain fragmented habitat and populations with minimal connectivity and low potential for habitat improvement. There are a total of 170,130 acres of PPMA and 54,692 acres of PGMA on the Ashley National Forest.

Dixie NF

The Dixie National Forest contains a portion of the Greater Parker Mountain Sage-grouse Management Area and the Panguitch Management Area in south central Utah. The Parker Mountain area had an estimated 821 males on leks in 2011. Of course only a portion of the aforementioned leks, male grouse, and habitat occurs on the Forest. The Panguitch portion has more than a dozen leks that are often inter-connected, with an estimated 304 males in 2011. Only a few of these are located on FS lands. There is a large range 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), suggested that there was 3.2% chance of the population dropping below 500 birds/200 males by 2037.

Portions of the Parker population that are on the Forest 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 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. On the Dixie National Forest, there are a total of 183,886 acres of PPMA and zero acres of PGMA.

Fishlake NF

The Fishlake National Forest, at the southern end, also contains a portion of the Greater Parker Mountain Sage-grouse Management Area 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. This is a small isolated population with high elevation sagebrush steppe. On the Fishlake National Forest, there are a total of 180,452 acres of PPMA and zero acres of PGMA. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was 3.2% chance of the population dropping below 500 birds/200 males by 2037.

Manti-LaSal NF

The Manti-La Sal National Forest contains a portion of the Carbon Sage-grouse Management Area located 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 NF, 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 leks 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% and 100% chance respectively of both the Carbon and Emery populations dropping below 500 birds/200 males by 2037.

In the Carbon population area, it is characterized by highly broken terrain, with deep canyons and mid-elevation plateaus. Telemetry studies in the area suggest that occasionally GRSG migrate to and from the adjoining Strawberry Valley portion of this population. In the Emery area, it is 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 a total of 96,072 acres of PPMA and zero acres of PGMA.

Uinta-Wasatch-Cache NF

Due to the combination, over time, of what used to be three forests, the Uinta-Wasatch-Cache National Forest contains portions of multiple sage grouse management areas in the northern portion of the state. The Rich-Morgan-Summit Sage-grouse Management Area is located in Northeastern Utah, and is a part of the Wyoming Basin population, 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 potential for growth. 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 chance of the population dropping below 500 birds/200 males by 2037. The habitat is comprised 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 is located in central Utah, and is a significant population center for GRSG in Utah. This management area had an estimated 82 males on leks as of 2011. Significant restoration efforts have been conducted on this population and it is the most intensively managed in Utah. This population is regarded as stable with a high 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 51.8% chance of the population dropping below 500 birds/200 males by 2037. 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 area to the east is drier and contains Wyoming big sagebrush with more pinyon/juniper moving off the slopes into the valleys.

The Sheeprock population in Utah is a relatively isolated population center also known as the Sheeprock Mountains Management Area. Garton et al. (2011) refers to this 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. However, based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was 51.8% chance of the population dropping below 500 birds/200 males by 2037. GRSG in this area show resiliency to known threats. Habitat is composed of Wyoming big sagebrush and less diverse understories than would be found in more mesic high elevation sites.

There are a total of 139,159 acres of PPMA and 21,117 acres of PGMA on the Uinta-Wasatch-Cache National Forest.

7.1.3 Threats by Forest

Table 5 identifies potential threats for the GRSG populations on the Utah National Forests and those portions of the Utah Forests that extend into Wyoming, as well as the contribution of management on NFS administered lands to those threats.

Ashley NF

Key threats to GRSG on and around the Ashley NF include predation, wildfire, invasive species, noxious weeds, disease, and habitat fragmentation (naturally occurring, but not topographical, and from existing and future anthropogenic uses). GRSG in the Management Area show resiliency to known threats. In concert with the remaining portions of this population, the management area is considered low risk.

Dixie NF

Key GRSG threats on and around the Dixie NF include: loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased risk of 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 include impacts from historical and current livestock grazing, energy development, and adjacent residential and commercial development.

Fishlake NF

Key GRSG threats on and around the Fishlake NF include: loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased risk of predation because of expansion of, or changes in, the native predator community in response to anthropogenic factors, and habitat fragmentation from loss or degradation of habitat that results in a loss of GRSG habitat connectivity. Local issues include livestock grazing impacts, degraded sagebrush habitats, with sagebrush too dense in some areas and adequate in others.

Table 5
Potential Threats for GRSG Populations on National Forest System Lands in Utah and the Portion of Those Forests that Reach into Wyoming Based on the COT Report (USFWS 2013)

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 – WY Basin	N	L	N	L	L	L	Y	L	Y	Y	L	Y	L
Ashley NF - WY	N	N	N	L	L	L	L	L	L	Y	L	Y	N
W-C NF - WY	N	N	N	L	L	L	L	L	L	Y	L	Y	N
9b – WY Basin (Rich/ Summit)	N	N	N	Y	Y	Y	Y	N	Y	N	N	Y	Y
9c – WY Basin (Uinta)	N	N	N	Y	Y	Y	L	Y	Y	N	N	Y	Y
Ashley NF - UT	N	L	N	Y	Y	Y	Y	L	Y	Y	L	Y	N
W-C NF – UT	N	L	N	Y	Y	Y	L	N	L	Y	L	Y	N
10a – Strawberry	Y	N	N	Y	Y	Y	Y	N	Y	N	N	Y	N
Uinta NF	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-LaSal NF	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 NF – 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–Panguitch	N	N	Y	Y	Y	Y	Y	L	Y	N	N	Y	L
Dixie-Fishlake NF	N	Y	N	Y	Y	Y	L	L	Y	Y	N	Y	L

Manti-LaSal NF

Key threats to GRSG and their habitats on and around the Manti-La Sal NF include habitat loss and fragmentation 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 West Nile Virus have been and could continue to be a threat. In addition

a few of the populations in the area are small and persist in fragmented habitats. This, along with the other threats present on and around NF lands, makes this population at-risk.

Uinta-Wasatch-Cache NF

Key threats to GRSG on and around the Uinta-Wasatch-Cache NF include wildfire, invasive species (cheatgrass and knapweed), pinyon/juniper encroachment, predation, habitat fragmentation (i.e. dispersed recreation), private land management and development, isolation of some small populations, a dearth of water resources at arid sites due to piping water for livestock, and some historical and current livestock operations. Because these populations are varied in their habitats, elevations, and juxtaposition with other private, state, and federal land, the risks to habitat and population persistence range from low to high.

7.1.4 Alternative A - No Action

Isolation/Habitat Fragmentation

Alternative A would maintain current land management and few Forests have specific conservation parameters in Land Use Plans for sagebrush and/or GRSG. Under this alternative there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on the Forest relative to GRSG. There would be minimal seasonal restrictions on casual use and some of the areas within 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 fragmentation and disturbance to GRSG. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent 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 effects. Therefore all direct and indirect effects to the species and its habitat would likely allow current trends to continue. Isolation in small, fragmented habitats results in similarly smaller populations supported and increases the probability for loss of genetic diversity and extirpation from stochastic events, such as disease or drought (Knick and Hanser 2011). Connectivity between seasonal habitats is decreased between isolated habitats, potentially resulting in the loss of the population, which may be cut off from food, water, or cover at critical times of year. Isolation, in addition to reducing the land area available to support GRSG, habitat loss and fragmentation also increase opportunities for other disturbances, such as human traffic, wildfire, and spread of invasive plants, and increase the risk from such threats.

Fire

Most sagebrush species are 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 blocks of continuous dead sagebrush. Prior to recovery, these sites are of limited use by GRSG 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 GRSG 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), depending on site conditions at the time of the burn. In addition, fires can result in a reduction of invertebrate food sources and may facilitate the spread of invasive weeds.

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 slow to reestablish, cheatgrass recovers within one to two years of a fire event from seed in the soil. This leads to rapid re-occurring fire cycles that prevent sagebrush reestablishment (USFWS 2010). Forest Service management to prevent or control wildfires also affects GRSG and habitat. Increased human activity and noise associated with fire suppression and prescribed fire in areas occupied by GRSG 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. As pinyon-juniper encroachment advances and the understory begins to thin, the depleted understory causes the stands to become resistant to wildfire and further alters fire return intervals. During years of high fire danger, the resulting heavy fuel loadings in these stands can contribute to large-scale wildfire events and confound control efforts due to extreme fire behavior. Fire risk is extremely high throughout the planning area, and is listed as one of the most significant threats to GRSG in 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 direction regarding fuels treatments in sagebrush habitat.

Both prescribed fire and non-fire fuels treatments are allowed in current Forest Plans. Additionally, fire fighter and public safety are the highest priority in a wildfire suppression scenario. GRSG habitat would 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. These policies do 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 leading to habitat loss and fragmentation. As this alternative does not prioritize fire operations beyond what has already been determined in the Fire Management Plans for the area, potential impacts may include: removing or degrading habitat, disrupting reproduction, causing changes in species movement patterns due to areas devoid of vegetation, and ultimately impacting local population viability.

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 competitive exclusion and niche displacement, among other mechanisms. 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, and a variety of native forbs and very often the insects associated with them. GRSG depend on sagebrush, which is eaten year-round and used exclusively throughout the winter for food and cover. Along with competitively excluding vegetation essential to GRSG, invasive plants fragment existing GRSG habitat or reduce habitat quality. Invasive plants may also alter long-term changes in ecosystem processes, such as fire-cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004, pp. 5-9). The

spread and establishment of invasive species is a major threat throughout the population areas of Utah (USFWS 2013). Under current management (Alternative A), the Forest Service utilizes integrated weed management techniques, including 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 can also reduce weeds and create fire breaks. Under Alternative A, Forest Service would continue to implement noxious weed and invasive species control using integrated weed management actions per funding and plans in cooperation with State and Federal agencies, affected counties, and adjoining private lands. Though there are no specific objectives in Forest Plans to focus these efforts on cheatgrass or sagebrush communities. These actions would improve GRSG habitat along with other vegetation types, but would not specifically prioritize management of these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach into 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 into mountain big sagebrush communities. The Forest Service frequently implements pinyon-juniper treatments using mechanical, chemical, hand-cutting and prescribed burning to reduce conifer encroachment of sagebrush communities. Conifer encroachment is a substantial threat to Box Elder, Panguitch, Parker Mountain, Emery and Uintah 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/or livestock grazing. 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/Energy Development

Energy development can result in direct habitat loss; fragmentation of important habitats by roads, pipelines, and power lines; noise; and direct human disturbance. The effects of energy development often add to the impacts from other human development and may result in GRSG population declines. Nonrenewable (oil and gas) energy development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors; indirectly from noise, gaseous emissions, changes in water availability and quality, and human presence. The interaction and intensity of effects could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004, 19 p. 41; Holloran 2005, pp. 57-60). 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 losses, habitat fragmentation through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development (USFWS 2010, p. 13951-2). Surface and subsurface mining for mineral resources (coal, uranium, copper, phosphate, and others) results in direct loss of habitat if they occur in sagebrush habitats. Surface mining usually has a greater impact than subsurface activity. Habitat loss from mining can

be exacerbated by the storage of overburden (soil removed from mine shafts) in undisturbed habitat. If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, railroad tracks, and power lines. GRSG 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 (Brown and Clayton 2004). Industrial activity associated with the development of surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life-cycle of GRSG. Under this alternative, a small percentage of PPMA would be closed to non-energy leasable mineral leasing, with the majority or remainder of all designated habitats open to leasing (including expansion of new leases) with no cap on surface disturbing activities. As such, this alternative would be expected to cause the greatest amount of direct and indirect habitat loss, degradation, and fragmentation for GRSG. There would likely also be greater negative effects from noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Recent work from developed natural gas fields in Wyoming gas fields (Gilbert and Chalfoun 2011) documents 10-20 percent declines in the abundance of certain sagebrush obligates (i.e., sage and Brewer's sparrow).

Infrastructure

Human developments, such as power lines, communication towers, fences, roads, and railroads, contribute to habitat loss and fragmentation, with power lines and roads having the largest effects (Connelly et al. 2004, Naugle et al. 2011). 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 GRSG. 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 associated with power line construction, as well as vehicle and human presence during maintenance activities, may introduce or spread invasive weeds over large areas, thereby degrading habitat. Cellular and other communications towers have the potential to cause GRSG mortality via collisions, to influence movements through avoidance of a tall structure or electromagnetic radiation, or to 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 (13.7 miles) was almost twice that of occupied range (7 miles). GRSG have been observed to avoid brood-rearing habitats within three miles of powerlines (LeBeau 2012). Higher densities of power lines within four miles of a lek negatively influence lek attendance (Walker et al. 2007). Additionally, the tendency of GRSG to fly relatively low, and in low light or when harried, may put them at high risk of collision with power lines (Manier et al. 2013, p. 81). In addition, research suggests that road traffic within 4.7 mi. of leks negatively influence male lek attendance (Connelly et al. 2004). Lek count trends have been found to be lower near interstate, federal, or 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 include facilitation of predator movements, spread of invasive plants, and human disturbance from noise and traffic (Forman and Alexander 1998, pp. 207-231). Closing and

reclaiming unused, minimally used and/or unnecessary roads in and around sagebrush habitats during seasonal use by GRSG may reduce habitat loss (NTT 2011, p. 11).

Railroads presumably have the same potential impacts to GRSG as do roads because they create linear corridors within sagebrush habitats, promoting habitat fragmentation and other disturbance. In addition, fence poles create predator perch sites and potentially predator corridors along fences (particularly if a road is adjacent). Fences and their associated roads may allow for the invasion or spread of invasive weeds along the fencing corridor. Furthermore, fences may effectively cause habitat fragmentation, as GRSG 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 GRSG and where available would continue under this Alternative. Also, under this alternative, there would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. All FS Lands would continue to be managed according to FS policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation for GRSG. Indirect effects may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects 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 aspects relative to 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, and protect intact sagebrush habitat and increase habitat extent and continuity (Connelly et al. 2004, NRCS 2013). 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, including changes in 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 including GRSG (Knick 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 nests/eggs (Coates 2007, pp. 28, 33), or disturb reproduction efforts in other ways. At the planning scale, 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, 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 within riparian and wet meadows can reduce impacts in these important seasonal habitats.

Approximately 40,000 free-roaming horses and burros currently live in the western US and are found in approximately 18 percent of occupied GRSG range (Connelly et al, 2004; Beever and Aldridge 2011) and primarily on BLM administered lands. A horse consumes 20 to 65 percent more forage than would a cow of equivalent size, and horses can use higher elevation areas and steeper slopes so a wider swath of sagebrush is grazed when horses are present (Connelly et al. 2004). Under Alternative A, Forest Service would continue to make GRSG habitat available for

livestock grazing. Active AUMs for permitted 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, 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 this alternative, there would be no change in the numbers, timing, or method of livestock grazing on the Forest. In addition, there would be no change to wild horse or burro management. Other potential effects to GRSG habitat could include: overgrazing, reduction in cover, structure, and loss of diversity due to consumption, and degradation of meadow/wetland/spring/stream habitat crucial for reproduction.

Cumulative Effects for Seven Resource Areas in Alternative A

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.1.5 Alternative B

Isolation/Habitat Fragmentation

Alternative B would encourage consolidation of GRSG habitat, facilitating habitat conservation. These conservation measures would be more protective than conservation measures in Alternatives A and D, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats. Alternative B would not establish any Zoological areas for GRSG. Currently the planning area does not include any Zoological Areas with GRSG as an important value. Under Alternative B, PPMA would be retained in public ownership, with exceptions for areas of minority federal ownership, where conservation easements would be pursued. In addition, where suitable conservation actions cannot be achieved in PPMA, federal agencies would seek to acquire state and private lands to best conserve, enhance or restore sage-grouse habitat. These actions would protect against additional fragmentation of GRSG habitat, but would do little to reduce existing isolation and fragmentation. Under this alternative there would be limited opportunities for road construction in PPMA, with minimum standards applied and no upgrading of current roads. In addition, recreational use permits would only be given in PPMA if there was a neutral or beneficial impact to GRSG and no driving cross country would be permitted in PPMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influence to sagebrush habitats and GRSG by minimizing human use and construction or upgrading of roads. Also, the 3 percent disturbance limitation in PPMA promotes contiguous healthy habitats and limits fragmentation.

Fire

Fire is among the greatest threats to GRSG in Utah. Under Alternative B, in PPMA, fuels treatments 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 fire fighter and public safety, which is the highest priority, and protection of 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 Weeds

Under Alternative B, Forest Service would continue to implement noxious weed and invasive species control using integrated weed management actions per existing plans to control, suppress, and eradicate noxious and invasive species. Vegetation management and restoration programs would prioritize sagebrush re-establishment 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 re-establishment. 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, invasive vegetation will be monitored and controlled in fuels treatment areas and in relation to PPMA. More emphasis on actively conserving sagebrush ecosystems than those described under Alternative A.

Minerals/Energy Development

Under Alternative B, lands within PPMA would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. Lands within PPMA would also be found unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Un-leased areas in PPMA would be closed to fluid mineral leasing, greatly increasing the habitat acreage protected from energy development. Existing lease areas would have conservation measures applied, including NSO stipulations. PGMA 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. This alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass many acres of GRSG habitat. This alternative may push energy and mineral development to less desirable sagebrush or non-sagebrush habitat, but there may be lingering effects of not protecting all potential GRSG habitat in terms of new areas to colonize or shift use to under when adjacent habitat is in imperiled.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation, collision and fragmentation of habitat. Under Alternative B, PPMA would be exclusion areas for new ROWs and the acreage excluded from ROW construction would be greatly increased over Alternative A--PGMA would be ROW avoidance areas. The acreage limited to existing routes would be greatly increased over Alternative, and the acres open to off-road vehicles decreased. These policies would protect PPMA from ROW and road construction more than Alternative A. Under this alternative, PPMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new rights-of-way projects.

Livestock Grazing and Feral Horses

Excessive or poorly managed grazing may degrade GRSG habitat. Alternative B would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs per say, but within PPMA, Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments through AMPs or permit renewals administratively. Alternative B would adjust grazing direction in GRSG PPMA. This accounts for about 10% of the Forest lands in Utah. The effects due to livestock grazing, vegetation disturbance, and range improvements is expected to be the same under Alternative B, as it would be under Alternative A, except 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 effect on the PPMA habitat, likely creating small pockets of improved areas for productive breeding, nesting, and brood rearing for GRSG.

Cumulative Effects for Seven Resource Areas in Alternative B

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.1.6 Alternative C

Isolation/Habitat Fragmentation

Under Alternative C, Zoological Areas are proposed on Forest Service lands in each of the fifteen GRSG population areas to function as sagebrush reserves in PPMA; totaling 318,200 acres and would conserve habitat against surface disturbance and fragmentation. Alternative C would retain all occupied habitat in public ownership. In addition, where suitable conservation actions cannot be achieved in PPMA, federal entities would seek to acquire state and private lands to meet these objectives. These actions and the establishment of sagebrush reserves would protect against additional fragmentation of GRSG habitat. Under this alternative, effects would be similar to those mentioned in Alternative B, except that it would apply to PGMA and not just PPMA.

Also, the 3% disturbance limitation in PPMA further promotes contiguous healthy habitats and limits fragmentation.

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 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. This alternative would be expected to have the least negative impacts and most positive impacts to wildlife species whose ranges overlap with PGMA and PPMA. Under this alternative, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include all occupied habitat.

Invasive Weeds

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 re-establishment and weed control. In addition, Alternative C would help to develop methods for prioritizing and restoring sagebrush steppe invaded or even once reseeded by nonnative plants. These policies would place greater emphasis on sagebrush re-establishment than Alternative A increasing habitat effectiveness further. However, the actual change in invasive weed establishment would depend on the resources available to devote to the effort.

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 increasing habitat quantity and effectiveness.

Minerals/Energy Development

Under Alternative C, lands within all occupied habitat would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. This action 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 within PH and GH would also be defined unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Un-leased areas would be closed to fluid mineral leasing, greatly increasing the amount of habitat protected from energy development. Existing lease areas would have conservation measures applied, including NSO stipulations. These policies would substantially reduce the available acreage for energy development, which would limit impacts such as disturbance and habitat degradation. Under this alternative, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include PPMA and PGMA.

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, effects would be much the same as those described for Alternative B, but would be applicable to a larger area of GRSG habitat offering more positive effects. The acreage limiting motorized travel to existing routes would be greatly increased over Alternative A, and off-road vehicle 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 fragmentation of habitat.

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, removal of 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. The complete removal of livestock grazing could improve sagebrush habitat quality initially and help to restore important wetland and adjacent riparian habitats that support GRSG.

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—primarily on BLM lands. These policy changes would reduce the direct impacts of grazing from Alternative A, while also maintaining the vegetation diversity and fuel reduction promoted by livestock grazing. Not exceeding proper use grazing levels, according to Forest Plan standards, will be more easily attainable if proposed grazing reductions are followed. Wild ungulates would still be using these areas and their use may also increase as available forage increases. 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 effects on GRSG due to alternative C with respect to range resources. This is because under this alternative, grazing would not only be reduced to improve conditions for GRSG in PPMA, but it would discontinue grazing in all occupied habitat (Alt C1) or substantially reduce grazing in all allotments that overlap GRSG habitat (C2). This amounts to roughly 11% of the total area of National Forest lands in Utah, certainly a much higher percentage of grazing suitable lands. Additionally, under this alternative, habitat treatments would only be allowed that benefit GRSG. Therefore, Alternative C would have the least negative effects and the most positive impacts on GRSG. By putting in place grazing restrictions and ensuring vegetation treatments benefit GRSG, there would likely be general benefits.

Cumulative Effects for Seven Resource Areas in Alternative C

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the

seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.1.7 Alternative D

Isolation/Habitat Fragmentation

Alternative D would not establish any Forest Service Zoological Areas for GRSG like Alternative C. Under Alternative D, PPMA would be retained in public ownership, with exceptions for areas of minority federal ownership, where conservation easements would be pursued. In addition, where suitable conservation actions cannot be achieved in PPMA, federal agencies would seek to acquire state and private lands to best conserve, enhance or restore GRSG habitat. These actions would protect against additional fragmentation of GRSG habitat, but would do little to reduce existing isolation and fragmentation. Under this alternative, the effects of most suggested management actions would be similar to Alternative B, with the exception that more flexibility or discretion would be given to the land management agency for site specific analysis to allow for example, route construction in PPMA, road improvements, and issuance of Special Use Permits (SUPs) 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% cap of disturbance for the UT management zone. Effects of this alternative include continued disturbance of a small amount of GRSG habitat with some disruption of normal life history behaviors if disturbance was permitted.

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 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. Under Alternative D, PPMA would be managed as an avoidance area, however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PPMA if the project would not adversely affect GRSG populations. This alternative would be more protective than Alternative A, but less protective than Alternatives B and C for GRSG.

Invasive Weeds

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush re-establishment and noxious/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 re-establishment than Alternative A. However, the actual change in invasive weed establishment would depend on the resources available to devote to control efforts.

Conifer Encroachment

Under Alternative D, vegetation management programs would include treatment of PPMA facing conifer encroachment in order to meet GRSG habitat objectives to reduce conifer encroachment within PPMA. 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/Energy Development

Under Alternative D, lands within PPMA would be closed to non-energy leasable mineral new leasing and mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. In PGMA, new leases would be allowed with stipulations to protect lek and breeding habitat. Coal leases in PPMA would be allowed, after review by 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. Un-leased areas in PPMA and PGMA would be open to fluid mineral leasing, but all acres would require NSO or CSU stipulations, where under Alternative A over 1 million acres had no stipulations. Existing lease areas would have conservation measures applied, including NSO stipulations. These proposed policies set only 22,900 PPMA 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 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 this alternative, PPMA would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks similar to Alternative B. However with some mineral development, this alternative would allow up to 5% disturbance in any Utah Management Zone. Effects would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance is increased from 3% to 5%. However the potential for this difference to have negative impacts on GRSG is minimal. Therefore effects 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 fragmentation. Under Alternative D, PPMA within four miles of an occupied lek would be exclusion areas for most types of new ROWs. PGMA and PPMA, more than four 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 off-road vehicles greatly decreased. These proposed policies would protect PPMA from ROW and road construction more than Alternative A, by limiting road and ROW construction in habitat areas. Although Alternative D would provide less protection to PPMA 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 under this alternative compared with Alternatives B and C due largely to the five percent disturbance cap and allowance for

development to occur in PPMA (open for development). As such, this alternative would be expected to provide fewer protective measures to GRSG where range and/or habitats are coincident with PPMAs than Alternatives B and C, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments within PPMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals habitat quality will improve over the long-term. Alternative D would be similar to Alternative B, but would be slightly more restrictive as GRSG habitat objectives within grazing allotments would be applied to PGMA and not just PPMA. With regard to wild horses and burros, Alternative D would be similar to Alternatives B and C, but would consider all resource values in conjunction with GRSG when managing wild horses and burros. 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, this alternative would have much fewer negative impacts than Alternative A, be similar to Alternative B, and not go as far to generally benefit GRSG as Alternative C relative grazing.

Cumulative Effects for Seven Resource Areas in Alternative D

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.1.8 Alternative E

Alternative E2 – Wyoming Governor's EO…where noted, E2 applies to those Ashley National Forest lands in Wyoming and will be discussed in seven resource areas below:

Isolation/Habitat Fragmentation

Under Alternative E, the Forest Service would not establish any Zoological areas, would not seek to retain federal lands in GRSG habitat under public ownership, and would not seek to acquire state and private lands to best conserve, enhance or restore sage-grouse habitat. Water developments, along with seeps, springs, and wetlands are not evaluated and modified and/or enhanced except in Sage-Grouse Management Areas (SGMAs) or core areas. The provisions limiting "new" disturbance on 5% of state or federal GRSG habitat in any given Management Area may offer more protection than Alternative A, but likely not as much as Alternatives B,C, and D in relative order of most protection to GRSG and/or habitat.

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 SGMAs 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 treatment programs compared to Alternative A.

Invasive Weeds

Under Alternative E, interagency focus groups-- likely by SGMA--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, but 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 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/Energy Development

Selection of alternative E would place a 1 mile no surface occupancy (NSO) restriction around occupied leks for fluid mineral development, which 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 they can be placed out of line-of-sight of the lek. Generally, alternative E would not close any lands to mineral material sales or non-energy mineral leasing, but would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and best management practices to minimize disturbance of GRSG. In areas outside SGMAs and in non-core areas, no specific management actions would be taken. Coal leases in SGMAs 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. Un-leased areas in SGMAs and core areas would remain open to oil and gas leasing under no surface occupancy buffers (1 mile from leks in SGMAs and 0.6 miles in core areas) and controlled surface use 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 fragmentation of habitat. Under Alternative E1, SGMAs 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 SGMAs, though non-core areas would be avoidance areas. The acreage limited to existing routes would be greatly increased over Alternative A, and the acres open to off-road vehicles

would decrease compared to Alternative A. These policies provided limited measures to protect habitat within SGMAs 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 reduce AUMs. Existing grazing operations would utilize rangeland best management practices to increase the necessary vegetation to improve nesting success and population recruitment. To limit impacts to 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, but does not provide a mechanism to reduce grazing intensity in AMPs to achieve proper use grazing relative to increasing GRSG habitat effectiveness.

Cumulative Effects for Seven Resource Areas in Alternative E

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

Summary

Effects to GRSG and their habitats due to any of the action alternatives would be generally beneficial due to reducing anthropogenic influences to sagebrush habitats known and identified as such. Overall, the highest potential for negative effects would be from Alternative A. Currently Alternative A does not provide the regulatory mechanisms or assurances to protect, conserve, or enhance GRSG habitats to the extent desired. Under the No Action Alternative (A), incremental small scale negative effects are more likely. Conversely, there would likely be beneficial impacts to GRSG as a result of implementing any of the action alternatives. Although Alternative C takes a more aggressive blanket approach to GRSG occupied habitat, especially by eliminating grazing (C1), Alternatives B and D 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 acres protected than other action alternatives. Differences in negative effects between action alternatives would be negligible and differences in positive effects would be difficult to discern at this scale. Alternative D provides a more measured approach to effects by qualifying any potential management action by ensuring it improves conditions for GRSG and their habitats.

7.2 SAGEBRUSH ASSOCIATED SPECIES (SAS) – MAMMAL AND AMPHIBIANS

Because of the focus on GRSG and their habitats in the EISs, they were singled out and discussed separately above; while pygmy rabbit, boreal toad, and Columbia spotted frog were grouped together for this analysis as they can occupy habitats (e.g. aquatic systems) within broader sagebrush communities. Though each of the species may not be completely dependent upon sagebrush for every life history stage, for the sake of this analysis, and based on the

potential effects, programmatic nature of the conservation measures and landscape scale which is being analyzed, we grouped them into this category and call them Sagebrush Associated Species (SAS). In addition, as the nature of the project is to amend Forest Plans to include regulatory mechanisms and conservation measures to protect sagebrush habitats for GRSG, the effects would generally be similar for these species where habitat overlaps.

Pygmy Rabbit (*Brachylagus idahoensis*)
Distribution – Pygmy rabbits occur in sagebrush systems within the western (primarily the northwestern) United States. The pygmy rabbit's historical range includes 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 winter months the rabbits' diet consists of up to 99 percent sagebrush. In the summer and spring months, 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 make use of 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 above ground near dawn and dusk--crepuscular. Inactive periods are spent in underground burrows. Breeding occurs during the spring and early summer; females may produce a litter of approximately six young about thirty days after mating. Pygmy rabbits primarily eat sagebrush, but other vegetation is also consumed. As its name implies, the pygmy rabbit is the smallest of all rabbits in Utah (and in North America) (Green and Flinders 1980). Loss of sagebrush, upon which pygmy rabbits are highly dependent for food and shelter, is the main reason for the decline of pygmy rabbit populations. Much sagebrush has been burned or converted to agriculture. 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).

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 suspected to occur in additional areas. The overall range of the toad has contracted slightly, but its distribution within that range has been greatly reduced in the Inter Mountain 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 cold winter months, 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 larvae (tadpoles) filter algae from the water or feed on detritus. Adults are dusky gray or greenish in color 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 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 3 main habitat components; 1) shallow wetlands for breeding, 2) terrestrial habitats with vegetative cover for foraging, and 3) burrows for winter hibernation (Loeffler 2001). Boreal toads have a low reproductive output.

Threats to boreal toads include: chytrid fungus *(Batrachochytrium dendrobatidis)*, acidification of wetlands, thinning of the ozone layer, timber harvesting that causes sedimentation, livestock grazing in and around riparian areas, pesticides and herbicides, and introduced species which prey on toads or create competition for resources or 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, Rana luteiventris, 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 working cooperatively 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 3-21 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 cold winter months, 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 include habitat loss and fragmentation, fish stocking in fishless ponds that are critical to frog reproduction, introduction of 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

Isolation/Habitat Fragmentation
Alternative A would maintain current land management and few Forests have specific conservation parameters in Land Use Plans for sagebrush associated species. Under this alternative there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on the Forest relative to sagebrush. This alternative has the highest potential to impact SAS due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects to the species and its habitat

would likely cause current trends to continue. Isolation in small, fragmented habitats results in similarly smaller populations supported and increases the probability for loss of genetic diversity and extirpation from stochastic events. Pierce et al (2011) concluded that pygmy rabbit abundance and use decreased within 100 meters of sagebrush edge. With Alternative A allowing continued impacts to sagebrush communities, negative effects to these small rabbits will continue. Connectivity between seasonal habitats is decreased between isolated habitats, potentially resulting in the loss of the population, which may be cut off from food, water, or cover at critical times of year. Isolation, in addition to reducing the land area available to support SAS, habitat loss and fragmentation also increase opportunities for other disturbances, such as human traffic, wildfire, and spread of invasive plants, and increase the risk from such threats.

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 blocks of continuous dead sagebrush. Pygmy rabbits prefer sagebrush sites with high cover, around 21%-36% (Lee et al 2010). Prior to recovery, these sites are of limited use by 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 slow to reestablish, cheatgrass recovers within one to two years of a fire event from 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 regarding fuels treatments in sagebrush habitat. In general, both prescribed fire and non-fire fuels treatments are allowed, and fire suppression is prioritized to protect fire fighter and public safety as the highest priority, with GRSG habitat prioritized commensurate with property values and other critical habitat to be protected. 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 may include: removing or degrading habitat, disrupting reproduction, causing changes in 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 competitive exclusion and niche displacement, among other mechanisms. 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 depends on sagebrush and a variety of native forbs and very often the insects associated with them. Pygmy rabbits depend on sagebrush, which is eaten year-round and used nearly exclusively throughout the winter for food and cover (Keinath and McGee 2004). Along with competitively excluding vegetation essential to SAS, invasive plants fragment existing SAS habitat or reduce habitat quality. Under current management (Alternative A), the Forest Service utilizes integrated weed management techniques, including mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. Under Alternative A, Forest Service would continue to implement noxious weed and invasive species control using integrated weed management actions per funding and plans in cooperation with State and Federal agencies, affected counties, and adjoining private lands. Though there are no specific objectives in Forest Plans to focus these efforts on cheatgrass or sagebrush communities. These actions would benefit SAS habitat along with other vegetation types, but would not specifically prioritize management of these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach into sagebrush ecosystems, which reduce and may eventually virtually eliminate SAS occupancy in these areas. Pinyon-juniper invasion continually 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 into mountain big sagebrush communities. The Forest Service manages pinyon-juniper encroachment, especially in previously treated areas, utilizing mechanical, chemical, hand-cutting, and prescribed burning, to reduce conifer encroachment of 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/or 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/Energy Development

Energy development can result in direct habitat loss; fragmentation of important habitats by roads, pipelines, and power lines; noise; and direct human disturbance. The effects 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 through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors; indirectly from noise, gaseous emissions, changes in water availability and quality, and human presence. The interaction and intensity of effects could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004, 19 p. 41; Holloran 2005, pp. 57-60). 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 losses, habitat fragmentation through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development (USFWS 2010, p. 13951-2). Surface and subsurface mining for mineral resources (coal, uranium, copper,

phosphate, and others) results in direct loss of habitat if they occur in sagebrush habitats. Surface mining usually has a greater impact than subsurface activity. Habitat loss from mining can be exacerbated by the storage of overburden (soil removed from mine shafts) 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 the development of surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life-cycle of SAS. Under this alternative, a small percentage of PPMA would be closed to non-energy leasable mineral leasing, with the majority or remainder of all designated habitats open to leasing (including expansion of new leases) with no cap on surface disturbing activities. As such, this alternative would be expected to cause the greatest amount of direct and indirect habitat loss, degradation, and fragmentation for SAS. There would likely also be greater negative effects from noise, increased presence of roads/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 activities, may introduce or spread invasive weeds over large areas, thereby degrading habitat. Cellular and other communications towers have the potential to cause SAS mortality by influencing movements through avoidance of a tall structure or electromagnetic radiation, or to provide 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 include facilitation of predator movements, spread of invasive plants, and human disturbance from noise and traffic (Forman and Alexander 1998, pp. 207-231). Closing and reclaiming unused, minimally used and/or unnecessary roads in and around sagebrush habitats during seasonal use by SAS may reduce habitat loss (NTT 2011, p. 11). Railroads presumably have the same potential impacts to SAS as do roads because they create linear corridors within sagebrush habitats, promoting habitat fragmentation and other disturbance. In addition, fence poles create predator perch sites and potentially predator corridors along fences (particularly if a road is adjacent). Fences and their associated roads may allow for the invasion or spread of invasive weeds along the fencing corridor. Furthermore, fences may effectively cause habitat fragmentation, 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 where available would continue under this Alternative. Also, under this alternative, there would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. All FS Lands would continue to be managed according to FS policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation for SAS. Indirect effects may include new infestations of

noxious or invasive weeds and an increase in edge habitat. Though most projects 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 aspects relative to 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, including changes in 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 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 efforts. At the planning level, 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, 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 within riparian and wet meadows can reduce impacts in these important seasonal habitats and benefit sensitive amphibians. Under Alternative A, 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, 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 SAS habitat degradation if current grazing practices are not meeting Forest Plan proper use parameters. Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing on the Forest. Other potential effects to SAS habitat could include: overgrazing, reduction in cover, structure, and diversity of vegetation due to consumption, and degradation of meadow/wetland/spring/stream habitat crucial for amphibians.

Cumulative Effects for Seven Resource Areas in Alternative A

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.2.2 Alternative B

Isolation/Habitat Fragmentation

Alternative B would encourage consolidation SAS habitat, facilitating habitat conservation. These conservation measures would be more protective than conservation measures in Alternatives A and D, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats. Alternative B would not establish any Zoological areas for GRSG. These actions would protect against additional fragmentation of GRSG habitat, but would do little to reduce existing isolation and fragmentation. Under this alternative there would be limited opportunities for road construction in PPMA, with minimum standards applied and no upgrading of current roads. In addition, recreational use permits would only be given in PPMA if there was a neutral or beneficial impact to GRSG and no driving cross country would be permitted in PPMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influence to sagebrush habitats and SAS by minimizing human use and construction or upgrading of roads. Negative impacts to SAS will be associated with displacing anthropogenic development and activities outside of PPMA/PGMA 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 old growth. Under Alternative B, in PPMA, fuels treatments 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 firefighter and public safety and protection of property. 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 SAS and habitat more than Alternative A. Sagebrush communities outside of GRSG habitat will likely not see the protection afforded to PPMA/PGMA and impacts to it will 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 they place on sagebrush re-establishment 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 to devote to the effort. Controlling noxious and invasive plants will benefit SAS in general.

Conifer Encroachment

Under Alternative B, invasive vegetation will be monitored and controlled in fuels treatment areas and in relation to PPMA. More emphasis on actively conserving sagebrush ecosystems than those described under Alternative A will generally benefit SAS.

Minerals/Energy Development

Under Alternative B, lands within PPMA would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. 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. 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 effects of not protecting all SAS habitat.

Infrastructure

Under Alternative B, PPMA 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 PPMA from ROW and road construction more than Alternative A. Under this alternative, PPMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new rights-of-way projects. This benefits SAS where habitat with GRSG overlaps but may increase negative impacts outside of GRSG habitat in other sagebrush communities suitable and/or occupied by SAS.

Livestock Grazing and Feral Horses

Alternative B would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs per say, but within PPMA, Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments through AMPs or permit renewals administratively. Alternative B would adjust grazing direction in GRSG PPMA. This accounts for less than 10% of the land cover of the National Forests in Utah. The potential effects due to livestock grazing, vegetation disturbance, and range improvements is expected to 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 effects to local populations would likely prove beneficial especially where water quality and springs/wetlands were improved for amphibians.

Cumulative Effects for Seven Resource Areas in Alternative B

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.2.3 Alternative C

Isolation/Habitat Fragmentation

Under Alternative C, Zoological Areas are proposed on Forest Service lands in each of the fifteen GRSG population areas to function as sagebrush reserves in PPMA, totaling 318,200 acres and would conserve habitat against surface disturbance and fragmentation. These actions and the establishment of sagebrush reserves would protect against additional fragmentation of a portion of sagebrush communities generally benefiting SAS where they overlap. In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat conservation and

management. This alternative would be expected to have the least negative impacts and most positive impacts to wildlife species whose ranges overlap with PGMA and PPMA.

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 re-establishment 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 re-establishment than Alternative A and 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/Energy Development

Under Alternative C, lands within all GRSG occupied habitat would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. 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, but would have greater impacts because they would be applied to all occupied habitat. Lands within PH and GH would also be defined unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Un-leased areas would be closed to fluid mineral leasing, greatly increasing the amount of habitat protected from energy development Existing lease areas would have conservation measures applied, including NSO stipulations. These policies would substantially reduce the available acreage for energy development, which would limit impacts such as disturbance and habitat degradation. Under this alternative, effects would be similar to those described under Alternative B, except 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 fragmentation of habitat.

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 loss of herbaceous cover, erosion, and diminished water quality. However, removal of 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. The complete removal of 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 also maintaining the vegetation diversity and fuel reduction promoted by livestock grazing. Not exceeding proper use grazing levels, according to Forest Plan standards, will be more easily attainable if proposed grazing reductions are followed. Wild ungulates would still be using these areas and their use may 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 effects on SAS due to alternative C with respect to range resources. Additionally, under this alternative, habitat treatments would only be allowed that benefit GRSG. Therefore, Alternative C would have the least negative effects and the most positive impacts on SAS.

Cumulative Effects for Seven Resource Areas in Alternative C
There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.2.4 Alternative D

Isolation/Habitat Fragmentation
Under this alternative, the effects of most suggested management actions would be similar to Alternative B, with the exception that more flexibility or discretion would be given to the land management agency for site specific analysis to allow for example, route construction in PPMA, road improvements, and issuance of Special Use Permits if it is determined that these actions would not adversely affect GRSG. Under Alternative D, PPMA would be managed as an avoidance area, however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PPMA if the project would not adversely affect GRSG populations. Under this alternative if populations and habitats are healthy or improving, it could permit

disturbance above the 5% cap of disturbance for the UT management zone. Effects of this alternative include continued disturbance of some SAS habitat that does not overlap GRSG along with some disruption of normal life history behaviors if disturbance was permitted in PPMA/PGMA.

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 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 re-establishment and noxious/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 re-establishment than Alternative A.

Conifer Encroachment

Under Alternative D, vegetation management programs would include treatment of PPMAs facing conifer encroachment in order to meet GRSG habitat objectives to reduce conifer encroachment within PPMA. 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 will likely generally benefit SAS.

Minerals/Energy Development

Under Alternative D, lands within PPMA would be closed to non-energy leasable mineral new leasing and mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. Un-leased areas in PPMA and PGMA would be open to fluid mineral leasing, but all acres would require NSO or CSU stipulations, where under Alternative A over 1 million acres had no stipulations. Existing lease areas would have conservation measures applied, including NSO stipulations. 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, PPMA would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks similar to Alternative B. However with some mineral development, this alternative would allow up to 5% disturbance in any Utah Management Zone. Effects would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance is increased from 3% to 5%. However the potential for this difference to have negative impacts on SAS is minimal. Therefore effects would be most similar to those described under Alternative B including displacing energy/minerals development to SAS habitats not overlapping GRSG.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation and habitat fragmentation. Under Alternative D, PPMA within four miles of an occupied lek would be exclusion areas for most types of new ROWs. These proposed policies would protect PPMA from ROW and road construction more than Alternative A, by limiting road and ROW construction in habitat areas. Although Alternative D would provide less protection to PPMA 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 under this alternative compared with Alternatives B and C due largely to the five percent disturbance cap and allowance for development to occur in PPMA (open for development). As such, this alternative would be expected to provide fewer protective measures to SAS where range and/or habitats are coincident with PPMAs than Alternatives B and C, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D Forest Service would incorporate GRSG habitat objectives and management considerations into grazing allotments within PPMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals habitat quality will improve over the long-term. Alternative D would be similar to Alternative B, but would be slightly more restrictive as GRSG habitat objectives within grazing allotments would be applied to occupied habitat not just PPMA. This alternative would have much fewer negative impacts than Alternative A, but slightly greater impacts than Alternative C to SAS. Generally speaking, if GRSG habitat is taken into consideration before applying the management action, then SAS would likely benefit from that protection or management action though some additional SAS habitat is still at risk as it is outside of GRSG habitat.

Cumulative Effects for Seven Resource Areas in Alternative D

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

7.2.5 Alternative E

Alternative E2 – Wyoming Governor's EO…where noted, E2 applies to those Ashley National Forest lands in Wyoming and will be discussed in seven resource areas below:

Isolation/Habitat Fragmentation

Under Alternative E, the Forest Service would not establish any Zoological areas, would not strive to retain federal lands in GRSG habitat under public ownership, and would not seek to acquire state and private lands to conserve, enhance or restore sage-grouse habitat. Additionally, a 1 mile no surface occupancy restriction would be placed around occupied leks for fluid mineral development, which would reduce anthropogenic disturbance and habitat fragmentation from oil and gas development in sagebrush habitats. Water developments, along with seeps, springs, and wetlands are not evaluated and modified and/or enhanced except in SGMAs. Impacts to SAS, especially amphibians may continue as in Alternative A regarding water and wetlands relative to sagebrush ecosystems.

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 SGMAs 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 benefit SAS.

Invasive Weeds

Under Alternative E, interagency focus groups-- likely by GRSG population area--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 effects will 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 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 and generally be beneficial to SAS.

Minerals/Energy Development

Selection of alternative E would place a 1 mile no surface occupancy (NSO) restriction around occupied GRSG leks for fluid mineral development, which would reduce anthropogenic disturbance from oil and gas development on nesting habitat close to the lek. However, exceptions to this NSO would be granted if they can be placed out of line-of-sight of the lek. Alternative E would not close any lands to mineral material sales or non-energy mineral leasing, but would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and best management practices to minimize disturbance of GRSG. In habitat outside SGMAs no specific management actions would be taken. Coal leases in SGMAs 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. Un-leased areas in SGMAs and core areas would remain open to oil and gas leasing under no surface occupancy buffers (1 mile from leks in SGMAs and 0.6 miles in core areas) and controlled surface use 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 provide some protection to SAS where coincident with GRSG but impacts will 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 fragmentation of habitat. Under Alternative E1, SGMAs 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 SGMAs, though non-core areas would be avoidance areas. These proposed policies provide limited measures to protect habitat within SGMAs and core areas from ROW and road construction and would reduce impacts compared to Alternative A for SAS only where coincident with SGMAs.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Existing grazing operations would utilize rangeland best management practices to increase the necessary vegetation to improve nesting success and population recruitment for GRSG. To limit impacts to 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 best management practices but doesn't go as far to protect and enhance habitat for SAS like other action alternatives.

Cumulative Effects for Seven Resource Areas in Alternative E

There could be cumulative effects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

Summary

Effects to SAS and their habitats due to any of the action alternatives would be generally beneficial due to reducing anthropogenic influences to sagebrush habitats that overlap GRSG. Overall, the highest potential for negative effects would be from Alternative A, however, the riparian protection measures in Forest Plans should provide adequate protection for those species that depend on aquatic/riparian habitats. That said, currently Alternative A does not have regulatory mechanisms or assurances specific to GRSG habitats to the extent desired. Under the No Action Alternative (A), incremental small scale negative effects are more likely. Conversely, there would likely be beneficial impacts to 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 the habitats used by SAS than would Alternative A. Though Alternative E has protective measures for GRSG, these measures are generally less conservative in terms of acres protected than other action alternatives. There will be negative effects to SAS resulting from the action alternatives as anthropogenic activities are displaced from GRSG habitat onto other areas of the Forest, especially other portions of the sagebrush ecosystem. Strategies that maintain large contiguous stands of old growth sagebrush with high canopy cover (24%-36%) will benefit pygmy rabbits the most while strategies that maintain high water quality and protect wetlands/streams/springs from impacts will benefit amphibians the most. Differences in negative effects between action alternatives would be negligible and likewise, differences in positive effects would be difficult to discern at this scale.

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 to 11,300 feet. Aquarius paintbrush is an 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 population occurrences is unknown but is believed to be less than 40 with total population estimated at about 45,000 individuals. Most populations of the species are found on Forest administered lands. Population trend typically fluctuates but appears to be stable to downward. Aquarius paintbrush is ranked imperiled in Utah (G2S2). Livestock grazing is the most imminent threat to the species, especially sheep. Where cattle grazing occurs, Aquarius paintbrush populations have also shown decline. Other threats or cumulative actions include site specific disturbance from road construction and maintenance, off-road recreation vehicle 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 an 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 include noxious weeds and possible highway expansion within 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 disturbance 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 to 8,200 feet. The plant is endemic to the Utah and Wyoming. 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 considered critically imperiled in the states of Utah and Wyoming (S1). Total population is estimated in the hundreds of thousands of individuals range (Jouseau 2012). Threats or other cumulative actions to the species include gravel quarrying; road construction, maintenance, or use; recreation activities in and around Flaming Gorge Reservoir; buildings, off-road vehicle use, collections for horticulture, and livestock trampling. Due to its diminutive form, domestic and wild ungulate foraging is not considered a threat to the species (Goodrich 2007, Jouseau 2012).

Little penstemon (*Penstemon 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 to 11,500 feet. Little penstemon is an endemic to south-central Utah with known populations in Garfield, Piute, Sevier, and Wayne counties.

Between 6 to 20 occurrences of the species are known, with populations often described as "frequent to common." Little penstemon is ranked imperiled in Utah (G2S2). Population estimates and trend is unknown. Threats or other cumulative actions include 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 adjacent to high elevation sagebrush communities. Elevations for the species range between 8,300 to 11,600 feet. It is known to occur in on the high plateaus of south-central Utah. Arizona willow also occurs 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 has been documented in four states with most occurrences 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. 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 include timber harvesting, road construction, recreation activities, 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/or 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 to 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 is possibly present in Utah.

There are four known occurrences of Uinta greenthread in Wyoming and none for Utah. The estimated population of the species is around 200,000 plants. Population trend is stable. Uinta greenthread is ranked globally imperiled (G2) and critically imperiled in Wyoming and Utah (S1). Threats or other cumulative actions include road construction or expansion, oil and gas exploration, timber harvest, ATV 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 PPMA and PGMA would remain constant. Conditions and trend for sensitive plants and their habitat would remain unchanged. Direct effects to sensitive plants include grazing and trampling. Indirect effects include ground disturbances in all its forms and origins and the spread of invasive species (these effects were listed in species information paragraphs above). Direct, indirect, and cumulative effects for Alternative A are further discussed under the sevens disturbance headings found below.

Isolation/Habitat Fragmentation

Alternative A would maintain current management; therefore, land use would continue under existing LUPs, most of which include management actions that allow for acquisition and disposition of lands that have important resource values; however, current policies do not include specific direction to reduce habitat isolation or fragmentation of GRSG habitat.

Plant endemics typically have few occurrences, small population sizes, and restricted distributions and are at greater risk to habitat fragmentation than plants with ample populations and wide distributions. Sensitive species in this analysis are endemics with relatively small populations and/or limited distributions. Under Alternative A, some current and foreseeable actions may lead to habitat fragmentation at a smaller scale for some sensitive species. For example, populations of Uinta greenthread on National Forest administered lands are threatened by land disturbances associated with oil and gas exploration in and near known habitat (Heidel 2004). 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). Direct and indirect effects to Uinta greenthread and stemless beardtongue may impact individuals or populations, but not likely result in a loss of viability, nor cause a trend toward federal listing. Population trends in other sensitive species under evaluation would likely remain stable under this alternative.

Fire

Under Alternative A, national forests would continue to implement policies and/or guidelines that manage both wild and prescribed fire events. 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 LUPs neither specify the use of fire to enhance nor the suppression of fire to protect sensitive species habitat.

Effects 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 several to many decades. On the other hand, fire is relatively common in montane or high-elevation sagebrush. Fire intervals for these communities typically range between 20 to 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) reported that little penstemon plants were observed growing within 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 effected by a catastrophic fire event. She reasoned that since willow habitat is found within spruce/fir forests that have increased fuel loading due to historic fire suppression, a catastrophic fire event, although rare, could increase erosion and/or sedimentation that would affect the hydrology of Arizona willow. The effect of fire to Arizona willow is unknown since no events have been observed or documented. In conclusion, the direct and indirect effects of fire to sensitive plants and their habitat would likely cause current trends to remain constant, but since the effects of fire on sensitive plants under evaluation are not well understood, except for assumptions made regarding 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 administered lands in Utah is an ongoing occurrence. Noxious weed data from National Forests indicate that most new infestations are located along roads, trails, at campsites, and at other sites (i.e. recreation, energy exploration, mineral extraction) accessible by motor vehicles and most frequented by 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 LUPs provide an integrated approach with other public and private entities in the treatment and control of noxious weeds on forest 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.

Two 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 located 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 (i.e. pipe lines, well pads, etc.). 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 or energy development within its habitat may lead to additional weed invasions, which may impact individual plants and populations, but 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 in 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 into sagebrush types located within their thermal zones. Common sagebrush types include Wyoming and black sagebrush, and occasionally mountain big sagebrush. Douglas fir trees are known to encroach into high elevation sagebrush types. Unchecked by disturbance (i.e. 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 but are not limited to prescribed fire, lop-and-scatter, and mechanical. These actions often coincide with Forest Service LUPs which contain objectives to maintain, restore, and/or improve sagebrush and other valued plant communities, but LPUs 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 plants species and their habitat would not likely benefit from actions that curtail conifer encroachment, except from coincidental indiscriminate actions. There are no known effects of conifer encroachment into habitat of sensitive plants under evaluation; therefore, conifer encroachment is not considered a cumulative effect.

Minerals/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 within the analysis areas are open to fluid mineral and non-energy solid minerals leasing and development; however, approximately 138,500 acres are closed to fluid mineral leasing and non-energy solid leasable minerals, 22,900 acres are classified 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 within mineral and energy closure areas would not be affected under this alternative. Sensitive plant individuals and populations located in open, leased, or in non-leased areas may be affected under Alternative A.

Two sensitive plants species under evaluation identify mineral and energy extraction and exploration as a threat to existing populations. 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, fences, buildings, and other man-made developments can contribute to the loss of individuals and populations and may fragment sensitive plant habitat. Under Alternative A, relatively few acres in the analysis areas are excluded from new ROWs or are identified as avoidance areas (approximately 94,800 acres). Sensitive plants found within ROW exclusion or avoidance areas would not likely be affected under this alternative. Sensitive plant individuals and populations located 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 would not likely result in a loss of viability, nor cause a trend toward federal listing. Other types of infrastructure that may impact individuals or populations under evaluation and are found to be cumulative; these include the construction or expansion of communication towers, pipelines, and recreational buildings.

Livestock Grazing and Feral Horses

Under Alternative A, livestock grazing would continue under current management with no expected change in AUMs; season-of-use; or other terms, conditions, or directives delineated within grazing permits or AMPs; although administrative actions may occur on a case-by-case basis to attain desired rangeland conditions. Desired rangeland conditions are usually incorporated into most LUPs, which also contain standards and guidelines designed to maintain healthy, sustainable rangeland resources and restore degraded rangelands.

Effects of livestock grazing to sensitive plants under evaluation include trampling and herbivory. These impacts can physically damage individuals, populations, and/or the habitat where they grow. Trampling and grazing can reduce plant growth, development, sexual reproduction, and cause mortality of individuals. Impacts to individual plants may lead to population decline of some sensitive plants.

The effects of grazing and trampling impacts on individuals, populations, and habitat quality depend on palatability of the species, grazing and trampling tolerance, grazing intensity, and forage preferences of ungulates. 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 in height and less in canopy cover. Decker concluded that the combined effect of domestic livestock and wildlife grazing on Arizona willow may be "beyond their 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 the species is found and is browsed by sheep, Aquarius paintbrush 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 or not livestock or wildlife actually uses 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 effects of grazing may likely impact individuals and populations of the plant, but population trend data is not known for this species. The effects 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 effects of grazing on Arizona willow, Aquarius paintbrush, little penstemon, and stemless beardtongue are considered cumulative. Grazing and trampling may continue impact individual plants and populations of sensitive plants, especially Arizona willow and Aquarius paintbrush. Trends of sensitive plants populations under evaluation are expected to remain unchanged under this alternative.

Since there is no wild horse or burro management areas in PPMA on Forest Service administered lands, Alternatives A, B, C, D, and E would not apply to feral horses.

7.3.2 Alternative B

Alternative B would place a 3% threshold on anthropogenic disturbance in PPMA areas, which would include all past, present, and future disturbances. The 3% threshold would reduce, but not eliminate the potential for direct and indirect effects described in Alternative A. Cumulative effects for Alternative B would be similar to those described for Alternative A, but the magnitude of cumulative impacts would likely be less than Alternative A because of the 3% threshold in PPMA. In PGMA, activities would continue under current management. Sensitive plants in PGMA 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 sevens headings found below.

Isolation/Habitat Fragmentation

Under Alternative B, all PPMA would be retained in public ownership, with minor exceptions. Where suitable conservation actions cannot be achieved in PPMA, federal agencies would seek to acquire lands to conserve, enhance, or restore GRSG habitat. Such actions could reduce potential isolation and fragmentation of sensitive plants in PPMA, but would do little to address existing isolation and fragmentation.

The 3% threshold on anthropogenic disturbance found in Alternative B would reduce, but not eliminate the potential direct and indirect effects described in Alternative A. Conservation actions associated with this alternative could lessen impacts of sensitive plant individuals and populations that occur in PPMA. In PGMA, direct, indirect, and cumulative effects to sensitive plants would be similar under Alternatives A and B.

Fire

Under Alternative B, fuel treatments would be implemented using design criteria that would best protect existing sagebrush ecosystems found within PPMA. 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 is specific to sensitive plant species. The implementation of the criteria would likely reduce but not eliminate direct and indirect effects to sensitive plants growing in sagebrush and other vegetation communities prone to burning or targeted for fuel treatments, but impacts would likely be less than Alternative A because of fewer acres burned.

Direct and indirect effects to sensitive plant species found in PGMA would be similar to those described under Alternative A. In PPMA and PGMA, 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% threshold.

Spread of Weeds

The establishment and spread of invasive weeds would likely be reduced because of the 3% disturbance threshold described in Alternative B; however, the direct, indirect, and cumulative effects to sensitive plants would likely be similar to those described in Alternatives A because of existing anthropogenic disturbance and weed establishment. Also, integrated weed management actions to control noxious weeds described in Alternative A are the same for Alternative B.

Conifer Encroachment

The direct, indirect, and cumulative effects to sensitive plants from conifer encroachment would be similar under Alternatives A and B.

Minerals/Energy

Within PPMA, lands not leased for either fluid minerals or non-energy 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% more in Alternative B than in Alternative A (See Table 2-2, Description of Alternatives A, B, C, D, and E). Overall, these actions would considerably increase the number of acres closed to mineral lease and extraction not found in Alternative A. Ground disturbances associated with mineral extraction would be reduced, which would likely lessen, but not eliminate direct, indirect, and cumulative effects to sensitive plant species found in PPMA. The 3% threshold on anthropogenic disturbance would likely further reduce potential impacts not found in Alternative A. Disturbance restrictions in this alternative could also benefit sensitive plant individuals and populations.

Under Alternative B, direct, indirect, and cumulative effects to sensitive plants in PGMA would be similar to those described for Alternative A.

Infrastructure

Compared to Alternative A, Alternative B considerably limits infrastructure construction within PPMA. Acres open to new ROWs decreased from 3,219,000 acres under Alternative A to 529,600 acres under Alternative B, which is an 84% reduction. Fewer disturbances associated with new roads and other infrastructure construction would likely reduce, but not eliminate

impacts to sensitive plants. The 3% threshold in Alternative B would further reduce impacts not found in Alternative A. The direct, indirect, and cumulative effects to sensitive plants would likely be less in Alternative B than in Alternative A.

Under Alternative B, direct, indirect, and cumulative effects to sensitive plants in PGMA 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 PPMA. Actions would be developed with specific objectives to conserve, enhance, or restore GRSG habitat and move rangelands in PPMA toward desired condition. Alternative B would likely reduce the direct and indirect effects of grazing on sensitive plants in PPMA, especially those species that are grazed by livestock such as Arizona willow or Aquarius paintbrush.

Under Alternative B, direct and indirect effects to sensitive plants in PGMA would be similar to those described for Alternative A. Cumulative effects in PPMA and PGMA would likely be similar to Alternatives A.

7.3.3 Alternative C

Under Alternative C, all GRSG habitats would be managed as PPMA. This alternative is similar to Alternative B in that it would place a 3% threshold on anthropogenic disturbance in PPMA, 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 effects to 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 PPMA. Direct, indirect, and cumulative effects for Alternative C are further discussed under the sevens headings found below.

Isolation/Habitat Fragmentation

In addition to the 3% anthropogenic disturbance threshold, 15 zoological areas consisting of 399,600 acres would be designated and managed on Forest Service administered PPMAs under Alternative C. Zoological areas would function as sagebrush reserves with limited anthropogenic disturbances. Where conservation objects cannot be achieved, federal agencies would seek to acquire state and private lands to meet objectives. The designation, management, and conservation objectives of zoological areas in Alternative C would likely reduce, but not fully eliminate the potential direct and indirect effects described in Alternatives A and B because of past and ongoing disturbances. Conservation actions from this alternative could lessen impacts of sensitive plant individuals and populations that occur in PPMA. Although cumulative effects are similar for Alternatives A, B, and C, the magnitude of those impacts would be less than those described in Alternatives A.

Fire

The fire policies and design criteria described in Alternative B would also be implemented in Alternative C; with an additional provision that would exclude livestock grazing in PPMA burned areas until recovery occurs. Direct and indirect effects to sensitive species growing in sagebrush and other vegetation communities prone to burning or targeted for fuel treatments would be similar to those described in Alternative B. Cumulative effects would be similar to those described in Alternatives A.

Spread of Weeds

The establishment and spread of invasive weeds would likely be reduced because of the 3% disturbance threshold that would be applicable in all GRAG potential habitat. On the other hand, the direct, indirect, and cumulative effects to sensitive plants would be similar, but the magnitude of impact 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 in 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 PPMA invaded by nonnative plants.

Conifer Encroachment

The direct, indirect, and cumulative effects to sensitive plants from conifer encroachment would be similar under Alternatives A, B, and C.

Minerals/Energy

The policy provisions regarding mineral leasing and extraction in Alternative B would be the same for Alternative C, except the policies are applicable to all GRSG habitat, which would be managed as PPMA under Alternative C. Overall, these actions would considerably increase the number of acres closed to mineral lease and extraction not found in Alternatives A and B. Ground disturbances under this alternative would be less, but would not fully eliminate direct, indirect, and cumulative effects to sensitive plant species because of past disturbances. The 3% threshold on new anthropogenic disturbance would contribute to the reduction of potential impacts because it would also include designated PGMA areas not covered under the disturbance threshold in 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 in Alternative B are the same for Alternative C, except the policies are applicable to all GRSG habitat, which is managed as PPMA 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 to sensitive plant species because of past and ongoing disturbances. The 3% threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found in Alternative A, but also would expand to designated PGMA areas recognized but not covered in Alternative B. Disturbance restrictions in 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 PPMA, which would result in the reduction of up to 265,373 permitted AUMs on Forest Service administered lands. Rangelands found in unsatisfactory condition from effects of grazing could improve under this alternative. In PPMA, all direct and indirect effects of current and future livestock grazing on sensitive plants would be eliminated, which would likely benefit sensitive plants, especially those species that are grazed by livestock such as Arizona willow or Aquarius paintbrush. The past and current effects are similar for Alternatives A, B, C1, and C2 and would be considered cumulative, but the elimination of livestock grazing would remove grazing as a future cumulative effect to sensitive plants.

Alternative C2

Under Alternative C2, reductions of AUMs would occur on livestock grazing allotments in PPMA following reviews at 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 effects of grazing on sensitive plants in PPMA, especially those species that are grazed by livestock such as Arizona willow or Aquarius paintbrush. Cumulative effects in PPMA would likely be similar in to those described in Alternatives A and B, although the magnitude of those impacts would be less than those described in Alternatives A and B.

7.3.4 Alternative D

Alternative D would place a 5% threshold on anthropogenic disturbance in PPMA areas, 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% threshold would reduce, but not eliminate the potential direct and indirect effects described in 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 impacts would likely be less than Alternative A because of the 5% threshold in PPMA. In PGMA, activities would continue under current management. Sensitive plants in PGMA would likely experience direct and indirect effects similar to those described for Alternative A. Direct, indirect, and cumulative effects for Alternative D are further discussed under the sevens headings found below.

Isolation/Habitat Fragmentation

Policies associated with isolation and fragmentation of GRSG habitat in Alternative D is similar to those described in Alternative B. Actions under this alternative could reduce potential isolation and fragmentation of sensitive plants in PPMA, but would do little to address existing isolation and fragmentation.

The 5% threshold on anthropogenic disturbance found in Alternative D would reduce, but not eliminate the potential direct and indirect effects described in Alternative A. Conservation

actions associated with this alternative could lessen impacts of sensitive plant individuals and populations that occur in PPMA. In PGMA, direct, indirect, and cumulative effects to sensitive plants would be similar under Alternative A.

Fire

Alternative D is similar to Alternative B, but would also include fuel breaks to protect large areas of PPMA, implement fuels management policies in PPMA that would protect GRSG habitat and accommodate GRSG life cycle needs, and would consider livestock grazing as a tool to reduce fuel loading. Fewer fuel treatments would occur in PPMA and/or less GRSG habitat would be burned under Alternative D than under Alternative A because of the new criteria. None of the design criteria of this alternative is specific to sensitive plant species. The implementation of the criteria would reduce but not eliminate direct and indirect effects to sensitive plant species growing in sagebrush or other vegetation communities prone to burning or targeted for fuel treatments, but impacts would likely be less than Alternative A and B because of fewer acres burned.

Direct and indirect effects to sensitive plant species found in PGMA would be similar to those described under Alternatives A and B, In PPMA and PGMA, 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% threshold.

Spread of Weeds

The direct, indirect, and cumulative effects to sensitive plants would be similar under Alternatives A, B, C, and D. The integrated vegetation management protocol to control noxious weeds described in Alternative A is the same for Alternative D. Alternative D is similar to Alternative C in that an additional provision would develop and implement methods to prioritize and restore sagebrush steppe in PPMA invaded by nonnative plants, which places greater emphasis on habitat restoration in PPMA not found in Alternatives A or B. The additional provision could lessen impacts to sensitive plants.

Conifer Encroachment

Unlike Alternatives A, B, and C, Alternative D includes provisions that would specifically target conifer encroachment in PPMA to maintain and expand GRSG habitat. These provisions are not specific for sensitive plants. The direct, indirect, and cumulative effects to sensitive plants from conifer encroachment would be similar to Alternative A, except for sensitive plants that are located within PPMA that are specifically targeted with treatments that would maintain or expand GRSG habitat..

Minerals/Energy

Under Alternative D, lands within PPMA would be closed to new leasing of non-energy leasable minerals and mineral material sales, which 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 remain open for leasing under this alternative, but would require government reviews to determine impacts to PPMA and conservation measures or stipulations would be implemented to reduce or mitigate impacts. Similar to Alternative A, Alternative D does not protect PPMA from potential impacts from coal leasing or locatable mineral withdrawals, but does add restrictions

to reduce or mitigate impacts and protect GRSG habitat and GRSG life cycle requirements. Under Alternative D, direct and indirect effects to sensitive plants in PPMA areas where coal leasing, locatable mineral withdrawals, and fluid mineral leasing occurs would be similar to those described in Alternative A, but impacts would likely be less due to additional conservation measures and stipulations. Direct and indirect impacts to sensitive plants would be similar to those in Alternative B in PPMA areas that would be closed to non-energy leasable minerals leasing and mineral material sales. Ground disturbances under this alternative would be less, but would not eliminate direct and indirect effects to sensitive plant species because of past and ongoing disturbances. The 5% threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found in Alternative A.

Alternative D adds specific conservation measures or stipulations to minerals and energy extraction to mitigate its impacts, protect GRSG habitat, and accommodate GRSG life cycle requirements in PGMA. Under Alternative D, direct and indirect cumulative effects to sensitive plants in PGMA would be similar to, but more protective than, those described for Alternative A.

Cumulative effects in PPMA and PGMA would likely be similar to Alternatives A.

Infrastructure

Alternative D would include new, avoidance, and exclusion areas for specific infrastructure types in PPMA and would include conservation measures or stipulations to reduce or mitigate impacts of new ROWs, to protect PPMA, and to accommodate GRSG life cycle requirements. Overall, Alternative D would protect PPMA from new ROW construction more than Alternative A because the additional conservation measures or stipulations would better protect PPMA and buffer GRSG life cycles from new ROW impacts. Ground disturbances under Alternative D would be less than Alternative A, but would not eliminate direct, indirect, and cumulative effects to sensitive plant species because of past and ongoing disturbances. The 5% threshold on anthropogenic disturbance would contribute to the reduction of potential impacts not found in Alternative A.

Livestock Grazing and Feral Horses

Similar to Alternatives A and B, Alternative D would maintain AUMs under current management, but would provide direction to modify grazing management in order to meet PPMA objectives and would maintain, enhance, or improve desired GRSG habitat conditions. Modifications would occur at unit level and be implemented through the permit renewal process or other appropriate actions. In PPMA, the direct, indirect, and cumulative effects to sensitive plants under Alternative D would be similar to Alternative B, which 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 effects to sensitive plants in PGMA would be similar to those described for Alternative A. Cumulative effects in PPMA and PGMA would likely be similar to Alternatives A, but the magnitude of the impacts could be less in PPMA 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% threshold on new anthropogenic disturbances in any particular State of Utah GRSG Management Area. Past and current disturbances would not count towards the 5% threshold. Conservation measures would be associated with new anthropogenic disturbances that would favor GRSG habitat and accommodate GRSG life-cycle requirements. The 5% threshold would reduce, but not eliminate the potential direct and indirect effects to sensitive plants described in 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 from lek) within SGMAs. 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 impacts would likely be less than Alternative A because of the 5% disturbance threshold. Direct, indirect, and cumulative effects for Alternative E are further discussed under the sevens headings found below.

Isolation/Habitat Fragmentation

Alternative E would not retain federal lands in GRSG habitat under public ownership and would not seek to acquire state or private lands to conserve, enhance, or restore GRSG habitat. Direct, indirect, and cumulative effects to sensitive plants would likely be similar to those described in Alternative A. Population trends of sensitive plants under evaluation would likely be similar to those described in Alternative As alternative. The 5% threshold on new anthropogenic disturbance could reduce the impacts described in Alternative A.

Fire

Unique features for fire in Alternative E include implementation of a statewide fire agency agreement that would eliminate jurisdictional boundaries, which would enhance the response to unwanted fire ignitions in SGMAs and core areas; and the use of fire-retardant vegetation to buffer high quality GRSG habitat areas from catastrophic fire. Conservation measures, practices, and/or 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 to sensitive plants would likely be less under Alternative E than those described in 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 high priority response to infestations located 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 to sensitive plants would likely be similar to those described in other alternatives although integrated weed management was not discussed in Alternative E.

Conifer Encroachment

Alternative E would implement vegetation management actions that would curtail conifer encroachment to expand, create new, or increase the carrying capacity of GRSG habitat. Direct, indirect, and cumulative effects to 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/Energy

Alternative E is more protective than Alternative A since there is a 1 mile NSO buffer around leks in SGMAs, and the remainder of habitat within SGMAs would be subject to CSU and timing stipulations for fluid mineral and non-energy solid minerals leasing. Alternative E differs from Alternative A by implementing conservation measures, stipulations, and best management practices to limit or mitigate potential impacts to protect GRSG habitat and accommodate GRSG life cycle requirements. Direct, indirect, and cumulative impacts to sensitive plants in SGMAs would likely be less than those identified in Alternative A because of additional provisions that implement conservation measures, stipulations, and best management practices. The 5% threshold on new anthropogenic disturbance could contribute to the reduction of impacts to sensitive plants not found in Alternative A.

Since GRSG habitat outside SGMAs would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects to sensitive plants under Alternative B would be similar to those described for Alternative A.

Infrastructure

Under Alternative E, habitat within SGMAs would be designated as an avoidance area for new ROWs with exceptions to accommodate some new infrastructure construction. This alternative would implement conservation measures, stipulations, and best management practices designed to limit or mitigate potential impacts to protect GRSG habitat and accommodate GRSG life cycle requirements. Direct, indirect, and cumulative impacts to sensitive plants in SGMAs would likely be less than those identified in Alternative A because of additional provisions that implement conservation measures, stipulations, and best management practices. The 5% threshold on new anthropogenic disturbance would likely contribute to the reduction of potential impacts not found in Alternative A.

Since GRSG habitat outside SGMAs would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects to 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, but would emphasize the employment of best management practices to improve GRSG habitat and would seek consideration of conservation measures and stipulations designed to enhance or improve GRSG habitat and accommodate GRSG life cycle requirements. Alternative E, also provides a mechanism to enhance or improve GRSG habitat in SGMAs impacted by grazing management by managing for stable or increasing populations. Direct, indirect, and cumulative impacts to sensitive plants in SGMAs may likely be less than those identified in Alternative A because of the emphasis to use best management practices, with additional conservation measures and stipulations not included in Alternative A.

Since habitat outside SGMAs would not be managed for conservation of GRSG, the direct, indirect, and cumulative effects to sensitive plants under Alternative E would be similar to those described for Alternative A.

8. SUMMARY OF EFFECTS

We 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: Isolation/Habitat Fragmentation, Fire, Invasive Weeds, Conifer Encroachment, Minerals/Energy Development, Infrastructure, and Livestock Grazing/Feral Horses management. Of the 7.7 million acres of Forest System lands in Utah, these action alternatives seek to modify management of sagebrush on roughly 11% of those lands. The main difference between the Alternative A (no change in current direction) and all of the action alternatives, is that the action alternatives would put into place regulatory authority and direction to protect and conserve GRSG habitats and minimize negative effects associated with land management actions in the resource areas above. Each of the action alternatives, to various degrees, is intended to protect and/or conserve GRSG individuals and habitat over the no action alternative in the Utah EIS planning area. Likewise, other sagebrush associated species considered in this BE may experience similar positive effects related to protecting GRSG habitat, where there is overlap in range like amphibians relative to riparian and wetland conservation in PPMA. Conversely, some negative effects to these other species will result from shifting anthropogenic disturbances into other sagebrush communities not associated with GRSG. For example, by avoiding GRSG habitat according to any action alternative, pygmy rabbits may be impacted in adjacent sagebrush environments by being outside of PPMA/PGMA. The analysis above lends logic that maintaining the status quo (Alternative A) may not provide the regulatory mechanisms or the assurances required to protect GRSG and perhaps the sensitive species evaluated above that occupy similar habitats. Largely the action alternatives provide small but generally positive effects and assurances, which over time should provide improvements for each of the species evaluated.

Alternative A maintains existing decisions from the Land and Resource Management Plans for all Forests in Utah, and all other current management direction, all terrestrial and aquatic wildlife species and plant species. The type and magnitude of impacts to sensitive species would remain unchanged under Alternative A and each would be treated separately by individual NEPA actions.

Since disturbance thresholds, restrictions, directives, best management practices, reductions, and other provisions were built into the action alternatives (Alternatives B, C, D, and E) to protect GRSG and its habitat, fewer impacts to sensitive species would likely occur and/or the magnitude of the impacts would likely be lessened.

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Appendix P

Forest Service Draft
Management Indicator Species Report

Draft

Management Indicator Species Report

for the

Greater Sage-Grouse Conservation Effort to Amend the Ashley, Fishlake, Manti - La Sal, Dixie, Uinta and Wasatch - Cache National Forest Plans

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1. INTRODUCTION

The National Forest Management Act (NFMA) directs National Forests to identify Management Indicator Species (MIS). MIS are chosen as a representative of certain habitat conditions important to a variety of other species. MIS are generally presumed to be sensitive to habitat changes. By monitoring and assessing populations of MIS, managers can determine if management actions are affecting other species populations. According to the various Forest Land and Resource Management Plans in Utah, there are 20 birds, 6 fish, 5 mammals, macro-invertebrates, and 1 plant (see all LRMPs, USDA 1986a-d, 2003a-b). These MIS were reviewed to determine which are present and/or have habitat in the analysis area, and to identify those likely to be affected by the implementation of a management decision, see Table 1.

The 1982 (36 CFR 219.19) regulations for viability state that the Forest Service has the responsibility to provide sufficient habitat that can support viable populations of native and desired nonnative vertebrates across the planning area at a level that populations are likely to persist on National Forest System (NFS) lands.

On December 18, 2009 the Department of Agriculture issued a final rule reinstating the National Forest System Land and Resource Management Planning rule of November 9, 2000, as amended (2000 rule) (74 FR 242 [67059-67075]). This rescinded the 1982 planning rule. The 2000 rule states: Projects implementing land management plans must comply with the transition provisions of 36 CFR §219.35, but not any other provisions of the planning rule. Projects implementing land management plans and plan amendments, as appropriate, must be developed considering the best available science in accordance with §219.35(a). Projects implementing land management plans must be consistent with the provisions of the governing plans.

In order to address the MIS species, the issues surrounding the change in planning rules, and to assure the best available science was used our approach was as follows:

1. Identify habitat and population characteristics/trends by Forest
2. Identify the role of the habitat on each Forest in the overall viability of the population
3. Analyze effects of each alternative based on relevant threats, as well as current and past management
4. Make a determination whether the effects of the alternatives will affect overall viability.

2. PROJECT HISTORY

Greater Sage-Grouse have emerged as a significant conservation concern over the last 10 years. The species is currently a candidate species for listing under the Endangered Species Act inferring that listing is "warranted, but precluded due to higher priorities" because of two primary factors: 1) the large-scale loss and fragmentation of habitats across the species range, and 2) a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to sage-grouse habitat are summarized in the listing decision. The two dominant threats are related to infrastructure associated with energy development in the eastern portion

of the species range, and the conversion of sagebrush communities to annual grasslands associated resulting in large uncharacteristic wildfires in the western portion of the species range (USFWS 2010).

The Bureau of Land Management (BLM) manages approximately half of the Greater Sage-Grouse habitats, whereas the Forest Service (FS) manages approximately 8 percent of species habitat, with most of that occurring on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sage-brush habitats, of which about 7.5 million acres occurring in the Intermountain Region. Most habitats on FS administered lands contribute to summer brood-rearing habitats, although some forests and grasslands do contribute important breeding nesting and winter habitat.

In 2011 and 2012, the United States Fish and Wildlife Service (FWS) submitted letters to the BLM and FS recommending that the agencies amend 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 discussion the FS added an additional 10 Forest Plans that would be considered for amendment. The FS 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 Forest Plans.

Since half of all Greater Sage-Grouse habitat occurs on BLM lands, the BLM is leading the effort to amend or revise land use plans, with the Forest Service as a cooperating agency. The purpose is to provide direction in land management plans that conserve and protect sage-grouse habitat and to provide assurances to the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for seven sage-grouse planning subregions: 1) eastern Montana and portions of North and South Dakota, 2) Idaho and southwest Montana, 3) Oregon, 4) Wyoming, 5) northwest Colorado, 6) Utah, and 7) Nevada and northern California. The FS 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." The Forest Service is involved in five of these efforts (http://fsweb.r4.fs.fed.us/unit/nr/sagegrouse/index.shtml, Accessed April 16, 2013)

This Management Indicator Species report is being prepared in support of the Utah EIS. All National Forests in Utah are planning to amend their respective Land and Resource Management Plan for the Greater Sage-Grouse.

Table 1
Management Indicator Species (MIS) on National Forest System Lands Within the Utah Greater Sage Grouse Analysis Area

Species of MIS	Forest Units	Habitat Association	Species or habitat in analysis area?	Rationale for inclusion or dismissal regarding analysis of anticipated effects from implementation of an action alternative to MIS
Brewer's sparrow	Fishlake	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Golden eagle	Ashley, Manti La Sal	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Greater sage-grouse	Ashley, Manti La Sal	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Hairy woodpecker	Fishlake	Mature Forest	No	Essentially no habitat in mapped priority or general habitat. *(For definitions of priority and general sage-grouse habitat see chapter 2 of the EIS.)* Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Lincoln's sparrow	Ashley, Fishlake	Riparian shrub	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
MacGillivray's warbler	Fishlake	Riparian shrub	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Mountain bluebird	Fishlake	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.

Table 1
Management Indicator Species (MIS) on National Forest System Lands Within the Utah Greater Sage Grouse Analysis Area

Species of MIS	Forest Units	Habitat Association	Species or habitat in analysis area?	Rationale for inclusion or dismissal regarding analysis of anticipated effects from implementation of an action alternative to MIS
Northern flicker	Dixie	Mature Forest	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Northern goshawk	Ashley, Dixie, Fishlake, Manti-La Sal, Uinta-Wasatch-Cache	Mature Forest	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Red-naped sapsucker	Ashley	Mature Forest	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Sage thrasher	Fishlake	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Song sparrow	Ashley, Fishlake	Riparian shrub	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Three-toed woodpecker	Uinta	Mature Forest	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.

Table 1
Management Indicator Species (MIS) on National Forest System Lands Within the Utah Greater Sage Grouse Analysis Area

Species of MIS	Forest Units	Habitat Association	Species or habitat in analysis area?	Rationale for inclusion or dismissal regarding analysis of anticipated effects from implementation of an action alternative to MIS
Vesper sparrow	Fishlake	Grassland, shrub edge	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Warbling vireo	Ashley	Mature Forest	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Western bluebird	Fishlake	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
White-tailed ptarmigan	Ashley	Tundra	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Wild turkey	Dixie	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Yellow warbler	Fishlake	Riparian Wooded	Yes	This species is present in riparian systems within the analysis area and adjacent to priority or general habitat in Utah. The alternatives generally propose changes to management of upland shrub-steppe environments and propose very minimal, if any, changes to the mature wooded/structured riparian corridors preferred by this species. Therefore, these species will NOT be evaluated in more detail.
Bonneville cutthroat, cutthroat, and	Ashley, Dixie, Fishlake,	Aquatic	Yes	These species are present in aquatic systems within the analysis area and adjacent to priority or general habitat in Utah. The alternatives generally propose changes to management of upland shrub-steppe

Table 1
Management Indicator Species (MIS) on National Forest System Lands Within the Utah Greater Sage Grouse Analysis Area

Species of MIS	Forest Units	Habitat Association	Species or habitat in analysis area?	Rationale for inclusion or dismissal regarding analysis of anticipated effects from implementation of an action alternative to MIS
Colorado River cutthroat, brown, and brook trout	Uinta-Wasatch-Cache			environments and other than limiting grazing management in some instances, propose minimal changes to aquatic environments. Therefore, these species will NOT be evaluated in more detail.
Southern leatherside chub	Dixie	Aquatic	Yes	This species is present in aquatic systems within the analysis area and adjacent to priority or general habitat in Utah. The alternatives generally propose changes to management of upland shrub-steppe environments and other than limiting grazing management in some instances, propose minimal changes to aquatic environments. Therefore, this species will NOT be evaluated in more detail.
Virgin spinedace	Dixie	Aquatic	No	This species is present in aquatic systems within the analysis area and adjacent to priority or general habitat in Utah. The alternatives generally propose changes to management of upland shrub-steppe environments and other than limiting grazing management in some instances, propose minimal changes to aquatic environments. Therefore, this species will NOT be evaluated in more detail.
Macro-invertebrates	Ashley, Fishlake, Manti-La Sal	Aquatic	Yes	These species are present in aquatic systems within the analysis area and adjacent to priority or general habitat in Utah. The alternatives generally propose changes to management of upland shrub-steppe environments and other than limiting grazing management in some instances, propose minimal changes to aquatic environments. Therefore, these species will NOT be evaluated in more detail.
Abert's Squirrel	Manti-La Sal	Montane Conifer	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.

Table 1
Management Indicator Species (MIS) on National Forest System Lands Within the Utah Greater Sage Grouse Analysis Area

Species of MIS	Forest Units	Habitat Association	Species or habitat in analysis area?	Rationale for inclusion or dismissal regarding analysis of anticipated effects from implementation of an action alternative to MIS
American beaver	Uinta-Wasatch-Cache	Aquatic	Yes	This species is present in aquatic systems within the analysis area and adjacent to priority or general habitat in Utah. The alternatives generally propose changes to management of upland shrub-steppe environments and other than limiting grazing management in some instances, propose minimal changes to aquatic environments. Therefore, this species will NOT be evaluated in more detail.
Mule deer	Ashley, Dixie, Fishlake, Manti-La Sal	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Rocky Mountain elk	Ashley, Dixie, Fishlake, Manti-La Sal	Shrub-Steppe	Yes	The alternatives propose some changes to management of shrub steppe habitats, so populations could respond to proposed changes according to each of the alternatives. Therefore, this species will be evaluated in more detail.
Snowshoe hare	Wasatch-Cache	Montane Forest	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.
Rydberg milkvetch	Fishlake	Montane Forest Service Alpine	No	Essentially no habitat in mapped priority or general habitat. Implementation of the alternatives will cause no changes to populations or habitat. Therefore, this species will NOT be evaluated in more detail.

3. PURPOSE AND NEED

The purpose of the Land and Resource Management Plan amendments for the Greater Sage-Grouse is to identify and incorporate appropriate conservation measures to conserve, enhance, and/or restore sage-grouse habitat by reducing, eliminating, or minimizing threats to their 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 Greater Sage-Grouse. The USFWS identified conservation measures within Forest Service Land and Resource Management Plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the Land and Resource Management Plan amendments will focus on areas affected by threats to sage-grouse 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 of the alternatives 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 the habitat level or management area a specific conservation measure applies to. Greater sage-grouse habitat is divided into two management areas – preliminary priority management areas (PPMA) and preliminary general management areas (PGMA). PPMA is defined as areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas include breeding, late brood-rearing and winter concentration areas. PGMA is defined as areas of occupied seasonal or year-round habitat outside of PPMA. A third category of linkage areas is also present. Within the document, all occupied habitat refers to all PPMA and PGMA, and linkage areas.

4.1 ALTERNATIVE A

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 sage-grouse and sagebrush habitats would continue.

4.2 ALTERNATIVE B

All applicable and appropriate conservation measures that were developed in the NTT's 2011 report (Sage Grouse National Technical Team 2011) are considered and incorporated into this alternative. These conservation measures would apply only to Greater Sage-Grouse PPMA. There would be a 3% cap on disturbance in these areas. Additional details about this alternative include: Travel construction would be limited in PPMA, minimum standards would be applied and there would be no upgrading of roads. Recreation special use permits in PPMA would only be allowed if they are deemed to have a beneficial effect to the Greater Sage-Grouse. Rights-of-way would be excluded in PPMA. The Forests would aim to keep and acquire PPMA. Grazing direction would be adjusted to improve management for Greater Sage-Grouse. PPMA would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy

buffer around leks. Wildfire/Fuels would aim to protect sagebrush habitats in PPMA. Habitat restoration would be a priority, with a focus on native species.

4.3 ALTERNATIVE C

During scoping, conservation groups had the opportunity to submit suggestions on how to define PPMA and PGMA areas and developed their own conservation measures that would be applied to those areas (proposing more stringent management). All of the reasonable conservation measures across the sage-grouse range have been consolidated into one alternative which each sub region will analyze in detail. This alternative would apply to all occupied Greater Sage-Grouse habitat, including PPMA, PGMA and linkage areas. There would be a 3% cap on disturbance in these areas. PPMA would be closed to livestock grazing. Additional details about this alternative include: Travel construction would be limited in habitat, and no new roads would be constructed within 4 miles of a lek or occupied habitat. Recreation would seasonally prohibit camping and non-motorized recreation within 4 miles of a lek. All occupied habitat would be exclusion areas for rights-of-way and special use permits. The Forests would aim to keep and acquire all occupied habitat. Wind and solar installations would not be allowed to be sited in designated habitat. All occupied habitat would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy buffer around leks. Wildfire/Fuels would aim to protect and restore sagebrush habitats; areas would be closed to grazing after wildfire. All PPMA would be designated as Areas of Critical Environmental Concern (ACEC) or Zoological Areas.

4.4 ALTERNATIVE D

In this alternative, the Utah sub-regions 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 NTT alternative. It would be applied to sagebrush ecological sites within PPMA. There would be a 3% cap on disturbance in these areas. Additional details about this alternative include: Travel construction would be limited in PPMA with a disturbance exception allowing the forests to exceed the 5% cap if Greater Sage-Grouse populations are doing well. Recreation special use permits that do not adversely affect the Greater Sage-Grouse would be allowed. Rights-of-way would be excluded in PPMA, with the exception of transmission lines. Grazing direction would be adjusted to improvement management for sage grouse in PPMA and other parts of all occupied habitat. PPMA would be designated as a no surface occupancy for new fluid minerals leases; existing leases would have seasonal conditional surface use. Wildfire/Fuels would aim to protect sagebrush habitats in all occupied 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 the State of Utah (except GRSG habitat located on portions of the Sawtooth National Forest that fall within Utah) as well as lands administered by the Ashley National Forest located in the State of 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, and would apply to all BLM- and FS-administered lands located in Utah. Alternative E-2 is based on the State of Wyoming's Governor's Executive Order 2011-5 with adjustments by the BLM IDT, which includes members of the Wyoming Governor's Office.

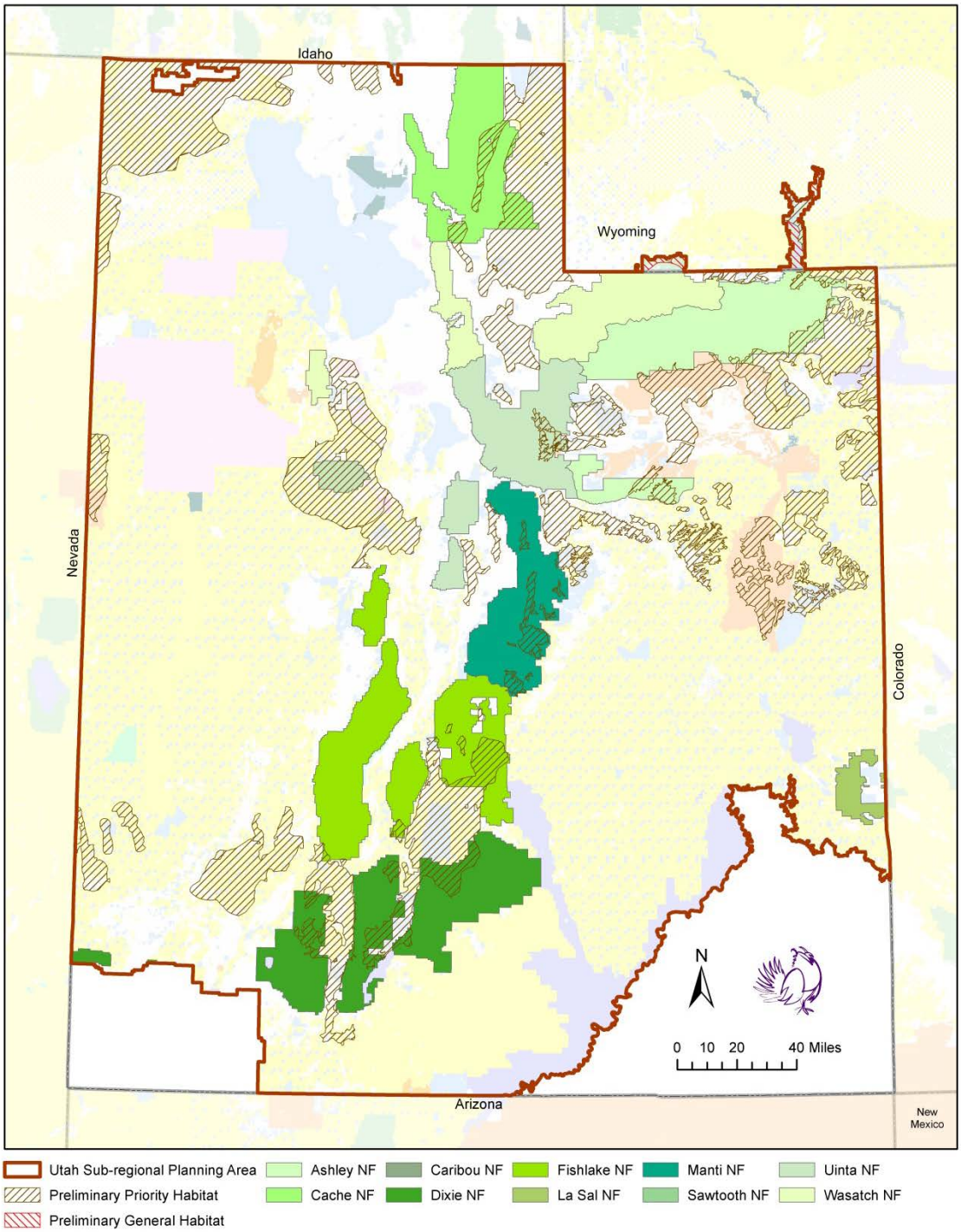
5. ANALYSIS AREA

The analysis area consists of the following National Forest system lands in Utah (and the small portion of the Ashley in Wyoming): including the Ashley, Fishlake & Manti La Sal, Dixie, and Uinta-Wasatch-Cache National Forests, that have been identified as Greater Sage-Grouse habitat (Figure 1). This consists of 845,508 total acres of identified Greater Sage-Grouse habitat, approximately 11% of the 7,663,304 acres that comprise all Forests. Of the 845,508 acres of identified habitat, 769,699 acres are preliminary priority habitat (91%), and 75,809 acres are preliminary general habitat (9%). The Dixie, Fishlake and Manti-La Sal Forests only have identified preliminary priority habitat (see Table 2).

Table 2
Greater Sage-Grouse Habitat by Forest and Percent of Land Cover for the Utah EIS Planning Area, From GIS Analysis

National Forest	Preliminary Priority Habitat	Preliminary General Habitat	Total Occupied	% of Forest
Ashley	170,310	54,692	224,822	16
Dixie	183,886	0	183,886	11
Fishlake	180,452	0	180,452	11
Manti-La Sal	96,072	0	96,072	12
Uinta-Wasatch-Cache	139,159	21,117	160,276	7
TOTAL	**769,699**	**75,809**	**845,508**	**(Ave 11.4)**

Figure 1
Utah Greater Sage-Grouse Planning Area with Forest Service



6. SPECIES INFORMATION AND EFFECTS ANALYSIS (DIRECT, INDIRECT, AND CUMULATIVE)

Because of the importance of Greater sage-grouse (GRSG) and their habitat in this effort, they will be singled out and discussed specifically.

6.1 GREATER SAGE-GROUSE (*CENTROCERCUS UROPHASIANUS*)

Life History– Sage-grouse 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)) (Patterson 1952; Braun *et al.* 1976; Connelly *et al.* 2000; Connelly *et al.* 2004; Miller *et al.* 2011). Sage-grouse 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 *etal.* 2004). Sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder *et al.* 2004; Connelly *et al.* 2011b). Sage-grouse 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 sage-grouse 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 section was copied from the USFWS FINAL COT report – Feb. 2013)

Habitat conditions and population information were largely taken from the USFWS FINAL COT report – Feb. 2013 and from the BLM draft EIS chapter 3. Populations identified in the Conservation Objectives Team Report (USFWS 2013)(COT) 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 Wasatch-Cache and Uinta). Table 3 displays the COT delineated populations along with their likelihood of persistence.

Table 3
Likelihood of Persistence of Greater Sage-Grouse Populations within Management Zones and Populations on the National Forests in Utah Based on the COT Report (USFWS 2013)

Population Area	<200 Males/500 Birds	% Chance of <50 birds/20 males in 2037	% Chance of <500 birds/200 males in 2037	% Chance of <50 birds/20 males in 2107	% Chance of <500 birds/200 males in 2107
Management Zone II: Wyoming Basin	NA	0.1	0.2	16.1	16.2
9a – Wyoming Basin	No				
9b - Rich-Morgan - Summit (*WY Basin in UT*)	No	0	0	9.9	10.7
9c- Uintah (*WY Basin in UT*)	No				
Management Zone III: Southern Great Basin	NA	0	0	6.5	7.8
10a – Strawberry Valley (NE Utah)	Y	0.8	51.8	8.8	78.6
10b – Carbon Co. (NE Utah)	Y	0.8	51.8	8.8	78.6

Table 3
Likelihood of Persistence of Greater Sage-Grouse Populations within Management Zones and Populations on the National Forests in Utah Based on the COT Report (USFWS 2013)

Population Area	<200 Males/500 Birds	% Chance of <50 birds/20 males in 2037	% Chance of <500 birds/200 males in 2037	% Chance of <50 birds/20 males in 2107	% Chance of <500 birds/200 males in 2107
11- Sheeprock (*UT,* aka *Tooele-Juab Counties*)	Y	56.6	100	100	100
12 - Emery (*UT, aka Sanpete- Emery Counties*)	Y	77.2	100	99.2	100
13a – Greater Parker Mt. (*Part of South Central UT*)	N	0.0	3.2	1.1	21.0
13b – Panguitch *(Part of South Central UT)*	N	0.0	3.2	1.1	21.0

6.1.1 Habitat and Population Condition by Forest

Ashley NF

The Ashley National Forest falls within the Uintah Sage-grouse Management Area. Throughout the area (not just on the Forest) there were an estimated 452 males on leks as of 2011. Within the northern portion of this area is the Diamond Mountain and Browns Park population, a significant population center for sage grouse 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. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was zero chance of the population dropping below 500 birds/200 males by 2037.

The central and southern portions of the management area contain fragmented habitat and populations with minimal connectivity and low potential for habitat improvement. There are a total of 170,130 acres of PPMA and 54,692 acres of PGMA on the Ashley National Forest.

Dixie NF

The Dixie National Forest contains a portion of the Greater Parker Mountain Sage-grouse Management Area and the Panguitch Management Area in south central Utah. The Parker Mountain area had an estimated 821 males on leks in 2011. Of course only a portion of the aforementioned leks, male grouse, and habitat occurs on the Forest. The Panguitch portion has more than a dozen leks that are often inter-connected, with an estimated 304 males in 2011. Only a few of these are located on FS lands. There is a large range 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), suggested that there was 3.2% chance of the population dropping below 500 birds/200 males by 2037.

Portions of the Parker population that are on the Forest are part of one of the most contiguous and connected sage-grouse 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 constrained by mountains and canyons. Movement of sage-grouse 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. On the Dixie National Forest, there are a total of 183,886 acres of PPMA and zero acres of PGMA.

Fishlake NF

The Fishlake National Forest, at the southern end, also contains a portion of the Greater Parker Mountain Sage-grouse Management Area 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. This is a small isolated population with high elevation sagebrush steppe. On the Fishlake National Forest, there are a total of 180,452 acres of PPMA and zero acres of PGMA. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was 3.2% chance of the population dropping below 500 birds/200 males by 2037.

Manti-LaSal NF

The Manti-La Sal National Forest contains a portion of the Carbon Sage-grouse Management Area located 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 NF, 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 leks 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% and 100% chance respectively of both the Carbon and Emery populations dropping below 500 birds/200 males by 2037.

In the Carbon population area, it is characterized by highly broken terrain, with deep canyons and mid-elevation plateaus. Telemetry studies in the area suggest that occasionally sage-grouse migrate to and from the adjoining Strawberry Valley portion of this population. In the Emery area, it is a small, mostly isolated sage-grouse 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 a total of 96,072 acres of PPMA and zero acres of PGMA.

Uinta-Wasatch-Cache NF

Due to the combination, over time, of what used to be three forests, the Uinta-Wasatch-Cache National Forest contains portions of multiple sage grouse management areas in the northern portion of the state. The Rich-Morgan-Summit Sage-grouse Management Area is located in Northeastern Utah, and is a part of the Wyoming Basin population, 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 potential for growth. 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 chance of the population dropping below 500 birds/200 males by 2037. The habitat is comprised 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 is located in central Utah, and is a significant population center for sage-grouse in Utah. This management area had an estimated 82 males on leks as of 2011. Significant restoration efforts have been conducted on this population and it is the most intensively managed in Utah. This population is regarded as stable with a high 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 51.8% chance of the population dropping below 500 birds/200 males by 2037. 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 area to the east is drier and contains Wyoming big sagebrush with more pinyon/juniper moving off the slopes into the valleys.

The Sheeprock population in Utah is a relatively isolated population center also known as the Sheeprock Mountains Management Area. Garton *et al.* (2011) refers to this as the Toole-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. However, based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was 51.8% chance of the population dropping below 500 birds/200 males by 2037. Sage-grouse in this area show resiliency to known threats. Habitat is composed of Wyoming big sagebrush and less diverse understories than would be found in more mesic high elevation sites.

There are a total of 139,159 acres of PPMA and 21,117 acres of PGMA on the Uinta-Wasatch-Cache National Forest.

6.1.2 Threats by Forest

Table 4 identifies potential threats for the GRSG populations on the Utah National Forests and those portions of the Utah Forests that extend into Wyoming, as well as the contribution of management on NFS administered lands to those threats.

Table 4
Potential Threats for Greater Sage-Grouse Populations on National Forest Lands in Utah and the Portion of Those Forests that Reach into Wyoming Based on the COT Report (USFWS 2013)

Conservation Objectives Team Report Population Area	Isolated/ Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
9a – WY Basin	N	L	N	L	L	L	Y	L	Y	Y	L	Y	L
Ashley NF - WY	N	N	N	L	L	L	L	L	L	Y	L	Y	N
W-C NF - WY	N	N	N	L	L	L	L	L	L	Y	L	Y	N
9b – WY Basin (Rich/ Summit)	N	N	N	Y	Y	Y	Y	N	Y	N	N	Y	Y
9c – WY Basin (Uinta)	N	N	N	Y	Y	Y	L	Y	Y	N	N	Y	Y
Ashley NF - UT	N	L	N	Y	Y	Y	Y	L	Y	Y	L	Y	N
W-C NF - UT	N	L	N	Y	Y	Y	L	N	L	Y	L	Y	N
10a – Strawberry	Y	N	N	Y	Y	Y	Y	N	Y	N	N	Y	N
Uinta NF	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-LaSal NF	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 NF – 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–Panguitch	N	N	Y	Y	Y	Y	Y	L	Y	N	N	Y	L
Dixie-Fishlake NF	N	Y	N	Y	Y	Y	L	L	Y	Y	N	Y	L

Ashley NF

Key threats to sage-grouse on and around the Ashley NF include predation, wildfire, invasive species, noxious weeds, disease, and habitat fragmentation (naturally occurring, but not topographical, and from existing and future anthropogenic uses). Sage-grouse in the Management Area show resiliency to known threats. In concert with the remaining portions of this population, the management area is considered low risk.

Dixie NF

Key sage-grouse threats on and around the Dixie NF include: loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or

cheatgrass at the lower elevations), increased risk of 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 include impacts from historical and current livestock grazing, energy development, and adjacent residential and commercial development.

Fishlake NF

Key sage-grouse threats on and around the Fishlake NF include: loss or degradation of habitat (primarily due to vegetation succession), conversion of habitat (sagebrush to pinyon-juniper or cheatgrass at the lower elevations), increased risk of predation because of expansion of, or changes in, the native predator community in response to anthropogenic factors, and habitat fragmentation from loss or degradation of habitat that results in a loss of sage-grouse habitat connectivity. Local issues include livestock grazing impacts, degraded sagebrush habitats, with sagebrush too dense in some areas and adequate in others.

Manti-LaSal NF

Key threats to sage-grouse and their habitats on and around the Manti-La Sal NF include habitat loss and fragmentation 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 West Nile Virus have been and could continue to be a threat. In addition a few of the populations in the area are small and persist in fragmented habitats. This, along with the other threats present on and around NF lands, makes this population at-risk.

Uinta-Wasatch-Cache NF

Key threats to sage-grouse on and around the Uinta-Wasatch-Cache NF include wildfire, invasive species (cheatgrass and knapweed), pinyon/juniper encroachment, predation, habitat fragmentation (i.e. dispersed recreation), private land management and development, isolation of some small populations, a dearth of water resources at arid sites due to piping water for livestock, and some historical and current livestock operations. Because these populations are varied in their habitats, elevations, and juxtaposition with other private, state, and federal land, the risks to habitat and population persistence range from low to high.

For complete discussion and analysis of effects to GRSG from Alternatives A through E, see discussion beginning on page 26 of the Wildlife and Botany Specialist Report prepared for the UTAH EIS.

6.1.3 Summary

Effects to GRSG and their habitats due to any of the action alternatives would be generally beneficial due to reducing anthropogenic influences to sagebrush habitats known and identified as such. Overall, the highest potential for negative effects would be from Alternative A. Currently Alternative A does not provide the regulatory mechanisms or assurances to protect, conserve, or enhance GRSG habitats to the extent desired. Under the No Action Alternative (A), incremental small scale negative effects are more likely. Conversely, there would likely be beneficial impacts to GRSG as a result of implementing any of the action alternatives. Although Alternative C takes a more aggressive blanket approach to GRSG occupied habitat, especially by eliminating grazing (C1), Alternatives B and D 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 acres protected than other action alternatives. Differences in

negative effects between action alternatives would be negligible and differences in positive effects would be difficult to discern at this scale. Alternative D provides a more measured approach to effects by qualifying any potential management action by ensuring it improves conditions for GRSG and their habitats.

6.2 SAGEBRUSH ASSOCIATED SPECIES (SAS) – BIRDS AND MAMMALS

Because of the importance of greater sage-grouse (GSG) and their habitat in this effort, they were singled out and discussed specifically above and in the Wildlife and Botany Specialist Report; while Brewer's sparrow, golden eagle, mountain bluebird, sage thrasher, western bluebird, wild turkey, mule deer, and elk were grouped together for this analysis due to the similar nature of the habitats they occupy in terms of association with sagebrush communities. Though each of the species may not be completely dependent upon sagebrush for every life history stage, for the sake of this analysis, and based on the potential effects, programmatic nature of the conservation measures and landscape scale which is being analyzed, we grouped them into this category and call them Sagebrush Associated Species (SAS). In addition, as the nature of the project is to amend Forest Plans to include regulatory mechanisms and conservation measures to protect sagebrush habitats for GRSG, the effects would generally be positive for these species where habitats overlap.

Brewer's Sparrow (*Spizella breweri*)

Natural History — The Brewer's sparrow commonly breeds in arid sagebrush steppes of western North America. They breed in the northern Rocky Mountains of the Yukon and British Columbia, and in the Great Basin south to southern California and New Mexico. Brewer's sparrows breed primarily in shrub steppe habitats in Utah and are considered to be shrub steppe obligates. However, Brewer's sparrows may also be found in high desert scrub (greasewood) habitats, particularly where these habitats are adjacent to shrub steppe. They may also breed in large sagebrush openings in pinyon-juniper habitat or coniferous forests. This species builds cup-shaped nests in sagebrush, with nests between 20 and 50 cm from the ground. Brewer's sparrows prefer shrubs tall enough (about 69 cm) and dense enough to provide sufficient cover. The diet of this sparrow primarily consists of insects and spiders in the summer and seeds of grasses and forbs in the winter. This species will commonly drink and bathe, but may not require free water. They are able to meet water needs by eating insects, and can subsist on dry seeds for up to 3 weeks. Direct cause of widespread decline on breeding grounds is uncertain, but possibly linked to widespread degradation of sagebrush habitats(Rodriguez 2006).

Population Status, Abundance and Trend – NatureServe shows species as "apparently secure" in Utah (S4S5B). BBS trend data from 1966-2011 show 0.0% change...stable in Utah (non-significant, N=96) (Sauer etal. 2012). Across their range in North America, a short term decline (last 20 years) of 10-30% is estimated; one exception is Utah (NatureServe 2013). Densities in Utah are high in the northern and western parts of the state and highest in Rich and Summit counties (Sauer et al. 2012). Brewer's sparrows winter in southeastern California, southern Arizona, and southern New Mexico, south into Baja and the central states of Mexico; they occur rarely in Utah during the winter, most often in the southwestern corner of the state (Parrish etal 1999).

Golden Eagle (*Aquila chrysaetos*)

Natural History — Golden eagles breeds across western North America, from Alaska south to northern Mexico. Populations in the northern parts of the breeding range migrate south for winter, but most populations in the western United States are year-round residents of the same area. This species is also seen rarely in the eastern United States. It is quite common in Utah. Typically this eagle is found in open country, especially in mountainous regions. It feeds mainly on small mammals, especially rabbits, marmots, and ground squirrels, but it also eats insects, snakes, birds, juvenile ungulates, and carrion. Rarely, this bird attacks large, healthy mammals. At times, pairs may hunt cooperatively. Nests are constructed on cliffs or in large trees. Pairs are monogamous and often use the same nest in consecutive years, but some pairs may use alternate nests some years. Eggs are laid from late February to early March in Utah. Most often two eggs are laid, but clutches may contain one egg, three eggs, or rarely four eggs. The eggs are incubated mostly by the female and hatch after 43 to 45 days. Young can fly after 60 to 77 days and are cared for by the parents for at least 30 days after fledging. The young may remain with the parents for several months. Birds first breed at an age of 4 or 5 years (URWR 2013a).

Population Status, Abundance and Trend –Natureserve shows species "apparently secure" in Utah (S4). BBS trend data from 1966-2011 show -0.9% change...stable to slightly decreasing in Utah (significant, N=80) (Sauer etal 2012). In North America, breeding occurs from western and northern Alaska eastward through Northwest Territories to Labrador, and south to northern Mexico, Texas, western Oklahoma, and western Kansas, and in eastern North America southward to New York and northern New England (rare). Golden eagles breed also in the Palearctic. The winter range in North America extends from south-central Alaska and southern Canada southward through the breeding range, and casually farther southward. In the United States, the species is most numerous in winter in the Rocky Mountain States, Great Basin, and western edge of the Great Plains. The 2004 estimated global population size at 170,000, with approximately half of the total in the United States and Canada (NatureServe. 2013).

Mountain Bluebird (*Sialia currucoides*)

Natural History — Highly migratory, Mountain Bluebirds breed in meadows, forest edges, and rangelands at elevations generally higher than 5,000 ft. Its numbers increase when people clear forests, and its affinity for open spaces makes it easy to spot in some human-dominated landscapes. The diet of the mountain bluebird consists primarily of insects; it frequently hovers during feeding, whereas other bluebirds glean insects off of foliage. Pairs are monogamous, and the female selects the nest site, normally a tree cavity previously excavated by a woodpecker. When available, however, females will frequently select nesting boxes erected by humans. The female lines her nest cavity with grasses, and then incubates five or six eggs for approximately two weeks. The hatchlings are blind, immobile, and featherless. The mother stays with the young in the nest for six days after the young hatch. The male brings food to the hatchlings, but when the female is present in the nest, he must relinquish the food to her, as she prevents him from feeding the young directly. The hatchlings remain in the nest for about three weeks and are cared for by both parents. They will attain independence about a month after leaving the nest. If the young leave the nest early in the season, the pair may attempt to have a second brood (UDWR 2013d)(Rodriguez 2006).

Population Status, Abundance and Trend – NatureServe shows species is "apparently secure" in Utah (S4S5B,S3S4N). BBS trend data from 1966-2011 show 0.0% change...stable in Utah (non-significant, N=79) (Saur etal 2012). Range wide their status is relatively stable (Natureserve 2013). The mountain bluebird breeds in the western United States and western Canada. Individuals in the northern part of the species breeding range migrate south for the winter to the western and southwestern United States, as well as to Mexico. Populations breeding in parts of the Great Basin and the southwestern United States remain year-round, though they normally move to lower elevations. Mountain bluebirds are not currently as common in Utah as they were in previous years, but they do breed in high mountain valleys throughout the state. Flocks are commonly seen during spring and fall migrations at lower elevations. Individuals have been known to winter in southern and central Utah (UDWR 2013d).

Sage Thrasher (*Oreoscoptes montanus*)
Natural History —Sage thrashers forage on the ground for insects and berries. These birds spend the majority of their time on the ground, but males will move to an elevated perch in order to sing. Males engage in a flight courtship display to impress the females, and a monogamous pair bond is formed. Pairs build a bulky nest in a concealed location, usually in sagebrush or on the ground, using twigs and grasses. Then, both parents incubate their four eggs for about two weeks. The young are born blind and naked, and both parents feed the nestlings. The sage thrasher is a member of the mockingbird family. Thrashers and mockingbirds have complex songs that often contain elements of other birds' songs. Positively correlated with shrub cover, shrub height, bare ground, and horizontal heterogeneity (patchiness); negatively correlated with spiny hopsage, budsage, and grass cover (UDWR 2013e). Sage Thrashers are very susceptible to sagebrush community conversion and modification (Rodriguez 2006).

Population Status, Abundance and Trend – NatureServe shows species "apparently secure" in Utah (S4S5B). BBS trend data from 1966-2011 show -2.5% change ...stable to slightly decreasing in Utah (significant, N=83) (Sauer 2012) (NatureServe 2013). The sage thrasher breeds in sagebrush communities in the western United States, and winters in the southwestern United States and northern Mexico. In Utah, the species nests in greasewood and sagebrush communities in low elevation deserts throughout the state (UDWR 2013e).

Western Bluebird (*Sialia mexicana*)
Natural History —Western bluebirds rush forth from perches to capture flying insects, and they also glean snails and earthworms from the ground. When breeding, the pair selects a cavity in a dead standing tree, often an old woodpecker's nest, and lines it with fine materials. The female incubates four to six eggs for about two weeks. The young are born naked and blind, and are tended to by both parents. The chicks leave the nest after about three weeks. The female begins preparations for a second brood after the chicks leave the nest, so the male assumes responsibility for caring for the first fledglings. Because the western bluebird relies on nesting cavities in dead trees and branches, the removal and felling of dead trees negatively impacts the reproductive success of the species (Rodriguez 2006) (UDWR 2013h).

Population Status, Abundance and Trend – NatureServe shows species "imperiled" in Utah (S2S3). BBS trend data from 1966-2011 show 4.5% change...stable to slightly increasing in Utah (non-significant, N=31) (NatureServe 2013) (Sauer 2012). The western bluebird breeds in open

forests and meadows in the western United States and southern British Columbia, usually at elevations higher than 7,000 feet. The winter range of the species includes the west coast of the United States, the southwestern United States, and much of Mexico. The species is commonly found year-round in the mountains of central and southern Utah. Local declines probably have been related to loss of nesting sites, which may result from the elimination of dead trees and branches, or from competition with house sparrows, starlings, or other cavity-nesting species (NatureServe 2013) (UDWR 2013h).

Wild Turkey (*Meleagris gallopavo*)
The wild turkey was selected as an MIS to represent issues associated with general Forest Management on the Dixie NF and as a popular game bird, providing abundant watchable wildlife opportunities.

Natural History — There are 2 subspecies of the Wild Turkey found in Utah. The Rio Grande (M. g. intermedia) is the smaller of the two subspecies, and can be found in cottonwood river bottoms as well as pinyon-juniper, and oak-pine forests. Merriam's Wild Turkeys (M .g. merriami) are typically found in stands of open ponderosa pine with interspersed quaking aspen, oak forests, and pinyon-juniper forests. They can also be found in grassy meadows and open areas which are their preferred foraging habitat. Wild Turkeys are a non-migratory game species, and must rely heavily on consistently available food sources to survive through the winter. Rio Grande Turkeys feed on mast plants like juniper berries, acorns, and pine nuts. They also consume a variety of vegetable matter such as grasses and other leafy vegetation. Insects and invertebrates are extremely important in the summer diet of young poults. Merriam's Turkeys have a similar diet to the Rio Grande subspecies. Mast plants and insects are an important component of their diet. Grasses and sedges are also year-round food items (Rodriguez 2006) (UDWR 2013i).

Population Status, Abundance and Trend – In 1983, the UDWR initiated an aggressive transplant program for wild turkeys statewide, and since that time, population numbers have been on the increase statewide. Turkey populations have expanded across the state to the extent that Utah has allowed "over the counter" (very liberal) hunting opportunity since 2010 (Rodriguez 2006).

Mule Deer (*Odocoileus hemionus*)
Natural History — Mule deer occupy several types of habitat throughout Utah. Mule deer occur in coniferous forests, desert shrubs, chaparral, and grassland with shrubs. They prefer tender new growth of various shrubs, many forbs, and a few grasses. They forage from the ground surface into bushes and trees as high as they can reach. Mule deer also dig out subterranean mushrooms to eat. Food preferences vary with season, forage quality, and availability. Forbs and grasses are important in spring, they feed heavily on acorns where available, and various shrubs are critical in summer and winter, e.g. bitterbrush and sagebrush. The breeding season occurs in late fall. Fawning occurs in moderately dense shrub-lands and forests, dense herbaceous stands, and high-elevation riparian and mountain shrub habitats with available water and abundant forage. Fawning peaks from late April through mid-June. Both males and females become sexually mature at 1.5 years old. The number of natural predators of deer has been reduced in most areas. Overpopulation, with resultant winter die-offs and

destruction of habitat, occurs periodically. Mule deer are preyed upon regularly by mountain lions and coyotes, and occasionally by bobcats, black bears, and domestic dogs. Deer populations can respond rapidly to habitat management. However, populations can decline in response to fragmentation, degradation or destruction of habitat caused by urban expansion, incompatible use of land resources (e.g. timber, water, rangeland), and disturbances by humans. Mule deer compete potentially for food with domestic cattle and sheep, wild horses, wild pigs, and black bears (Rodriguez 2006) (UDWR 2008).

Population Status, Abundance and Trend – Mule deer are widespread in Utah but unlike elk, deer numbers are lower today in Utah than the middle of the last century. Most of this decline is due to habitat alteration in the way of rangeland conversion to agriculture and urban development. As a classic shrub-steppe species, mule deer are declining in Utah as they have in much of their range in the intermountain west. The Utah Division of Wildlife Resources (UDWR) statewide deer plan (mule deer only) calls for 409,900 deer across the State in over thirty herd units. Despite very minimal antlerless harvest, less than 1000 permits statewide, deer have trended down from 301,700 in 2009, to 293,700 and 286,100 in 2010 and 2011 respectively based on modeled population estimates. The trend went back up last year, with 318,550 deer estimated for post season 2012 across Utah (UDWR, Regional Advisory Council material, April 2013) (UDWR 2008).

Rocky Mtn Elk (*Cervus canadensis*)

Natural History — Elk are generally migratory and may travel large distances between summer and winter ranges. During the summer, elk are found in the mountains, usually between 6,000 and 10,000 feet in elevation. Elk migrate downslope in the fall, and congregate in valley bottoms in the winter. Important components of winter habitat include cover and available forage. Elk consume a combination of grasses, forbs, and shrubs. Elk eat mostly grasses, forbs, and sedges during summer. Though they prefer grass, elk will also feed on serviceberry, willow, bitterbrush, snowberry, mountain mahogany, winter fat, aspen shoots, juniper, and sagebrush. In winter, they consume mostly browse, including twigs, bark, pine needles, and lichens. Elk breeding season, called the rut, begins in September. Harems of cows are gathered by mature bulls, which defend their group of 10-20 females from other bulls. Coyotes, black bears, and mountain lions likely prey on elk. Human disturbance during calving season may also adversely impact calf survival. Hunting is the primary means of managing population numbers, and reducing damage to range and agricultural lands. Agricultural lands may be used more heavily after the loss of winter range due to development, logging, and other land uses that reduce habitat effectiveness. Roads in particular may decrease elk habitat effectiveness, although it is the use of roads, and not the roads themselves that disturb elk. Elk will move long distances to avoid disturbance (Rodriguez 2006) (UDWR 2010).

Population Status, Abundance and Trend – Elk are well distributed across all Forests in Utah, and primarily use the Forest during late spring through Fall; though some elk remain on Forest Service land year-round--especially during light winters. Elk have increased from as low as 18,000 around 1975 to 79,750 animals estimated by the Utah Division of Wildlife Resources (UDWR) at the close of the 2012 hunting seasons. The UDWR's statewide elk plan calls for 70,965 animals across the State and has recommended some 17,982 antlerless permits for the public draw system just in the 2013 hunting seasons to bring the herd back down to objective

(UDWR, Regional Advisory Council material, April 2013). The herd has been over objective since 2010 and antlerless harvest has been increased each year by UDWR to catch up to the surplus. Utah has rather productive elk herds with calf crops averaging near 50 calves per 100 cows on many of the elk herds using Forest Service lands (UDWR 2010).

6.3 GRASSLAND AND SHRUBLAND EDGE SPECIES (GSE) – BIRDS

Vesper sparrow were separated out from those species more dependent upon sagebrush, as they are more closely associated with shrub-steppe and grassland mix habitats. They often use grasslands interspersed with grass and/or edges of grasslands where they meet shrub-land. For the sake of this analysis, and based on the potential effects, programmatic nature of the conservation measures, and landscape scale which is being analyzed, we grouped them into this category and call them Grassland and Shrub-land edge (GSE).

Vesper Sparrow (*Pooecetes gramineus*)

Natural History — The vesper sparrow breeds in grasslands, open shrublands mixed with grasslands, and open piñon-juniper woodlands. Vesper sparrows have two broods per nesting season with 3-6 eggs/clutch. This species seeks a narrow set of habitat conditions within its nesting range (middle to high elevation sagebrush and grassland habitats) and subtle changes in these conditions (reductions in residual grass and forbs) can impact essential nesting habitat components (Rodriguez 2006). The vesper sparrow is a common summer resident in foothills (and adjacent lowlands) and mountain parks, a fairly common spring and fall migrant in western valleys, foothills, mountain parks and on eastern plains. Sparsely or patchily distributed shrubs with a good grass cover make the best habitat. It is rare in late summer and fall above timberline (UDWR 2013g).

Population Status, Abundance and Trend – NatureServe shows species "secure" in Utah (S5BS2N). BBS trend data from 1966-2011 show -1.1% change...stable to slightly decreasing in Utah (non-significant, N=79) (NatureServe 2013) (Sauer 2012). Vesper sparrows breed in Canada and the northern United States, and winter in the southern United States and most of Mexico. This species is common during summer throughout Utah and is rare during winter in the southwestern corner of the state (UDWR 2013g).

6.3.1 Alternative A

Isolation/Habitat Fragmentation

Alternative A would maintain current land management and few Forests have specific desired conditions in Land Use Plans for grassland and/or shrubland associated avian species. Under this alternative there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on the Forest relative to grasslands or shrublands. This alternative has the highest potential to impact GSE due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects to the species and its habitat would likely allow current trends to continue. With Alternative A allowing continued impacts to sagebrush and surrounding vegetative communities, negative effects to these species would occur over time due to anthropogenic development and changes. Connectivity between seasonal habitats is decreased between isolated habitats effecting species which may be cut off from food, water, or cover at critical times of year. Isolation, in addition to

reducing the land area available to support GSE, habitat loss and fragmentation also increase opportunities for other disturbances, such as human traffic, wildfire, and spread of invasive plants, and increase the risk from such threats.

Fire

Sagebrush is killed by wildfires and recovery requires many years, especially in the case of large fires. Prior to recovery, these sites are of limited use by GSE except along the edges and in unburned islands. Being associated with slightly earlier seral vegetation following a disturbance, GSE may return to areas sooner than late seral shrub associated species like GRSG but would be displaced nonetheless. As a result of this loss of habitat, fire has been identified as a primary factor associated with GSE population threats. 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 slow to reestablish, cheatgrass recovers within one to two years of a fire event from seed in the soil. Forest Service management to prevent or control wildfires can also affect GSE and habitat. Increased human activity and noise associated with fire suppression and prescribed fire in areas occupied by GSE 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, continued suppression may 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 regarding fuels treatments in sagebrush/grassland habitat. In general, both prescribed fire and non-fire fuels treatments are allowed. Additionally, fire fighter and public safety are the highest priority in a wildfire suppression scenario. GRSG habitat would 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. These policies would not avoid the use of prescribed fire in sagebrush/grassland habitat nor prioritize protection of sagebrush/grassland communities; 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, potential impacts may include: removing or degrading habitat, disrupting reproduction, causing changes in species movement patterns due to areas devoid of vegetation; ultimately reducing habitat quality and quantity and negatively impacting GSE 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/grassland habitats, through competitive exclusion and niche displacement, among other mechanisms. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that GSE use for food and cover. Invasive plant communities do not provide suitable GSE habitat, since these species in some way depends on sagebrush and a variety of native forbs/grasses and very often the insects associated with them. Along with competitively excluding vegetation essential to GSE, invasive plants fragment existing GSE habitat or reduce habitat quality. Under current management (Alternative A), the Forest Service utilizes integrated weed management techniques, including mechanical, manual, chemical, and biological control to reduce the

likelihood of invasive weed spread and the extent of current infestations. Under Alternative A, Forest Service would continue to implement noxious weed and invasive species control using integrated weed management actions per funding and plans in cooperation with State and Federal agencies, affected counties, and adjoining private lands. Though there are no specific objectives in Forest Plans to focus these efforts on cheatgrass or sagebrush/grassland communities. These actions would benefit GSE habitat along with other vegetation types as long as funding continues, but would not specifically prioritize management of these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach into sagebrush/grassland ecosystems, which reduce and may eventually virtually eliminate GSE occupancy in these areas. In higher elevation areas, Douglas-fir may also encroach into mountain big sagebrush communities. The Forest Service frequently manages pinyon-juniper encroachment, especially in previously treated areas, utilizing mechanical, chemical, hand-cutting, and prescribed burning, to reduce conifer encroachment of 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/rangeland plant communities often for big game winter range and/or livestock grazing. These approaches do not specifically address the threat of conifer encroachment to benefit GSE and thus would likely have limited effectiveness in controlling its spread.

Minerals/Energy Development

Energy development can result in direct habitat loss; fragmentation of important habitats by roads, pipelines, and power lines; noise; and direct human disturbance. The effects of energy development often add to the impacts from other human development and may result in GSE population declines. Nonrenewable (oil and gas) energy development impacts GSE and sagebrush/grassland habitats through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors; indirectly from noise, gaseous emissions, changes in water availability and quality, and human presence. 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 losses, habitat fragmentation through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development. Surface and subsurface mining for mineral resources (coal, uranium, copper, phosphate, and others) results in direct loss of habitat if they occur in sagebrush/grassland habitats. Surface mining usually has a greater impact than subsurface activity. Habitat loss from mining can be exacerbated by the storage of overburden (soil removed from mine shafts) in undisturbed habitat. If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, railroad tracks, and power lines. GSE 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. Industrial activity associated with the development of surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life-cycle of GSE. Under this alternative, a small percentage of PPMA would be closed to non-energy leasable mineral leasing, with the majority or remainder of all occupied habitats open to leasing (including expansion of new leases) with no cap on surface disturbing activities. As such, this alternative would be expected to cause the greatest amount of direct and indirect habitat loss, degradation, and

fragmentation for GSE. There would likely also be greater negative effects from noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape.

Infrastructure

Human disturbance is increased during infrastructure construction. In the long term, increased threats from infrastructure may cause declines in GSE. 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 activities, may introduce or spread invasive weeds over large areas, thereby degrading habitat. Cellular and other communications towers have the potential to cause GSE mortality by influencing movements through avoidance of a tall structure or electromagnetic radiation, or to provide perches for corvids and raptors. 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 include facilitation of predator movements, spread of invasive plants, and human disturbance from noise and traffic. Closing and reclaiming unused, minimally used and/or unnecessary roads in and around sagebrush/grassland habitats during seasonal use by GSE may reduce habitat loss. In addition, fence poles create predator perch sites and potentially predator corridors along fences (particularly if a road is adjacent). Fences and their associated roads may allow for the invasion or spread of invasive weeds along the fencing corridor. Furthermore, fences may effectively cause habitat fragmentation, as GSE may avoid habitat around the fences to escape predation. Cross country motorized recreation, and other more motorized travel can be very disturbing and destructive to GSE and where available would continue under this Alternative. Also, under this alternative, there would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. All FS Lands would continue to be managed according to FS policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation for GSE. Indirect effects may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on GSE in the future, though current population trends for vesper sparrow are favorable given current management.

Livestock Grazing and Feral Horses

Rangelands meeting Forest Plan Standards may also provide effective GSE habitat. However, grazing at inappropriate intensity, season, or location may degrade sagebrush/grassland ecosystems over the long term, including changes in plant communities and soils, leading to loss of vegetative cover and plant litter, increased erosion, decreased water quality, and reduced overall habitat quality. 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 GSE nests, or disturb reproduction efforts. At the planning level, 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, Forest Service can consider changes in grazing practices or systems, which could reduce grazing intensity or change the season of use, for example. Under Alternative A, Forest Service would continue to make sage-grouse 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, 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 GSE habitat degradation if current grazing practices are not meeting Forest Plan proper use parameters. Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing on the Forest. Other potential effects to GSE habitat could include: overgrazing, reduction in cover, structure, and diversity of vegetation due to consumption, and degradation of meadow/wetland/spring/stream habitats.

Cumulative Effects for Seven Resource Areas in Alternative A

There could be cumulative effects in addition to impacts described above. Sagebrush/grassland habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/grassland habitat. See also: Cumulative Effects analysis in the Environmental Impact Statement prepared for the Utah planning area, Chapter 4.

6.3.2 Alternative B

Isolation/Habitat Fragmentation

Alternative B would encourage consolidation GRSG habitat, facilitating habitat conservation. These conservation measures would be more protective than conservation measures in Alternatives A and D, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats. Alternative B would not establish any Zoological areas for sage-grouse. These actions would protect against additional fragmentation of sage-grouse habitat, but would do little to reduce existing isolation and fragmentation. Under this alternative there would be limited opportunities for road construction in PPMA, with minimum standards applied and no upgrading of current roads. In addition, recreational use permits would only be given in PPMA if there was a neutral or beneficial impact to GRSG and no driving cross country would be permitted in PPMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influence to sagebrush/grassland habitats and GSE by minimizing human use and construction or upgrading of roads. Negative impacts to GSE will be associated with displacing anthropogenic development and activities outside of PPMA/PGMA to other areas in the sagebrush/grassland ecosystem occupied by vesper sparrows.

Fire

Under Alternative B, in PPMA, fuels treatments would be designed and implemented to emphasize protection of existing sagebrush ecosystems. Fuels management programs would consider sage-grouse habitat needs, and fire suppression would prioritize protection of habitat after fire fighter and public safety, which is the highest priority, and protection of property. 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 GSE where these

habitats overlap more than Alternative A. Sagebrush/grassland communities outside of sage-grouse habitat will likely not see the protection afforded to PPMA/PGMA and impacts to it will likely decrease habitat effectiveness to vesper sparrows.

Invasive Weeds

Alternative B would likely protect more acres of sagebrush/grassland habitats from invasive weeds because of the greater emphasis they place on sagebrush re-establishment than Alternative A but focusing again only on sage-grouse habitat. However, the actual change in the probability of invasive weed establishment would depend on the resources available to devote to the effort. Controlling noxious and invasive plants will benefit GSE in general.

Conifer Encroachment

Under Alternative B, invasive vegetation will be monitored and controlled in fuels treatment areas and in relation to PPMA. More emphasis on actively conserving sagebrush ecosystems than those described under Alternative A will generally benefit GSE, especially those former treatments areas maintained for livestock and big game winter range..

Minerals/Energy Development

Under Alternative B, lands within PPMA would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. 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. This alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass many acres of GSE habitat. Though this alternative may push energy and mineral development to less desirable sagebrush or non-GRSG habitat, there may be negative effects of not protecting all GSE habitat.

Infrastructure

Under Alternative B, PPMA 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 PPMA from ROW and road construction more than Alternative A. Under this alternative, PPMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new rights-of-way projects. This benefits GSE where habitat with GRSG overlaps but may increase negative impacts outside of GRSG habitat in other sagebrush/grassland communities suitable and/or occupied by GSE.

Livestock Grazing and Feral Horses

Alternative B would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs per say, but within PPMA, Forest Service would incorporate sage-grouse habitat objectives and management considerations into grazing allotments through AMPs or permit renewals administratively. The NTT alternative would adjust grazing direction in GSG PPMA. This accounts for less than 10% of the land cover of the National Forests in Utah. The potential effects due to livestock grazing, vegetation disturbance, and range improvements is expected to 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 GSE habitat. Though this would occur at a

very small scale, some effects to local populations would likely prove beneficial; however vesper sparrow prefer less dense sagebrush than GRSG and more grass.

Cumulative Effects for Seven Resource Areas in Alternative B

There could be cumulative effects in addition to impacts described above. Sagebrush/grassland habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/grassland habitat. See also Cumulative Effects analysis in the Environmental Impact Statement prepared for the Utah planning area, Chapter 4.

6.3.3 Alternative C

Isolation/Habitat Fragmentation

Under Alternative C, Zoological Areas are proposed on Forest Service lands in each of the fifteen GRSG population areas to function as sagebrush reserves in PPMA, totaling 318,200 acres and would conserve habitat against surface disturbance and fragmentation. These actions and the establishment of sagebrush reserves would protect against additional fragmentation of a portion of sagebrush communities generally benefiting GSE where they overlap. In addition, Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management. This alternative would be expected to have the least negative impacts and most positive impacts to wildlife species whose ranges overlap with PGMA and PPMA, namely vesper sparrow.

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 GSE habitat. Alternative C would have the most protective measures for GSE overall.

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 re-establishment 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 re-establishment than Alternative A and be generally beneficial to GSE.

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 GSG habitats focusing on sagebrush communities in general and benefiting GSE more than Alternative A and more similar to Alternative D.

Minerals/Energy Development

Under Alternative C, lands within all GRSG occupied habitat would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. 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, but would have greater impacts because they would be applied to all occupied habitat. Lands within PPMA and PGMA would also be defined unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Un-leased areas would be closed to fluid mineral leasing, greatly increasing the amount of habitat protected from energy development Existing lease areas would have conservation measures applied, including NSO stipulations. These policies would substantially reduce the available acreage for energy development, which would limit impacts such as disturbance and habitat degradation. Under this alternative, effects would be similar to those described under Alternative B, except more restrictive increasing habitat effectiveness for GSE except outside GRSG habitat where impacts are the same as Alternative A.

Infrastructure

Under Alternative C, all occupied sage-grouse 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 GSE 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 fragmentation of habitat.

Livestock Grazing and Feral Horses

Alternative C1:

Under Alternative C1, grazing would be closed in sage-grouse habitat for livestock and wild horses. This change would avoid direct impacts of grazing, such as loss of herbaceous cover, erosion, and diminished water quality. However, removal of livestock and feral horse grazing may eventually lead to increased fuel loading in the way of fine flashy dry vegetation in late summer. Wild ungulates would still be using these areas and their use may also increase as available forage increases. The complete removal of livestock and feral horse grazing could improve sagebrush/grassland habitat quality initially and help to restore important wetland and adjacent riparian habitats that support GSE.

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 also maintaining the vegetation diversity and fuel reduction promoted by livestock grazing. Not exceeding proper use grazing levels, according to Forest Plan standards, will be more easily attainable if proposed grazing reductions are followed. Wild ungulates would still be using these areas and their use may also increase as available forage increases. The reduction of livestock and feral horse grazing could improve sagebrush/grassland habitat quality and help to restore important wetland and adjacent riparian habitats that support GSE. There would be few if any negative effects on GSE due to alternative C with respect to range resources. Additionally,

under this alternative, habitat treatments would only be allowed that benefit GRSG. Therefore, Alternative C would have the least negative effects and the most positive impacts on GSE.

Cumulative Effects for Seven Resource Areas in Alternative C

There could be cumulative effects in addition to impacts described above. Sagebrush/grassland habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/grassland habitat. See also Cumulative Effects analysis in the Environmental Impact Statement prepared for the Utah planning area, Chapter 4.

6.3.4 Alternative D

Isolation/Habitat Fragmentation

Under this alternative, the effects of most suggested management actions would be similar to Alternative B, with the exception that more flexibility or discretion would be given to the land management agency for site specific analysis to allow for example, route construction in PPMA, road improvements, and issuance of Special Use Permits if it is determined that these actions would not adversely affect GRSG. Under Alternative D, PPMA would be managed as an avoidance area, however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PPMA if the project would not adversely affect sage-grouse populations. Under this alternative if populations and habitats are healthy or improving, it could permit disturbance above the 5% cap of disturbance for the UT management zone. Effects of this alternative include continued disturbance of some GSE habitat that does not overlap GRSG along with some disruption of normal life history behaviors if disturbance was permitted in PPMA/PGMA.

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 sage-grouse 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/grassland burned in wildfires or lost during fuels treatment programs. As such, they would protect sage-grouse 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 GSE.

Invasive Weeds

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush re-establishment and noxious/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 re-establishment than Alternative A and generally increase habitat effectiveness for GSE.

Conifer Encroachment

Under Alternative D, vegetation management programs would include treatment of PPMAs facing conifer encroachment in order to meet sage-grouse habitat objectives to reduce conifer encroachment within PPMA. Because this alternative has a specific goal of reducing conifer encroachment to protect sage-grouse habitat, it would likely be more effective in lowering pinyon-juniper spread than Alternative A and will likely generally benefit GSE.

Minerals/Energy Development

Under Alternative D, lands within PPMA would be closed to non-energy leasable mineral new leasing and mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. Un-leased areas in PPMA and PGMA would be open to fluid mineral leasing, but all acres would require NSO or CSU stipulations, where under Alternative A over 1 million acres had no stipulations. Existing lease areas would have conservation measures applied, including NSO stipulations. 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 sage-grouse from energy development as described under Alternative A would be reduced. Under this alternative, PPMA would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks similar to Alternative B. However with some mineral development, this alternative would allow up to 5% disturbance in any Utah Management Zone. Effects would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance is increased from 3% to 5%. However the potential for this difference to have negative impacts on GSE is minimal. Therefore effects would be most similar to those described under Alternative B including displacing energy/minerals development to GSE habitats not overlapping GRSG.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation and habitat fragmentation. Under Alternative D, PPMA within four miles of an occupied lek would be exclusion areas for most types of new ROWs. These proposed policies would protect PPMA from ROW and road construction more than Alternative A, by limiting road and ROW construction in habitat areas. Although Alternative D would provide less protection to PPMA 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 under this alternative compared with Alternatives B and C due largely to the five percent disturbance cap and allowance for development to occur in PPMA (open for development). As such, this alternative would be expected to provide fewer protective measures to GSE where range and/or habitats are coincident with priority sage-grouse areas than Alternatives B and C, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D Forest Service would incorporate sage-grouse habitat objectives and management considerations into grazing

allotments within PPMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals habitat quality will improve over the long-term. Alternative D would be similar to Alternative B, but would be slightly more restrictive as GRSG habitat objectives within grazing allotments would be applied to occupied habitat not just PPMA. This alternative would have much fewer negative impacts than Alternative A, but slightly greater negative impacts than Alternative C to GSE. Generally speaking, if GRSG habitat is taken into consideration before applying the management action, then GSE would likely benefit from that protection or management action though some additional GSE habitat is still at risk as it is outside of GRSG habitat.

Cumulative Effects for Seven Resource Areas in Alternative D

There could be cumulative effects in addition to impacts described above. Sagebrush/grassland habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/grassland habitat. See also Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

6.3.5 Alternative E

Alternative E2 – Wyoming Governor's EO…where noted, E2 applies to those Ashley National Forest lands in Wyoming and will be discussed in seven resource areas below. Also, in Wyoming, under alternative E2, habitat is designated core and non-core areas.

Isolation/Habitat Fragmentation

Under Alternative E, the Forest Service would not establish any Zoological areas, would not strive to retain federal lands in sage-grouse habitat under public ownership, and would not seek to acquire state and private lands to conserve, enhance or restore sage-grouse habitat. Water developments, along with seeps, springs, and wetlands are not evaluated and modified and/or enhanced except in priority habitat. Impacts to GSE, will likely continue as in Alternative A regarding water and wetlands relative to sagebrush/grassland ecosystems.

Fire

Under Alternative E, a statewide fire agency agreement would be created to reduce jurisdictional boundaries and allow for immediate response to natural fire in priority habitat. 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/grassland burned in wildfires or lost during fuels treatment programs compared to Alternative A and generally benefit GSE.

Invasive Weeds

Under Alternative E, interagency focus groups-- likely by GRSG population area--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 sage-grouse habitat more than Alternative A, and effects will be generally positive for GSE.

Conifer Encroachment

Under Alternative E, vegetation management programs would include aggressive treatment to remove encroaching conifers and other plant species to expand sage-grouse habitat or increase the carrying capacity and effectiveness of habitat areas. Because this alternative has a specific goal of reducing conifer encroachment to protect sage-grouse habitat, it would likely be more effective in lowering the probability of pinyon-juniper spread than Alternative A and generally be beneficial to GSE.

Minerals/Energy Development

Alternative E would not close any lands to mineral material sales or non-energy mineral leasing, but would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and best management practices to minimize disturbance of sage-grouse. In general habitat no specific management actions would be taken. Coal leases in priority habitat 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. 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 provide some protection to GSE where coincident with GRSG but impacts will 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 fragmentation of habitat. Under Alternative E, priority habitat would be avoidance areas for new ROWs. No specific management actions are provided for general habitat. These proposed policies provide limited measures to protect priority habitat from ROW and road construction and would reduce impacts compared to Alternative A for GSE only where coincident with GRSG priority habitat.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Existing grazing operations would utilize rangeland best management practices to increase the necessary vegetation to improve nesting success and population recruitment for GRSG. To limit impacts to nesting and lekking areas, the intensity and timing of grazing in sagebrush habitats would be controlled. Alternative E may improve GSE habitat quality on grazing lands over the long-term through use of best management practices but doesn't go as far to protect and enhance habitat for GSE like other action alternatives, i.e. Alternative C.

Cumulative Effects for Seven Resource Areas in Alternative E

There could be cumulative effects in addition to impacts described above. Sagebrush/grassland habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/grassland

habitat. See also: Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

6.3.6 Summary

Direct, indirect, and cumulative effects to grassland/shrubland edge species and their habitat will be similar to those described for the Sagebrush Associated Species (SAS) in the Wildlife and Botany Specialist Report. Overall, the highest potential for any negative effects would be from Alternative A. Though populations of these species (vesper sparrow) appear to be stable or slightly increasing, effects from management actions that might change the structural makeup of the vegetation, not already considered in the Land and Resource Management Plans, could have detrimental effects. All action alternatives protect and conserve GRSG habitat to some degree and increase habitat effectiveness generally for these species. Alternatives B and D have similar generally positive effects to conserve GRSG habitats more than Alternative E (most liberal protection), but somewhat less than Alternative C (most conservative protection). These species mentioned above, have affinities for sagebrush communities and though will benefit from protections offered to GRSG by the action alternatives, may be negatively impacted by the displacement of anthropogenic disturbances from GRSG habitats into other areas of sagebrush communities. Differences in negative effects between action alternatives would be negligible and likewise, differences in positive effects are difficult to discern at this scale.

6.4 RIPARIAN SHRUB SPECIES (RSS) – BIRDS

MacGillivray's warbler, Lincoln's sparrow and song sparrow were grouped together for this analysis due to the similar nature of the habitats they occupy in terms of association with sagebrush communities. Neither of these species are completely dependent upon sagebrush, but instead are closely associated with shrub-steppe and prefer to nest in riparian corridors often in shrub-steppe communities. For the sake of this analysis, and based on the potential effects, programmatic nature of the conservation measures, and landscape scale which is being analyzed, we grouped them into this category and call them Riparian Shrub Species (RSS).

MacGillivray's Warbler (Oporornis tolmiei)

Natural History — *B*reeds in streamside habitats and forest edges along the Rocky Mountains, in most of the western United States, in British Columbia, in southeastern Alaska, and in localized areas of Mexico. Most individuals migrate south, generally along the Rocky Mountains, to Mexico and Central America for winter. MacGillivray's warbler is a common species throughout Utah during the summer, where it can be found nesting at middle elevations. MacGillivray's warbler forages on or near the ground; its diet consists mainly of insects. Mating pairs form shortly after birds reach the breeding grounds. The pair builds a cup nest using a variety of dry woody and leafy materials, and then lines the nest with fine fibers. Approximately four eggs are incubated by the female for about twelve days. Hatchlings are born with closed eyes and some downy feathers. The hatchlings leave the nest after about nine days, but both parents will continue to care for the young until they are independent (Rodriguez 2006) (UDWR 2013c).

Population Status, Abundance and Trend –Natureserve shows species "apparently secure to vulnerable" in Utah (S4,S5B). BBS trend data from 1966-2011 show 3.5% change...stable to slightly increasing in Utah (significant, N=40) (Sauer etal 2012). Range wide their status is

relatively stable to decline of 30% (Natureserve 2013). In Utah, the species was less abundant in campgrounds and picnic sites developed in riparian areas where shrub/sapling density was half that of non-campground riparian sites. Activities such as intensive grazing, water developments, recreation or urban development, and intensive agriculture that remove or degrade brush and seedling/sapling vegetation in riparian habitats, ecotones, bogs, wet-meadows, and forests or woodlands may be detrimental to local populations. Widespread loss and degradation of western riparian habitats probably affects the species but is unstudied. Intensive grazing that reduces or eliminates willows and other brush and sapling vegetation along streamsides, in bogs, wet meadows, and moist woodlands is detrimental. Nests may also be vulnerable to trampling by livestock. The species may be declining in southern Alberta due to grazing and agriculture; it has disappeared in some areas, but is still common in protected provincial parks (UDWR 2013c).

Lincoln's Sparrow (Melospiza lincolnii)
Natural History —Habitats utilized by Lincoln's sparrow during the breeding season include wet meadows, bogs, and riparian thickets, especially where these habitats include willows and where shrub cover is dense; during migration and in winter, this species uses a much broader array of habitats, ranging from weedy pastures to tropical forests. This species feeds mainly on terrestrial invertebrates (arthropods) and small seeds. The nest is typically on the ground, rarely elevated in a shrub. Clutch size is usually three to five eggs, most commonly four. The eggs are incubated by the female alone for ten to thirteen days. The nestlings are fed by both parents and fledge after an additional ten to eleven days (Rodriguez 2006).

Population Status, Abundance and Trend –Natureserve shows species "apparently secure to vulnerable" in Utah (S4B, S3N). BBS data trend from 1966-2011 shows 7.1% change...stable to slightly increasing in Utah (significant, N=22) (Sauer etal 2012). Breeds in Alaska and across northern Canada south through the Rocky Mountains and the Pacific coastal ranges to southern California, Arizona, and New Mexico. During winter, it is found in the south-central and southwestern United States south to Honduras. In Utah, it is common as a breeding species during summer in the high mountains and plateaus, especially in the north-central and northeastern parts of the state, as well as in areas of high-elevation the southwestern part of Utah. It is a common migrant throughout Utah at lower elevations, and in winter it is rare to uncommon in the southwestern corner of the state (UDWR 2013b) (NatureServe 2013).

Song Sparrow (*Melospiza melodia*)
Natural History — Song sparrows occupy a variety of habitats, breeding mainly in streamside thickets and marshes, but it is found also in wet meadows, bogs, forest edges, clearings, and residential areas. The diet of the song sparrow is mostly terrestrial arthropods (especially insects), small seeds, some berries, and, in coastal areas, some crustaceans and mollusks. The nest is usually on the ground, often under a tuft of grass or small shrub, or sometimes above the ground a few feet up in a shrub, particularly among later broods. The clutch, usually consisting of three or four eggs, is incubated by the female for twelve to fourteen days. The nestlings, fed by both parents, fledge after about nine to twelve days. This species is multiple-brooded, producing two or three, sometimes even four, clutches each nesting season (UDWR 2013f) (Rodriguez 2006).

Population Status, Abundance and Trend – NatureServe shows species "apparently secure" in Utah (S4S5). BBS trend data from 1966-2011 show -2.5% change...stable to slightly decreasing in Utah (non-significant, N=65) (Sauer 2012) (NatureServe 2013). Song Sparrows range from Alaska and Canada to central Mexico. It occurs throughout Utah, where it is common during all seasons. Over thirty subspecies are recognized in this species, six (two breeding, four migrant or wintering) being known from Utah (UDWR 2013f).

6.4.1 Alternative A

Isolation/Habitat Fragmentation

Alternative A would maintain current land management and few Forests have specific desired conditions in Land Use Plans for shrubland associated species. Under this alternative there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on the Forest relative to shrublands. This alternative has the highest potential to impact RSS due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects to the species and its habitat would likely allow current trends to continue. With Alternative A allowing continued impacts to sagebrush and surrounding vegetative communities, negative effects to these species would occur over time due to anthropogenic development and changes. Connectivity between seasonal habitats is decreased between isolated habitats effecting species which may be cut off from food, water, or cover at critical times of year. Isolation, in addition to reducing the land area available to support RSS, habitat loss and fragmentation also increase opportunities for other disturbances, such as human traffic, wildfire, and spread of invasive plants, and increase the risk from such threats.

Fire

Sagebrush is killed by wildfires and recovery requires many years, especially in the case of large fires. Prior to recovery, these sites are of limited use by RSS 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 GSE population threats. 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 slow to reestablish, cheatgrass recovers within one to two years of a fire event from seed in the soil. Forest Service management to prevent or control wildfires can also affect RSS and habitat. Increased human activity and noise associated with fire suppression and prescribed fire in areas occupied by RSS 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, continued suppression may 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 regarding fuels treatments in sagebrush/riparian habitat. In general, both prescribed fire and non-fire fuels treatments are allowed, and fire suppression is prioritized to protect fire fighter and public safety as the highest priority, with GRSG habitat prioritized commensurate with property values and other critical habitat to be protected. These policies would not avoid the use of prescribed fire in sagebrush/riparian habitat nor prioritize protection of sagebrush/riparian communities; 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, potential impacts may include: removing or degrading habitat, disrupting reproduction, causing changes in species movement patterns due to areas devoid of vegetation; ultimately reducing habitat quality and quantity and negatively impacting RSS 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/riparian habitats, through competitive exclusion and niche displacement, among other mechanisms. Invasive plants reduce and, in cases where monocultures occur, eliminate vegetation that RSS use for food and cover. Invasive plant communities do not provide suitable RSS habitat, since these species in some way depend on sagebrush and a variety of native forbs/grasses and very often the insects associated with them. Along with competitively excluding vegetation essential to RSS, invasive plants fragment existing RSS habitat or reduce habitat quality. Under current management (Alternative A), the Forest Service utilizes integrated weed management techniques, including mechanical, manual, chemical, and biological control to reduce the likelihood of invasive weed spread and the extent of current infestations. Under Alternative A, Forest Service would continue to implement noxious weed and invasive species control using integrated weed management actions per funding and plans in cooperation with State and Federal agencies, affected counties, and adjoining private lands. Though there are no specific objectives in Forest Plans to focus these efforts on cheatgrass or sagebrush/riparian communities. These actions would benefit RSS habitat along with other vegetation types as long as funding continues, but would not specifically prioritize management of these areas.

Conifer Encroachment

Pinyon-juniper woodlands may encroach into sagebrush/grassland ecosystems, which reduce and may eventually virtually eliminate RSS occupancy in these areas. In higher elevation areas, Douglas-fir may also encroach into mountain big sagebrush communities. The Forest Service frequently manages pinyon-juniper encroachment, especially in previously treated areas, utilizing mechanical, chemical, hand-cutting, and prescribed burning, to reduce conifer encroachment of 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/riparian plant communities often for big game winter range and/or livestock grazing. These approaches do not specifically address the threat of conifer encroachment to benefit RSS and thus would likely have limited effectiveness in controlling its spread.

Minerals/Energy Development

Energy development can result in direct habitat loss; fragmentation of important habitats by roads, pipelines, and power lines; noise; and direct human disturbance. The effects of energy development often add to the impacts from other human development and may result in RSS population declines. Nonrenewable (oil and gas) energy development impacts RSS and sagebrush/grassland habitats through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors; indirectly from noise, gaseous emissions, changes in water availability and quality, and human presence. 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 losses, habitat fragmentation through roads and power lines, noise, and increased human presence would generally be similar to those for nonrenewable energy development. Surface and subsurface mining for mineral resources (coal, uranium, copper, phosphate, and others) results in direct loss of habitat if they occur in sagebrush/grassland habitats. Surface mining usually has a greater impact than subsurface activity. Habitat loss from mining can be exacerbated by the storage of overburden (soil removed from mine shafts) in undisturbed habitat. If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, railroad tracks, and power lines. RSS 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. Industrial activity associated with the development of surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life-cycle of RSS. Under this alternative, a small percentage of PPMA would be closed to non-energy leasable mineral leasing, with the majority or remainder of all occupied habitats open to leasing (including expansion of new leases) with no cap on surface disturbing activities. As such, this alternative would be expected to cause the greatest amount of direct and indirect habitat loss, degradation, and fragmentation for RSS. There would likely also be greater negative effects from noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Impacts from energy development on water quality and availability are especially important to RSS and some eventual 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 RSS. 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 activities, may introduce or spread invasive weeds over large areas, thereby degrading habitat. Cellular and other communications towers have the potential to cause RSS mortality by influencing movements through avoidance of a tall structure or electromagnetic radiation, or to provide perches for corvids and raptors. 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 include facilitation of predator movements, spread of invasive plants, and human disturbance from noise and traffic. In addition, fence poles create predator perch sites and potentially predator corridors along fences (particularly if a road is adjacent). Fences and their associated roads may allow for the invasion or spread of invasive weeds along the fencing corridor. Furthermore, fences may effectively cause habitat fragmentation, as RSS may avoid habitat around the fences to escape predation. Also, under this alternative, there would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. All FS Lands would continue to be managed according to FS policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation for RSS. Indirect effects may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest negative impact on RSS habitat effectiveness.

Livestock Grazing and Feral Horses

Rangelands meeting Forest Plan Standards may provide effective RSS habitat. However, grazing at inappropriate intensity, season, or location may degrade sagebrush ecosystems over the long term, including changes in 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 RSS. 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 RSS nests, or disturb reproduction efforts. At the planning level, 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, 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 within riparian and wet meadows can reduce impacts in these important seasonal habitats and benefit RSS. Under Alternative A, Forest Service would continue to make sage-grouse 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, 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 RSS habitat degradation if current grazing practices are not meeting Forest Plan proper use parameters. Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing on the Forest. Other potential effects to RSS habitat could include: overgrazing, reduction in cover, structure, and diversity of vegetation due to consumption, and degradation of meadow/wetland/spring/stream habitat.

Cumulative Effects for Seven Resource Areas in Alternative A

There could be cumulative effects in addition to impacts described above. Sagebrush/riparian habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/riparian habitat. See also: Cumulative Effects analysis in Chapter 4 the Environmental Impact Statement prepared for the Utah planning area.

6.4.2 Alternative B

Isolation/Habitat Fragmentation

Alternative B would encourage consolidation RSS habitat, facilitating habitat conservation. These conservation measures would be more protective than conservation measures in Alternatives A and D, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats. Alternative B would not establish any Zoological areas for sage-grouse. These actions would protect against additional fragmentation of sage-grouse habitat, but would do little to reduce existing isolation and fragmentation. Under this alternative there would be limited opportunities for road

construction in PPMA, with minimum standards applied and no upgrading of current roads. In addition, recreational use permits would only be given in PPMA if there was a neutral or beneficial impact to GRSG and no driving cross country would be permitted in PPMA. This is more restrictive than Alternative A, allowing fewer anthropogenic influence to sagebrush habitats and RSS by minimizing human use and construction or upgrading of roads. Negative impacts to RSS will be associated with displacing anthropogenic development and activities outside of PPMA/PGMA to other areas in the sagebrush ecosystem occupied by RSS.

Fire

Under Alternative B, in PPMA, fuels treatments would be designed and implemented to emphasize protection of existing sagebrush ecosystems. Fuels management programs would consider sage-grouse habitat needs, and fire suppression would prioritize protection of habitat after firefighter and public safety and protection of property. These policies would be likely to reduce the acres of sagebrush/riparian burned in wildfires, or lost during fuels treatment programs. As such, these policies would protect RSS and habitat more than Alternative A. Sagebrush communities outside of sage-grouse habitat will likely not see the protection afforded to PPMA/PGMA and impacts to it may negatively impact RSS.

Invasive Weeds

Alternative B would likely protect more acres of sagebrush from invasive weeds because of the greater emphasis placed on sagebrush re-establishment than Alternative A but focusing again only on sage-grouse habitat. However, the actual change in the probability of invasive weed establishment would depend on the resources available to devote to the effort. Controlling noxious and invasive plants will generally benefit RSS.

Conifer Encroachment

Under Alternative B, invasive vegetation will be monitored and controlled in fuels treatment areas and in relation to PPMA. More emphasis on actively conserving sagebrush ecosystems than those described under Alternative A will generally benefit RSS.

Minerals/Energy Development

Under Alternative B, lands within PPMA would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. 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. This alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass many acres of RSS habitat. Though this alternative may push energy and mineral development to less desirable sagebrush or non-GRSG habitat, there may be negative effects of not protecting all RSS habitat.

Infrastructure

Under Alternative B, PPMA 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 PPMA from ROW and road construction more than Alternative A. Under this alternative, PPMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new rights-of-way projects. This benefits RSS where habitat with

GRSG overlaps but may increase negative impacts outside of GRSG habitat in other sagebrush communities suitable and/or occupied by RSS.

Livestock Grazing and Feral Horses

Alternative B would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs per say, but within PPMA, Forest Service would incorporate sage-grouse habitat objectives and management considerations into grazing allotments through AMPs or permit renewals administratively. The NTT alternative would adjust grazing direction in GSG PPMA. This accounts for less than 10% of the land cover of the National Forests in Utah. The potential effects due to livestock grazing, vegetation disturbance, and range improvements is expected to 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 RSS habitat. Though this would occur at a very small scale, some effects to local populations would likely prove beneficial especially where water quality and springs/wetlands were improved.

Cumulative Effects for Seven Resource Areas in Alternative B

There could be cumulative effects in addition to impacts described above. Sagebrush/riparian habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/riparian habitat. See also: Cumulative Effects analysis in the Environmental Impact Statement prepared for the Utah planning area, Chapter 4.

6.4.3 Alternative C

Isolation/Habitat Fragmentation

Under Alternative C, Zoological Areas are proposed on Forest Service lands in each of the fifteen GRSG population areas to function as sagebrush reserves in PPMA, totaling 318,200 acres and would conserve habitat against surface disturbance and fragmentation. These actions and the establishment of sagebrush reserves would protect against additional fragmentation of a portion of sagebrush communities generally benefiting RSS where they overlap. In addition, Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management. This alternative would be expected to have the least negative impacts and most positive impacts to wildlife species whose ranges overlap with PGMA and PPMA.

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 RSS habitat. Alternative C would have the most protective measures for RSS.

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 re-establishment 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 re-establishment than Alternative A and be generally beneficial to RSS.

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 GSG habitats focusing on sagebrush communities in general and benefiting RSS more than Alternative A and more similar to Alternative D.

Minerals/Energy Development

Under Alternative C, lands within all GRSG occupied habitat would be closed to non-energy leasable mineral leasing and to mineral material sales, including not permitting expansions of existing mines. 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, but would have greater impacts because they would be applied to all occupied habitat. Lands within PPMA and PGMA would also be defined unsuitable for surface exploration of coal and would be proposed for withdrawal from locatable mineral entry. Un-leased areas would be closed to fluid mineral leasing, greatly increasing the amount of habitat protected from energy development. Existing lease areas would have conservation measures applied, including NSO stipulations. These policies would substantially reduce the available acreage for energy development, which would limit impacts such as disturbance and habitat degradation. Under this alternative, effects would be similar to those described under Alternative B, except more restrictive increasing habitat effectiveness for RSS except outside GRSG habitat where impacts are the same as Alternative A.

Infrastructure

Under Alternative C, all occupied sage-grouse 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 RSS 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 fragmentation of habitat.

Livestock Grazing and Feral Horses

Alternative C1:

Under Alternative C1, grazing would be closed in sage-grouse habitat for livestock and wild horses. This change would avoid direct impacts of grazing, such as loss of herbaceous cover, erosion, and diminished water quality. However, removal of livestock and feral horse grazing may eventually lead to increased fuel loading in the way of fine flashy dry vegetation in late summer. Wild ungulates would still be using these areas and their use may also increase as

available forage increases. The complete removal of livestock and feral horse grazing could improve sagebrush/riparian habitat quality initially and help to restore important wetland and adjacent riparian habitats that support RSS.

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 also maintaining the vegetation diversity and fuel reduction promoted by livestock grazing. Not exceeding proper use grazing levels, according to Forest Plan standards, will be more easily attainable if proposed grazing reductions are followed. Wild ungulates would still be using these areas and their use may 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 RSS. There would be few if any negative effects on RSS due to alternative C with respect to range resources. Additionally, under this alternative, habitat treatments would only be allowed that benefit GRSG. Therefore, Alternative C would have the least negative effects and the most positive impacts on RSS.

Cumulative Effects for Seven Resource Areas in Alternative C
There could be cumulative effects in addition to impacts described above. Sagebrush/riparian habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/riparian habitat. See also: Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

6.4.4 Alternative D

Isolation/Habitat Fragmentation
Under this alternative, the effects of most suggested management actions would be similar to Alternative B, with the exception that more flexibility or discretion would be given to the land management agency for site specific analysis to allow for example, route construction in PPMA, road improvements, and issuance of Special Use Permits if it is determined that these actions would not adversely affect GRSG. Under Alternative D, PPMA would be managed as an avoidance area, however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PPMA if the project would not adversely affect sage-grouse populations. Under this alternative if populations and habitats are healthy or improving, it could permit disturbance above the 5% cap of disturbance for the UT management zone. Effects of this alternative include continued disturbance of some RSS habitat that does not overlap GRSG along with some disruption of normal life history behaviors if disturbance was permitted in PPMA/PGMA.

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 sage-grouse 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 sage-grouse 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 RSS.

Invasive Weeds

Alternative D would follow the same approach as Alternative B, using integrated vegetation management and prioritizing sagebrush re-establishment and noxious/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 re-establishment than Alternative A.

Conifer Encroachment

Under Alternative D, vegetation management programs would include treatment of PPMAs facing conifer encroachment in order to meet sage-grouse habitat objectives to reduce conifer encroachment within PPMA. Because this alternative has a specific goal of reducing conifer encroachment to protect sage-grouse habitat, it would likely be more effective in lowering pinyon-juniper spread than Alternative A and will likely generally benefit RSS.

Minerals/Energy Development

Under Alternative D, lands within PPMA would be closed to non-energy leasable mineral new leasing and mineral material sales, including not permitting expansions of existing mines. This action would greatly reduce the acreage open to mineral leasing compared to Alternative A. Existing lease areas would have conservation measures applied, including NSO stipulations. However, Alternative D is more similar to Alternative B regarding energy development using stipulations to protect GSG compared to Alternative A; as a result, impacts on sage-grouse from energy development as described under Alternative A would be reduced. Under this alternative, PPMA would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks similar to Alternative B. However with some mineral development, this alternative would allow up to 5% disturbance in any Utah Management Zone. Effects would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance is increased from 3% to 5%. However the potential for this difference to have negative impacts on RSS is minimal. Therefore effects would be most similar to those described under Alternative B including displacing energy/minerals development to RSS habitats not overlapping GRSG.

Infrastructure

Limiting infrastructure construction would reduce the risks posed by roads and transmission lines, such as increased predation and habitat fragmentation. Under Alternative D, PPMA within four miles of an occupied lek would be exclusion areas for most types of new ROWs. These proposed policies would protect PPMA from ROW and road construction more than Alternative A, by limiting road and ROW construction in habitat areas. Although Alternative D

would provide less protection to PPMA 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 under this alternative compared with Alternatives B and C due largely to the five percent disturbance cap and allowance for development to occur in PPMA (open for development). As such, this alternative would be expected to provide fewer protective measures to RSS where range and/or habitats are coincident with priority sage-grouse areas than Alternatives B and C, but more than Alternative A.

Livestock Grazing and Feral Horses

Alternative D would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Impacts would be similar to Alternative B, but under Alternative D Forest Service would incorporate sage-grouse habitat objectives and management considerations into grazing allotments within PPMA. Other actions are similar to Alternative B, and as GRSG objectives are added to grazing permit renewals habitat quality will improve over the long-term. Alternative D would be similar to Alternative B, but would be slightly more restrictive as GRSG habitat objectives within grazing allotments would be applied to occupied habitat not just PPMA. This alternative would have much fewer negative impacts than Alternative A, but slightly greater impacts than Alternative C to RSS. Generally speaking, if GRSG habitat is taken into consideration before applying the management action, then RSS would likely benefit from that protection or management action though some additional RSS habitat is still at risk as it is outside of GRSG habitat.

Cumulative Effects for Seven Resource Areas in Alternative D

There could be cumulative effects in addition to impacts described above. Sagebrush/riparian habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/riparian habitat. See also: Cumulative Effects analysis in the Environmental Impact Statement prepared for the Utah planning area, Chapter 4.

6.4.5 Alternative E

Alternative E2 – Wyoming Governor's EO…where noted, E2 applies to those Ashley National Forest lands in Wyoming and will be discussed in seven resource areas below. Also, in Wyoming, under alternative E2, habitat is designated core and non-core areas.

Isolation/Habitat Fragmentation

Under Alternative E, the Forest Service would not establish any Zoological areas, would not strive to retain federal lands in sage-grouse habitat under public ownership, and would not seek to acquire state and private lands to conserve, enhance or restore sage-grouse habitat. Water developments, along with seeps, springs, and wetlands are not evaluated and modified and/or enhanced except in priority habitat. Impacts to RSS, may continue as in Alternative A regarding water and wetlands relative to sagebrush ecosystems.

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 priority habitat. 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/riparian burned in wildfires or lost during fuels treatment programs compared to Alternative A and generally benefit RSS.

Invasive Weeds

Under Alternative E, interagency focus groups-- likely by GRSG population area--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 sage-grouse habitat more than Alternative A, and effects will be generally positive for RSS.

Conifer Encroachment

Under Alternative E, vegetation management programs would include aggressive treatment to remove encroaching conifers and other plant species to expand sage-grouse habitat or increase the carrying capacity and effectiveness of habitat areas. Because this alternative has a specific goal of reducing conifer encroachment to protect sage-grouse habitat, it would likely be more effective in lowering the probability of pinyon-juniper spread than Alternative A and generally be beneficial to RSS.

Minerals/Energy Development

Alternative E would not close any lands to mineral material sales or non-energy mineral leasing, but would limit impacts from mineral leasing and development through the use of conservation measures, such as seasonal timing restrictions, and best management practices to minimize disturbance of sage-grouse. In PGMA no specific management actions would be taken. Coal leases in priority habitat 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. 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 provide some protection to RSS where coincident with GRSG but impacts will 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 fragmentation of habitat. Under Alternative E, priority habitat would be avoidance areas for new ROWs. No specific management actions are provided for general habitat. These proposed policies provide limited measures to protect priority habitat from ROW and road construction and would reduce impacts compared to Alternative A for RSS only where coincident with GRSG priority habitat.

Livestock Grazing and Feral Horses

Alternative E would not reduce acres open to livestock or feral horse grazing, nor reduce AUMs. Existing grazing operations would utilize rangeland best management practices to increase the necessary vegetation to improve nesting success and population recruitment for GRSG. To limit impacts to nesting and lekking areas, the intensity and timing of grazing in sagebrush habitats would be controlled. Alternative E may improve RSS habitat quality on grazing lands over the long-term through use of best management practices but doesn't go as far to protect and enhance habitat for RSS like other action alternatives.

Cumulative Effects for Seven Resource Areas in Alternative E

There could be cumulative effects in addition to impacts described above. Sagebrush/riparian habitat also occurs on private, state, and BLM land adjacent to the Forest units. Activities occurring in the seven resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush/riparian habitat. See also: Cumulative Effects analysis in Chapter 4 of the Environmental Impact Statement prepared for the Utah planning area.

6.4.6 Summary

Direct, indirect, and cumulative effects to grassland/shrubland edge species and their habitat will be similar to those described for the Sagebrush Associated Species (SAS) in the Wildlife and Botany Specialist Report. Overall, the highest potential for any negative effects would be from Alternative A. Though populations of these species (vesper sparrow) appear to be stable or slightly increasing, effects from management actions that might change the structural makeup of the vegetation, not already considered in the Land and Resource Management Plans, could have detrimental effects. All action alternatives protect and conserve GRSG habitat to some degree and increase habitat effectiveness generally for these species. Alternatives B and D have similar generally positive effects to conserve GRSG habitats more than Alternative E (most liberal protection), but somewhat less than Alternative C (most conservative protection). These species mentioned above, have affinities for sagebrush communities and though will benefit from protections offered to GRSG by the action alternatives, may be negatively impacted by the displacement of anthropogenic disturbances from GRSG habitats into other areas of sagebrush communities. Differences in negative effects between action alternatives would be negligible and likewise, differences in positive effects are difficult to discern at this scale.

7. CONCLUSION AND DETERMINATIONS BY FOREST UNIT

When considering the potential for population-level impacts on these species across the planning area of Forest Service system lands in Utah, it is important to consider that the analysis area makes up less than 12% of the entire acreage of the total Forest Service surface lands. Therefore it is unlikely that any population-level trends would be significantly altered by one of the action alternatives. Instead, a more likely scenario under the action alternatives is that there could be slight increases in the numbers of individuals and quality of habitat in the highly localized areas of GRSG designated habitat that is coincident with a particular MIS. Some negative impacts may occur where action alternatives seek to protect GRSG specific habitat and displace anthropogenic disturbances to other areas within the sagebrush ecosystem.

This MIS analysis indicates that implementation of any of the action alternatives **would maintain stable populations and habitat, and would not result in a loss of viability in the planning area or cause a trend toward federal listing** for all of the species analyzed in detail.

7.1 DETERMINATIONS BY FOREST

7.1.1 Ashley NF

This MIS analysis indicates that implementation of any of the action alternatives would maintain stable populations and habitat, and would not result in a loss of viability in the planning area or cause a trend toward federal listing for Golden eagle, Greater Sage-grouse, Lincoln's sparrow, Song sparrow, Mule deer, and Rocky Mountain elk.

7.1.2 Dixie NF

This MIS analysis indicates that implementation of any of the action alternatives would maintain stable populations and habitat, and would not result in a loss of viability in the planning area or cause a trend toward federal listing for Wild turkey, Mule deer, and Rocky Mountain elk.

7.1.3 Fishlake NF

This MIS analysis indicates that implementation of any of the action alternatives would maintain stable populations and habitat, and would not result in a loss of viability in the planning area or cause a trend toward federal listing for Brewer's sparrow, Lincoln's sparrow, MacGillivray's warbler, Mountain bluebird, Sage Thrasher, Song sparrow, Vesper sparrow, Western bluebird, Mule deer, and Rocky Mountain elk.

7.1.4 Manti-LaSal NF

This MIS analysis indicates that implementation of any of the action alternatives would maintain stable populations and habitat, and would not result in a loss of viability in the planning area or cause a trend toward federal listing for Golden eagle, Greater Sage-grouse, Mule deer, and Rocky Mountain elk.

7.1.5 Uinta-Wasatch-Cache NF

No MIS species habitat or effects due to implementation of these alternatives; thus, no MIS species were considered in detail in this document.

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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

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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		
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

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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
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

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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		
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		

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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
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

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BLM Allotments

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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
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		

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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

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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
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

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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
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		

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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
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		

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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		
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

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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		
Cedar City	05132	INDIAN PEAK				CATTLE	03/01	02/28	ACTIVE	82	1,758	717

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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		

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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
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

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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
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

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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
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

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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
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		

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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

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Vernal	04845	EAST LITTLE MOUNTAIN	3,726	2,590	2,589	CATTLE	05/15	09/15	ACTIVE	100	265	249
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		

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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
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

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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
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

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	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
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

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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	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		
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

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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	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							

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
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

Table Q.2
Forest Service Allotments

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								From Month	From Day	To Month	To Day		
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
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

Table Q.2
Forest Service Allotments

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								From Month	From Day	To Month	To Day		
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
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

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	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
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

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	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
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

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	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
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

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	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 Scenario is a required component of the GRSG LUPA/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 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 BLM, Forest Service, State of Utah, and the Ute Tribe, as well as fee lands. This Reasonably Foreseeable Development Scenario applies primarily to BLM-administered and Forest Service-administered 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 projects a baseline scenario of activity assuming that all potentially productive areas are open under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation, or executive order. Under these conditions, this Reasonably Foreseeable Development Scenario provides a maximum development scenario. The effect of the alternatives on potential development is also included in this scenario.

Oil and gas occurrence potential (as shown on **Map 3.20-2**, Oil and Gas Occurrence and Development Potential; **Appendix A**) is one of several criteria used to project future oil and gas activity in GRSG occupied habitat. Other criteria include past, present and future (APDs) oil and gas activity within and near GRSG occupied habitat, existing oil and gas leases and

expressions of interest, exploration and development trends, 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 and 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, plugged and abandoned wells, and plugged and abandoned dry holes. The majority of these attributes were also partitioned into priority and general habitat within the GRSG occupied habitat of each population area. This data were then analyzed spatially in ArcMap 10.0 (GIS) for proximity to oil and gas fields and units to estimate well county locations.

This Microsoft Excel and GIS data were then analyzed with respect to the number of wells in the Reasonably Foreseeable Development 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.

Resulting from 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-Diamond Mountain. 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 Toole County. The majority of mineral interest in Toole County is federal, while 100 percent of the mineral interest 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 this Population Area; therefore, no wells are projected for this population area.

WY Black Fork

The entire WY Black Fork Population Area is within occupied habitat. Only the northeast corner of the population area is under federal lease (WYW 146527), which is entirely within general habitat. 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 Black 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 5 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 5 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 350 miles to the south. It includes BLM, Forest Service, 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 5 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 5 years after it is plugged and abandoned.

Sheeprocks

The Sheeprocks Population Area consists of BLM, Forest Service, 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 Reasonably Foreseeable Development 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.

WY Uinta

The northern portion of the WY Uinta Population Area is occupied habitat, which is predominantly general habitat. 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 Reasonably Foreseeable Development 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 Forest Service-administered 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 3 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 Forest Service-administered 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 Forest Service-administered 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 Forest Service-administered 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 Forest Service-administered lands, whereas the eastern portion is mostly fee and State of Utah lands. Forest Service-administered 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 applications for permit to drill are in the southeast corner of the GRSG occupied habitat on fee lands. The applications for permit to drill 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 are 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-Wasatch-Cache National Forest in October 2011. Approximately 736,070 acres were made available for leasing; however, the majority of that acreage has an NSO stipulation. The Reasonably Foreseeable Development 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 Forest Service-administered lands.

Carbon

The Carbon Population Area consists of roughly equal amounts of fee and BLM-administered lands, several townships of Forest Service-administered 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 recent 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 1 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-Diamond Mountain

The Uintah-Diamond Mountain Population Area consists of three discreet areas: a Southern Lobe in southern Uintah County and northern Grand County, which includes mostly BLM and tribal lands; a smaller lobe on the Utah-Colorado border (Eastern Lobe) in central Uintah County, including BLM 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, state, and Forest Service-administered 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 are 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 is 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 applications for permit to drill 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 applications for permit to drill in the western part of the GRSG occupied habitat in Duchesne County on predominantly tribal and bee 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 2 percent of the GRSG occupied habitat in this area and does not influence this Reasonably Foreseeable Development

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 in this LUPA/EIS have the potential to reduce the number of wells that could be drilled under each alternative. **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 and County, 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 Reasonably Foreseeable Development Scenario would vary under each alternative, it was assumed that the same level of development will occur on valid and existing rights under each alternative. The BLM made this assumption despite the fact that Alternatives B, C, and to a lesser extent, D, would add required design features as conditions of approval (e.g., a 4-mile NSO around occupied GRSG leks) to applications for permit to drill on existing leases. The BLM determined that this was a reasonable assumption for the following reasons:

1. When only portions of the lease are within 4 miles of an occupied GRSG lek, lease holders will likely be able to access mineral resources within 2 miles by directional drilling from lands outside the 4-mile buffer.
2. The majority of the Reasonably Foreseeable Development Scenario is proposed on existing leases that are currently held by production. Lease holders would be able to directionally drill from existing well pads located on both federal and nonfederal land that are within 4 miles of an occupied GRSG lek.
3. Operators would be able to access nearly all federal minerals within 4 miles of a GRSG lek by drilling from existing or new well pads on state and private lands.
4. In the rare circumstance where there are leases entirely contained within 4 miles of a GRSG lek, there are no existing well pads that could be used for directional drilling, and there are no state or private lands from which federal minerals could be accessed, then the BLM could impose conditions of approval but cannot deny lease holders reasonable access to the lease.

To determine whether the abovementioned analysis assumption was valid, a GIS exercise was conducted, which is explained as follows.

1. For fluid mineral leasing, the most restrictive condition of approval that would be applied to existing leases is a 4-mile NSO. Because this is the most restrictive condition of approval, it was used as the basis of the GIS exercise.
2. It was assumed that through directional drilling technology, it is possible to reach approximately 2 miles from a surface location. While there are many variables that determine the feasibility of directional drilling, given the improvements in technology

that have occurred during the past 10 years, it was determined that this is a reasonable assumption for the next 15 to 20 years.

3. Based on the above assumption, it was assumed that any fluid minerals within 2 miles of a GRSG lek would, in effect, be inaccessible.
4. Using GIS, all areas within 2 miles of GRSG lek were intersected with existing leases to show the leases and their acreage that could potentially impacted.
5. Because decisions being considered in this LUPA planning process only apply to federal surface (and areas where the BLM has federal mineral interest), it was assumed that development on existing leases could still occur from state and private lands, which likely contain existing leases and/or development.
6. Using GIS, a 2-mile buffer was placed around state and private lands (again assuming that through directional drilling technology, it is possible to reach approximately 2 miles from a surface location).
7. Again, using GIS, the existing leases within 2 miles of lek were intersected with the buffered state and private lands to determine whether there are any federal lands that are within 2 miles of GRSG lek that are also inaccessible from state or private lands.
8. As a result of this exercise, it was determined that there are approximately 12,000 acres of existing leases (in an over 4-million-acre decision area) that would be inaccessible.

Given the limited amount of leased acreage that would be inaccessible (0.3 percent), it was determined that the original assumption that the same level of development will occur on valid and existing rights under each alternative is reasonable for this LUPA/EIS.

Development from New Leases

Given the assumption that the same level of development will occur on valid and existing rights under each alternative, variation in the Reasonably Foreseeable Development Scenario under each alternative is tied to potential development of new leases in GRSG occupied habitat. Included below is a summary of how the Reasonably Foreseeable Development Scenario was conducted for each alternative.

Alternative C

Under Alternative C, all GRSG occupied habitat would be designated as priority habitat. Priority habitat 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 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.

Alternative B

Similar to Alternative C, under Alternative B, areas designated as priority habitat would be closed to fluid mineral leasing. However, different than under Alternative C, under Alternative B, not all occupied GRSG habitat would become priority habitat. Areas that are not designated as priority habitat would be designated as general habitat. General habitat would continue to be managed as it is currently. Therefore, there would be no change in Reasonably Foreseeable Development Scenario from new leases in general habitat. 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 Reasonably Foreseeable Development 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 priority habitat. This exercise shows that impacts would vary by county. For example, comparing two of Utah's largest producing counties, 83 percent of the occupied GRSG habitat in Carbon County that would be designated as priority habitat has high oil and gas potential, whereas only 13 percent of the GRSG occupied habitat in Uintah County that would be designated as priority habitat has high oil and gas potential.

Alternative D

With regards to designating priority habitat, 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 4 miles of an occupied GRSG lek. To calculate the Reasonably Foreseeable Development 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 priority habitat by the percent of priority habitat that would be NSO. It was assumed that there would be no reductions in development in priority habitat where there are minor constraints (CSU and TL).

Restrictions on surface occupancy (NSO) are not equivalent to closure. To ascertain the number of wells that would be foregone in areas where there are major constraints (NSO), the BLM again applied the assumption that if a 4-mile buffer were placed on occupied GRSG leks, areas within 2 miles would be inaccessible given current drilling technology. Based on this assumption, step two consisted of multiplying the number of potential wells on new leases in priority habitat that are also in areas that would be NSO by 25 percent. Twenty-five percent was used because it is the percent of lands within a 4-mile area that could effectively be closed by an NSO restriction.

Alternative E

Alternative E is based on the State of Utah's 2013 Conservation Plan for Greater Sage-grouse in Utah (State of Utah 2013). Under Alternative E, BLM-administered lands inside of GRSG management areas within one 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 Reasonably Foreseeable Development Scenario. Therefore, the same numbers of wells predicted under Alternative A are also predicted under Alternative E.

SURFACE DISTURBANCE ESTIMATES

Table R.3, Estimated Surface Disturbance: Alternatives A and E, through **Table R.6**, Estimated Surface Disturbance: Alternative D, 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 1 to 5 acres per pad. The value used in this Reasonably Foreseeable Development Scenario is 4 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. Surface disturbance estimates are outlined in **Table R.7**, Disturbance Tables.

REFERENCES

BLM (United States Department of the Interior, Bureau of Land Management). 2010. West Tavaputs Plateau Natural Gas Full Field Development Plan Final Environmental Impact Statement and Record of Decision (add correct title). BLM, Price, Utah.

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_____. 2012b.Greater Natural Buttes Final Environmental Impact Statement and Record of Decision. BLM, Vernal, Utah.

State of Utah. 2013. 2013 Conservation Plan for Greater Sage-grouse in Utah. Salt Lake City, Utah.

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		
		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**		0	**1**	1	0	**1**	1	0	**1**	1	0
	IRON	**1**	0	1	**1**	0	1	**1**	0	1	**1**	0	1
Carbon	CARBON	**770**	770	0	**680**	680	0	**662**	662	0	**760**	760	0
	DUCHESNE	**647**	247	400	**620**	240	380	**572**	227	345	**641**	245	396
Emery	EMERY	**35**	35	0	**35**	35	0	**29**	29	0	**35**	35	0
Hamlin Valley	BEAVER	**1**	1	0	**0**	0	0	**0**	0	0	**0**	0	0
Panguitch	BEAVER	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
	GARFIELD	**1**	1	0	**0**	0	0	**0**	0	0	**0**	0	0
Parker Mountain	GARFIELD	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
Rich	RICH	**25**	18	7	**15**	10	5	**15**	10	5	**23**	23	0
	SUMMIT	**10**	5	5	**10**	5	5	**10**	5	5	**10**	5	5
Sheeprocks	JUAB	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
	TOOELE	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0
Strawberry	DUCHESNE	**48**	0	48	**48**	0	48	**48**	0	48	**48**	0	48
	WASATCH	**12**	0	12	**12**	0	12	**12**	0	12	**12**	0	12
Uintah-Diamond Mountain	DAGGETT	**30**	30	0	**24**	24	0	**24**	24	0	**29**	29	0
	DUCHESNE	**150**	10	140	**150**	10	140	**150**	10	140	**150**	10	140
	UINTAH	**1,455**	1,318	137	**1,441**	1,307	134	**1,347**	1,220	127	**1,453**	1,315	138
WY Uinta	UINTA	**4**	1	3	**4**	1	3	**4**	1	3	**4**	1	3
Total		**3,194**	2,441	753	**3,045**	2,317	728	**2,879**	2,193	686	**3,171**	**2,428**	**743**

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 B - Producing Wells			Alternative C - Producing Wells			Alternative D - 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 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
	IRON	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
Carbon	CARBON	75%	85%	**510**	510	0	**497**	497	0	**570**	570	0
	DUCHESNE	75%	85%	**503**	180	323	**429**	170	259	**481**	184	297
Emery	EMERY	60%	60%	**21**	21	0	**17**	17	0	**21**	21	0
Hamlin Valley	BEAVER	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
Panguitch	BEAVER	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
	GARFIELD	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
Parker Mountain	GARFIELD	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
Rich	RICH	20%	20%	**3**	2	1	**3**	2	1	**5**	5	0
	SUMMIT	20%	20%	**2**	1	1	**2**	1	1	**2**	1	1
Sheeprocks	JUAB	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
	TOOELE	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
Strawberry	DUCHESNE	10%	10%	**5**	0	5	**5**	0	5	**5**	0	5
	WASATCH	10%	10%	**1**	0	1	**1**	0	1	**1**	0	1
Uintah-Diamond Mountain	DAGGETT	50%	50%	**12**	12	0	**12**	12	0	**15**	15	0
	DUCHESNE	85%	70%	**107**	9	98	**128**	9	119	**128**	9	119
	UINTAH	85%	70%	**1,205**	1,111	94	**1,145**	1,037	108	**1,235**	1,118	117
WY Uinta	UINTA	10%	10%	**0**	0	0	**0**	0	0	**0**	0	0
Total				**2,369**	**1,846**	**523**	**2,239**	**1,745**	**494**	**2,462**	**1,922**	**541**

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)	Dist. Acres	Avg. Dist./ Mi.	Total Well Pads	Fed-eral Well Pads	Non-federal Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Federal Pad Dist. Acres	Non-federal Pad Dist. Acres	Roads Miles	Dist. Acres	Avg. Mi./ Pad	Avg. Dist / Mi.	Pipe-lines Miles	Dist. acres		
Hamlin Valley	**L**	50	60	1.2	1	1	0	4	4	4	0	10	60	10.0	6	0	0	0	**124**
Bald Hills	**M,** L	75	90	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	**188**
Panguitch	**L,** M	60	72	1.2	2	2	0	4	8	8	0	15	90	7.5	6	0	0	0	**170**
Parker Mtn.	**L,** H	65	78	1.2	1	1	0	4	4	4	0	8	48	8.0	6	0	0	0	**130**
Emery	H, **M, L**	75	90	1.2	35	31	4	4	140	124	16	40	240	1.1	6	5	30	20	**520**
Sheeprocks	**M, L**	100	120	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	**218**
Strawberry	**M,** H	120	150	1.2	60	2	58	4	240	8	232	80	480	1.3	6	75	450	20	**1,340**
Carbon	**M, H,** L	300	360	1.2	660	447	214	4	2,640	1,788	856	520	3,120	0.8	6	316	1,915	200	**8,235**
Uinta	**H,** M, L	300	360	1.2	570	450	120	6	3,420	2,700	720	420	2,520	0.7	6	855	5,215	170	**11,685**
Rich	**H,** M, L	75	90	1.2	35	13	22	4	140	52	88	80	480	2.3	6	50	125	20	**855**
Box Elder	**L**	70	84	1.2	0	0	0	4	0	0	0	0	0	0.0	0	0	0	0	**84**
WY Uinta	**M,**H	10	12	1.2	4	3	1	4	16	12	4	10	60	2.5	6	5	30	10	**128**
STATEWIDE TOTAL		**1,300**	**1,566**		1,372	952	421		**6,628**	4,708	1,924	1,213	**7,278**			1,306	**7,765**	**440**	**23,677**

[1] L=low, M=moderate, H=high

Table R.4
Estimated Surface Disturbance: Alternative B

Population Areas	Oil and Gas Poten-tial[1]	Seismic			Well Pads							Roads			Pipelines			Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Dist. Acres	Avg. Dist./ Mi.	Total Well Pads	Fed-eral Well Pads	Non-fed-eral Well Pads	Avg. Dist. / Pad	Total Pad Dist. Acres	Federal Pad Dist. Acres	Non-federal Pad Dist. Acres	Roads Miles	Dist. Acres	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipe-lines Miles	Dist. acres		
Hamlin Valley	**L**	50	60	1.2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	**60**
Bald Hills	**M,** L	75	90	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	**188**
Panguitch	**L,** M	60	72	1.2	1	1	0	4	4	4	0	8	45	7.5	6	0	0	0	**121**
Parker Mtn.	**L,** H	65	78	1.2	1	1	0	4	4	4	0	8	48	8.0	6	0	0	0	**130**
Emery	H, **M, L**	75	90	1.2	35	31	4	4	140	124	16	40	240	1.1	6	5	30	20	**520**
Sheeprocks	**M, L**	100	120	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	**218**
Strawberry	**M,** H	120	150	1.2	57	2	55	4	228	8	220	75	450	1.3	6	68	408	18	**1,254**
Carbon	**M, H,** L	300	360	1.2	607	411	196	4	2,428	1,644	784	460	2,760	0.8	6	291	1,746	184	**7,478**
Uinta	**H,** M, L	300	360	1.2	530	418	112	6	3,180	2,508	672	330	1,980	0.6	6	795	4,770	160	**10,450**
Rich	**H,** M, L	75	90	1.2	25	9	16	4	100	36	64	57	342	2.3	6	36	85	14	**631**
Box Elder	**L**	70	84	1.2	0	0	0	4	0	0	0	0	0	0.0	0	0	0	0	**84**
WY Uinta	**M,**H	10	12	1.2	4	3	1	4	16	12	4	10	6	5.0	6	5	30	8	**126**
STATEWIDE TOTAL		1,300	**1,566**		1,264	878	386		**6,116**	4,348	1,768	1,018	**6,105**			1,200	**7,069**	**404**	**21,260**

[1] L=low, M=moderate, H=high

Table R.5
Estimated Surface Disturbance: Alternative C

Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads							Roads			Pipelines			Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Dist. Acres	Avg. Dist./ Mi.	Total Well Pads	Fed-eral Well Pads	Non-fed-eral Well Pads	Avg. Dist. / Pad	Total Pad Dist. Acres	Federal Pad Dist. Acres	Non-fed-eral Pad Dist. Acres	Roads Miles	Dist. Acres	Avg. Mi./ Pad	Avg. Dist / Mi.	Pipe-lines Miles	Dist. acres		
Hamlin Valley	**L**	50	60	1.2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	**60**
Bald Hills	**M,** L	75	90	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	**188**
Panguitch	**L,** M	60	72	1.2	1	1	0	4	4	4	0	8	45	7.5	6	0	0	0	**121**
Parker Mtn.	**L,** H	65	78	1.2	1	1	0	4	4	4	0	8	48	8.0	6	0	0	0	**130**
Emery	H, **M, L**	75	90	1.2	26	23	3	4	104	92	12	30	180	1.2	6	4	23	15	**412**
Sheeprocks	**M, L**	100	120	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	**218**
Strawberry	**M,** H	120	150	1.2	55	2	53	4	215	7	208	70	420	1.3	6	65	390	16	**1,191**
Carbon	**M, H,** L	300	360	1.2	575	389	186	4	2,300	1,556	744	453	2,718	0.8	6	275	1,650	174	**7,202**
Uinta	**H,** M, L	300	360	1.2	521	411	105	6	3,126	2,466	630	315	1,890	0.6	6	765	4,590	147	**10,113**
Rich	**H,** M, L	75	90	1.2	25	9	16	4	100	36	64	57	343	2.3	6	36	85	14	**632**
Box Elder	**L**	70	84	1.2	0	0	0	4	0	0	0	0	0	0.0	0	0	0	0	**84**
WY Uinta	**M,**H	10	12	1.2	4	3	1	4	16	12	4	10	60	5.0	6	5	30	7	**125**
STATEWIDE TOTAL		1,300	**1,566**		1,212	841	366		**5,885**	4,185	1,670	981	**5,884**			1,150	**6,768**	**373**	**20,476**

[1] L=low, M=moderate, H=high

Table R.6
Estimated Surface Disturbance: Alternative D

Population Areas	Oil and Gas Potential[1]	Seismic			Well Pads							Roads			Pipelines			Ancillary Features Acres	TOTAL Dist. Acres
		Seismic Lines (Miles)	Dist. Acres	Avg. Dist./Mi.	Total Well Pads	Federal Well Pads	Non-federal Well Pads	Avg. Dist./ Pad	Total Pad Dist. Acres	Federal Pad Dist. Acres	Non-federal Pad Dist. Acres	Roads Miles	Dist. Acres	Avg. Mi./ Pad	Avg. Dist/ Mi.	Pipe-lines Miles	Dist. acres		
Hamlin Valley	L	50	60	1.2	1	1	0	4	4	4	0	10	60	10.0	6	0	0	0	124
Bald Hills	M, L	75	90	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	188
Panguitch	L, M	60	72	1.2	2	2	0	4	8	8	0	15	90	7.5	6	0	0	0	170
Parker Mtn.	L, H	65	78	1.2	1	1	0	4	4	4	0	8	48	8.0	6	0	0	0	130
Emery	H, M, L	75	90	1.2	35	31	4	4	140	124	16	40	240	1.1	6	5	30	20	520
Sheeprocks	M, L	100	120	1.2	2	1	1	4	8	4	4	15	90	7.5	6	0	0	0	218
Strawberry	M, H	120	150	1.2	60	2	58	4	240	8	232	80	480	1.3	6	75	450	20	1,340
Carbon	M, H, L	300	360	1.2	653	442	211	4	2,612	1,768	844	514	3,086	0.8	6	313	1,894	198	8,150
Uinta	H, M, L	300	360	1.2	565	446	119	6	3,390	2,676	714	379	2,273	0.7	6	748	4,531	165	10,719
Rich	H, M, L	75	90	1.2	33	12	21	4	132	48	84	75	451	2.3	6	47	118	19	810
Box Elder	L	70	84	1.2	0	0	0	4	0	0	0	0	0	0.0	0	0	0	0	84
WY Uinta	M,H	10	12	1.2	4	3	1	4	16	12	4	10	60	5.0	6	5	30	10	128
STATEWIDE TOTAL		1,300	1,566		1,358	942	416		6,562	4,660	1,902	1,161	6,968			1,193	7,053	432	22,581

[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 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 (NFMA) (36 CFR Part 219.25; 36 CFR Part 251.23). The need for and value of RNAs have a basis in NFMA, 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 sage-grouse 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. 2010b), with sage-grouse 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 sage-grouse priority habitat.
3. All remaining BLM-administered lands were then selected for ACECs.

Using the abovementioned criteria, nearly all DWR-mapped occupied sage-grouse habitat in Utah (and some land outside of DWR-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 (WWP) 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 DWR 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 DWR-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 in 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 sage-grouse 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 in the Code of Federal Regulations (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 DWR sage-grouse 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 DWR-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 Utah DWR (DWR 2012). The Utah DWR 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% breeding bird density range at the national level, but with one in the 25% breeding bird density range at the state level, as well as several in the 75% 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% range nationally and 25%, 50%, and 75% 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% range nationally and 75% 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% breeding bird density range at the national level, but with one in the 50% 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% 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 precipitation. Marginal habitat, at best.

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
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. O&G 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 the state of Utah. The habitat is largely undeveloped. According to the state and national breeding bird density map, there are several 25% and 50% 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 with Parker Mountain. The BLM-administered land is separated by

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
		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% 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% 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 sage-grouse 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% 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% breeding bird density. The Sheeprock mountains also support numerous other leks.
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

Table S.1
ACEC Evaluations for Individual GRSG Habitat Areas

Population Area	Area Name	Relevance
		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% 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% 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% lek according to the state's breeding bird density map. GRSG habitat located in this population area extends across the planning area boundary into the State of 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 2012. 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 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

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[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 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

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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 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

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[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 2012. 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.

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[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 2012. 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 2012. 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, 2001-2009

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mining									
Beaver County	55	53	(D)	(D)	(D)	(D)	80	134	169
Box Elder County	(D)	(D)	67	64	48	(D)	62	(D)	58
Cache County	(D)	(D)	(D)	(D)	46	(D)	74	69	216
Carbon County	(D)	(D)	(D)	(D)	820	(D)	(D)	(D)	(D)
Daggett County	11	(L)	12	10	10	11	15	44	(D)
Duchesne County	643	583	542	618	745	1,083	1,387	1,813	1,651
Emery County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Garfield County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Grand County	(D)	(D)	109	104	123	(D)	(D)	(D)	(D)
Iron County	45	(D)	(D)	(D)	(D)	70	(D)	(D)	(D)
Juab County	(D)	(D)	(D)	(D)	(D)	92	115	125	106
Kane County	11	(D)	(D)	10	10	11	(D)	(D)	(D)
Morgan County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Piute County	11	(L)	12	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	0	(L)	(L)	(D)	(D)	(D)	(D)	48	(D)
Sanpete County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	130	101
Sevier County	353	406	404	410	434	508	535	577	596
Summit County	144	149	163	143	157	194	263	267	226
Tooele County	73	71	63	59	55	(D)	(D)	(D)	106
Uintah County	1,909	1,840	2,026	2,261	2,656	3,425	3,789	4,007	3,102
Wasatch County	(D)	(D)	(D)	(D)	(D)	91	85	88	82
Wayne County	0	0	0	0	0	0	0	0	(D)
Socioeconomic Study Area	**3,255**	**3,102**	**3,398**	**3,679**	**5,104**	**5,485**	**6,405**	**7,302**	**6,413**
Farming									
Beaver County	575	520	563	544	554	560	533	552	538
Box Elder County	1,510	1,404	1,384	1,335	1,322	1,301	1,328	1,341	1,323
Cache County	1,901	1,768	1,740	1,600	1,514	1,412	1,366	1,379	1,362
Carbon County	274	266	268	268	274	275	299	297	294
Daggett County	40	37	38	37	37	36	40	40	40
Duchesne County	1,075	1,032	997	940	905	857	884	876	874
Emery County	560	536	529	518	516	506	547	540	540
Garfield County	287	259	261	264	272	277	298	299	297

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2009 (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Grand County	110	102	104	99	98	94	94	97	96
Iron County	813	779	805	745	718	683	651	658	651
Juab County	319	310	320	322	328	331	350	355	352
Kane County	157	147	143	138	134	129	133	136	135
Morgan County	324	305	304	303	306	309	329	330	329
Piute County	153	144	144	140	141	141	145	146	144
Rich County	216	199	198	189	185	182	181	185	182
Sanpete County	1,088	1,023	1,040	1,012	1,013	1,004	1,036	1,041	1,032
Sevier County	728	703	707	680	673	655	685	681	679
Summit County	631	607	595	588	593	591	633	632	628
Tooele County	490	471	467	444	436	422	434	432	428
Uintah County	1,018	975	961	936	933	914	976	969	965
Wasatch County	421	414	408	402	402	398	428	427	426
Wayne County	214	196	197	196	200	200	214	215	214
Socioeconomic Study Area	**12,904**	**12,197**	**12,173**	**11,700**	**11,554**	**11,277**	**11,584**	**11,628**	**11,529**
Retail trade									
Beaver County	360	390	373	379	387	378	420	384	384
Box Elder County	2,389	2,513	2,616	2,718	2,751	2,784	2,868	2,751	2,610
Cache County	5,888	6,010	6,248	6,219	6,453	6,655	6,875	7,328	7,235
Carbon County	1,538	1,637	1,646	1,579	1,656	1,707	1,711	1,561	1,525
Daggett County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Duchesne County	926	894	874	930	987	1,045	1,093	1,125	1,097
Emery County	605	586	598	667	686	707	733	657	629
Garfield County	233	254	248	263	278	273	285	281	262
Grand County	778	810	816	811	848	893	928	913	876
Iron County	2,336	2,400	2,443	2,463	2,621	2,765	2,879	3,028	2,896
Juab County	404	433	457	459	478	452	436	452	462
Kane County	421	404	427	454	480	509	500	489	484
Morgan County	290	309	309	292	263	268	303	306	299
Piute County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	95	90	93	105	102	101	98	92	107
Sanpete County	1,257	1,309	1,299	1,323	1,327	1,366	1,477	1,485	1,433
Sevier County	1,390	1,390	1,382	1,569	1,477	1,551	1,632	1,779	1,766
Summit County	2,802	2,922	2,960	2,936	3,355	3,689	3,765	3,947	3,708

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2009 (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Tooele County	1,922	2,033	2,058	2,110	2,189	2,345	2,466	2,396	2,382
Uintah County	1,693	1,664	1,720	1,760	1,852	1,956	2,075	2,129	2,032
Wasatch County	826	855	880	885	830	921	1,010	1,144	1,071
Wayne County	144	146	128	127	129	137	142	126	124
Socioeconomic Study Area	**26,297**	**27,049**	**27,575**	**28,049**	**29,149**	**30,502**	**31,696**	**32,373**	**31,382**
Accommodation and food services									
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	1,239	1,151	1,197	1,208	1,271	1,390	1,454	1,418	1,397
Cache County	2,767	2,889	2,852	3,090	3,036	3,174	3,172	3,233	3,334
Carbon County	772	797	747	747	732	798	817	759	773
Daggett County	123	118	106	99	98	100	108	101	105
Duchesne County	327	(D)	423	429	428	(D)	499	511	438
Emery County	251	252	277	316	322	316	(D)	332	311
Garfield County	830	774	762	802	(D)	845	881	930	855
Grand County	1,314	1,333	1,363	1,330	1,325	1,379	1,449	1,467	1,426
Iron County	1,550	1,432	1,477	1,533	1,651	1,682	1,799	1,758	1,657
Juab County	(D)	(D)	(D)	(D)	(D)	(D)	353	(D)	(D)
Kane County	640	(D)	610	610	615	667	(D)	964	900
Morgan County	158	143	155	169	156	159	168	(D)	(D)
Piute County	(D)	41	49	54	47	73	82	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	522	517	532	576	525	547	536	511	532
Sevier County	809	880	874	944	960	965	976	981	913
Summit County	3,622	3,650	3,960	4,127	4,356	4,661	4,837	5,800	5,245
Tooele County	1,018	(D)	1,210	1,121	1,205	1,260	1,264	1,151	1,070
Uintah County	860	864	885	926	914	934	995	1,094	1,011
Wasatch County	1,009	992	943	918	997	1,189	1,333	1,336	1,174
Wayne County	(D)	(D)	(D)	(D)	184	198	207	239	239
Socioeconomic Study Area	**17,811**	**15,833**	**18,422**	**18,999**	**18,822**	**20,337**	**20,930**	**22,585**	**21,380**
Arts, entertainment, and recreation									
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	246	251	258	275	277	297	303	310	324
Cache County	881	1,130	1,006	1,017	1,028	1,102	1,180	1,167	1,195
Carbon County	127	132	133	139	153	156	149	143	159

Table T.5
Employment Trends by Select Industry Sector and County, 2001-2009 (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Daggett County	41	48	47	48	47	50	43	40	40
Duchesne County	58	(D)	69	65	67	(D)	104	118	111
Emery County	38	49	46	47	41	38	(D)	34	35
Garfield County	38	89	80	82	(D)	83	89	94	91
Grand County	300	284	314	321	328	345	370	375	372
Iron County	344	365	376	440	460	451	479	517	584
Juab County	(D)	(D)	(D)	(D)	(D)	(D)	43	(D)	(D)
Kane County	348	(D)	367	380	287	294	(D)	96	92
Morgan County	52	56	55	51	48	53	61	(D)	(D)
Piute County	(D)	(L)	(L)	(L)	(L)	(L)	(L)	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	96	107	114	125	121	124	133	163	170
Sevier County	81	49	55	58	66	67	70	85	89
Summit County	2,565	2,746	2,867	3,070	3,168	3,535	3,815	3,311	3,304
Tooele County	144	(D)	158	176	202	298	391	413	441
Uintah County	196	161	159	136	156	147	136	111	110
Wasatch County	117	137	144	200	210	229	251	297	342
Wayne County	(D)	(D)	(D)	(D)	27	30	36	37	39
Socioeconomic Study Area	5,672	5,604	6,248	6,630	6,686	7,299	7,653	7,311	7,498

Source: US Department of Commerce 2012. 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, 2001-2009 (thousands)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mining									
Beaver County	$1,700	$1,801	(D)	(D)	(D)	(D)	$3,462	$4,856	$7,325
Box Elder County	(D)	(D)	$1,827	$1,789	$826	(D)	$882	(D)	$734
Cache County	(D)	(D)	(D)	(D)	$323	(D)	$240	$185	$151
Carbon County	(D)	(D)	(D)	(D)	$75,759	(D)	(D)	(D)	(D)
Daggett County	0	0	0	0	0	0	0	0	(D)
Duchesne County	$40,591	$35,839	$29,857	$36,698	$48,822	$80,047	$106,655	$141,844	$118,495
Emery County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Garfield County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Grand County	(D)	(D)	$4,503	$5,358	$6,190	(D)	(D)	(D)	(D)
Iron County	$1,759	(D)	(D)	(D)	(D)	$1,755	(D)	(D)	(D)
Juab County	(D)	(D)	(D)	(D)	(D)	$4,036	$5,130	$4,281	$2,915
Kane County	0	(D)	(D)	0	0	0	(D)	(D)	(D)
Morgan County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Piute County	0	0	0	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	0	0	0	(D)	(D)	(D)	(D)	$2,418	(D)
Sanpete County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	$7,998	$4,394
Sevier County	$22,260	$24,094	$23,277	$24,151	$22,982	$27,384	$30,685	$35,726	$34,764
Summit County	$3,807	$3,956	$4,195	$3,464	$4,127	$5,606	$7,303	$6,444	$5,513
Tooele County	$3,412	$5,987	$1,961	$1,967	$2,265	(D)	(D)	(D)	$4,392
Uintah County	$123,616	$105,818	$125,135	$150,928	$182,489	$266,558	$281,113	$298,638	$226,000
Wasatch County	(D)	(D)	(D)	(D)	(D)	$5,894	$5,454	$4,466	$3,951
Wayne County	0	0	0	0	0	0	0	0	(D)
Socioeconomic Study Area	**$197,145**	**$177,496**	**$190,756**	**$224,356**	**$343,784**	**$391,280**	**$440,924**	**$506,857**	**$408,636**
Farming									
Beaver County	$18,034	$21,932	$19,778	$21,279	$24,357	$24,040	$27,420	$25,232	$27,686
Box Elder County	$11,868	$12,275	$11,428	$12,732	$14,765	$14,926	$17,217	$16,024	$17,610
Cache County	$13,632	$14,509	$12,587	$13,282	$14,389	$13,843	$15,205	$14,177	$15,578
Carbon County	$506	$525	$494	$562	$643	$662	$752	$721	$796
Daggett County	$155	$162	$134	$129	$128	$115	$115	$107	$118
Duchesne County	$2,693	$3,004	$2,528	$2,600	$2,725	$2,556	$2,708	$2,552	$2,812
Emery County	$1,950	$2,258	$1,798	$1,733	$1,722	$1,503	$1,486	$1,395	$1,533
Garfield County	$1,612	$1,930	$1,733	$1,865	$2,112	$2,085	$2,346	$2,191	$2,410

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2001-2009 (thousands) (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Grand County	$464	$487	$478	$553	$658	$685	$803	$758	$834
Iron County	$11,855	$13,542	$11,491	$11,781	$12,616	$11,868	$12,820	$11,890	$13,056
Juab County	$1,809	$2,084	$1,952	$2,202	$2,546	$2,587	$2,992	$2,793	$3,071
Kane County	$464	$547	$479	$509	$560	$545	$603	$562	$618
Morgan County	$1,225	$1,104	$1,139	$1,384	$1,690	$1,801	$2,153	$2,015	$2,216
Piute County	$984	$1,091	$1,084	$1,279	$1,542	$1,618	$1,917	$1,790	$1,966
Rich County	$2,190	$2,297	$2,004	$2,114	$2,323	$2,243	$2,477	$2,313	$2,545
Sanpete County	$9,568	$10,607	$9,323	$9,892	$10,939	$10,632	$11,813	$11,007	$12,094
Sevier County	$5,500	$6,476	$5,391	$5,410	$5,696	$5,251	$5,563	$5,160	$5,669
Summit County	$2,078	$2,059	$2,025	$2,366	$2,830	$2,958	$3,475	$3,267	$3,596
Tooele County	$3,935	$4,470	$3,776	$3,847	$4,112	$3,852	$4,141	$3,850	$4,230
Uintah County	$1,918	$1,823	$1,928	$2,386	$2,949	$3,172	$3,823	$3,590	$3,951
Wasatch County	$558	$510	$556	$703	$872	$949	$1,145	$1,086	$1,196
Wayne County	$1,555	$1,753	$1,513	$1,569	$1,717	$1,640	$1,798	$1,677	$1,842
Socioeconomic Study Area	**$94,555**	**$105,444**	**$93,617**	**$100,179**	**$111,892**	**$109,532**	**$122,773**	**$114,157**	**$125,427**
Retail trade									
Beaver County	$4,963	$5,436	$5,320	$5,313	$5,320	$5,220	$5,815	$5,787	$6,259
Box Elder County	$41,278	$44,423	$45,325	$48,292	$47,976	$49,841	$53,784	$53,701	$50,249
Cache County	$110,430	$114,044	$117,655	$123,824	$128,124	$134,017	$136,911	$136,508	$135,436
Carbon County	$30,935	$32,950	$33,389	$30,717	$32,205	$33,919	$33,688	$33,726	$34,373
Daggett County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Duchesne County	$16,541	$15,252	$14,325	$15,200	$16,409	$19,704	$22,690	$23,057	$22,280
Emery County	$7,128	$7,045	$7,051	$7,796	$7,685	$8,070	$8,431	$8,903	$9,427
Garfield County	$2,831	$2,805	$3,065	$3,037	$3,212	$2,936	$3,001	$3,149	$3,368
Grand County	$15,843	$16,343	$16,961	$16,958	$17,601	$19,467	$20,371	$21,304	$20,756
Iron County	$49,124	$50,154	$51,827	$54,571	$59,678	$65,746	$66,879	$63,933	$61,088
Juab County	$6,560	$6,566	$6,576	$7,775	$8,544	$7,911	$7,319	$7,568	$7,303
Kane County	$6,510	$6,418	$6,641	$7,117	$8,555	$9,715	$8,360	$7,859	$7,408
Morgan County	$4,290	$4,508	$4,439	$5,146	$4,397	$4,257	$4,852	$4,850	$4,684
Piute County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	$1,176	$1,212	$1,037	$1,145	$1,015	$1,026	$1,136	$1,118	$1,462
Sanpete County	$18,545	$18,964	$19,261	$18,831	$18,490	$19,767	$22,480	$24,005	$24,034
Sevier County	$30,157	$30,854	$30,412	$35,021	$34,350	$35,533	$38,169	$38,625	$39,389
Summit County	$65,700	$68,602	$72,255	$75,326	$90,608	$105,177	$111,992	$112,059	$101,293

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2001-2009 (thousands) (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Tooele County	$37,134	$38,045	$40,475	$40,986	$40,875	$45,617	$48,695	$45,477	$45,700
Uintah County	$31,891	$32,411	$34,503	$35,930	$38,724	$42,830	$48,624	$54,183	$51,720
Wasatch County	$15,833	$16,800	$17,715	$18,998	$16,312	$19,283	$21,573	$22,541	$20,661
Wayne County	$1,767	$1,776	$1,592	$1,622	$1,756	$1,672	$1,689	$1,623	$1,795
Socioeconomic Study Area	**$498,634**	**$514,607**	**$529,824**	**$553,606**	**$581,834**	**$631,708**	**$666,458**	**$669,977**	**$648,682**
Accommodation and food services									
Beaver County	$16,195	$15,560	$16,336	$16,708	$17,373	$18,513	$19,482	$18,708	$18,442
Box Elder County	$33,753	$35,211	$36,066	$41,058	$40,195	$42,082	$45,383	$46,073	$46,964
Cache County	$9,408	$9,904	$8,866	$8,997	$8,918	$9,816	$10,192	$9,668	$10,073
Carbon County	$2,941	$2,463	$2,145	$2,040	$2,256	$2,068	$2,528	$2,209	$2,147
Daggett County	$3,686	(D)	$5,781	$6,083	$6,161	(D)	$6,915	$6,759	$6,021
Duchesne County	$2,604	$2,703	$3,108	$4,287	$4,331	$4,321	(D)	$4,303	$4,240
Emery County	$16,504	$14,783	$15,116	$17,021	(D)	$16,215	$19,065	$19,044	$16,697
Garfield County	$22,213	$23,369	$24,195	$23,799	$24,922	$26,055	$28,849	$29,744	$29,919
Grand County	$20,541	$19,105	$19,943	$21,414	$24,310	$23,905	$26,805	$25,286	$23,451
Iron County	(D)	(D)	(D)	(D)	(D)	(D)	$4,763	(D)	(D)
Juab County	$8,904	(D)	$9,927	$8,900	$9,265	$10,364	(D)	$18,819	$17,954
Kane County	$1,582	$1,259	$1,414	$1,439	$1,437	$1,586	$1,764	(D)	(D)
Morgan County	(D)	$263	$273	$346	$349	$552	$642	(D)	(D)
Piute County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Rich County	$3,732	$3,572	$3,866	$4,329	$3,837	$4,010	$4,227	$4,319	$4,518
Sanpete County	$9,017	$10,000	$10,701	$11,412	$11,200	$11,593	$12,514	$12,786	$11,833
Sevier County	$91,904	$92,693	$100,159	$103,795	$109,973	$118,241	$132,582	$161,664	$140,166
Summit County	$13,450	(D)	$16,070	$15,139	$16,788	$17,995	$18,610	$16,189	$15,415
Tooele County	$9,505	$9,106	$9,404	$10,879	$11,617	$12,883	$15,640	$18,280	$17,099
Uintah County	$18,125	$17,769	$16,884	$17,031	$17,882	$23,555	$29,459	$28,433	$21,645
Wasatch County	(D)	(D)	(D)	(D)	$2,492	$2,659	$3,005	$3,162	$3,074
Wayne County	$284,065	$257,761	$300,252	$314,678	$313,306	$346,412	$382,425	$425,446	$389,657
Socioeconomic Study Area	**$16,195**	**$15,560**	**$16,336**	**$16,708**	**$17,373**	**$18,513**	**$19,482**	**$18,708**	**$18,442**
Arts, entertainment, and recreation									
Beaver County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Box Elder County	$1,007	$1,022	$1,107	$1,174	$1,139	$1,356	$1,264	$1,379	$1,302
Cache County	$8,146	$9,660	$9,470	$9,578	$9,475	$9,919	$9,589	$9,693	$9,967
Carbon County	$1,029	$1,053	$1,019	$1,102	$1,264	$1,306	$1,277	$1,128	$1,283

Table T.6
Labor Earnings Trends by Select Industry Sector and County, 2001-2009 (thousands) (continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Daggett County	$708	$739	$840	$949	$1,033	$1,061	$1,094	$1,054	$1,049
Duchesne County	$90	(D)	$156	$60	(L)	(D)	$212	$257	$329
Emery County	$0	$0	$0	$0	$0	$0	(D)	$0	$0
Garfield County	$353	$2,251	$1,915	$1,846	(D)	$1,927	$2,116	$2,122	$2,059
Grand County	$4,582	$4,423	$4,794	$5,023	$5,248	$5,529	$6,228	$5,825	$5,741
Iron County	$4,297	$4,339	$4,464	$4,495	$4,302	$4,355	$4,972	$4,285	$4,070
Juab County	(D)	(D)	(D)	(D)	(D)	(D)	(L)	(D)	(D)
Kane County	$12,676	(D)	$11,531	$9,986	$9,148	$9,754	(D)	$1,787	$1,995
Morgan County	$421	$304	$283	$232	$200	$196	$274	(D)	(D)
Piute County	(D)	$0	$0	$0	$0	$0	$0	(D)	(D)
Rich County	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Sanpete County	$438	$474	$508	$502	$518	$528	$595	$663	$573
Sevier County	$587	$65	$107	$104	$176	$140	$130	$121	$136
Summit County	$85,027	$83,665	$84,541	$91,223	$97,252	$112,616	$123,074	$95,613	$90,025
Tooele County	$490	(D)	$710	$743	$1,309	$4,448	$5,710	$7,116	$7,845
Uintah County	$1,709	$1,056	$1,068	$882	$882	$734	$620	$337	$309
Wasatch County	$632	$1,025	$721	$1,700	$1,872	$2,235	$2,124	$2,410	$2,636
Wayne County	(D)	(D)	(D)	(D)	$66	$112	$136	$132	$151
Socioeconomic Study Area	**$122,193**	**$110,078**	**$123,234**	**$129,600**	**$133,883**	**$156,215**	**$159,417**	**$133,923**	**$129,469**

Values were converted to 2010 dollars using the Consumer Price Index (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.

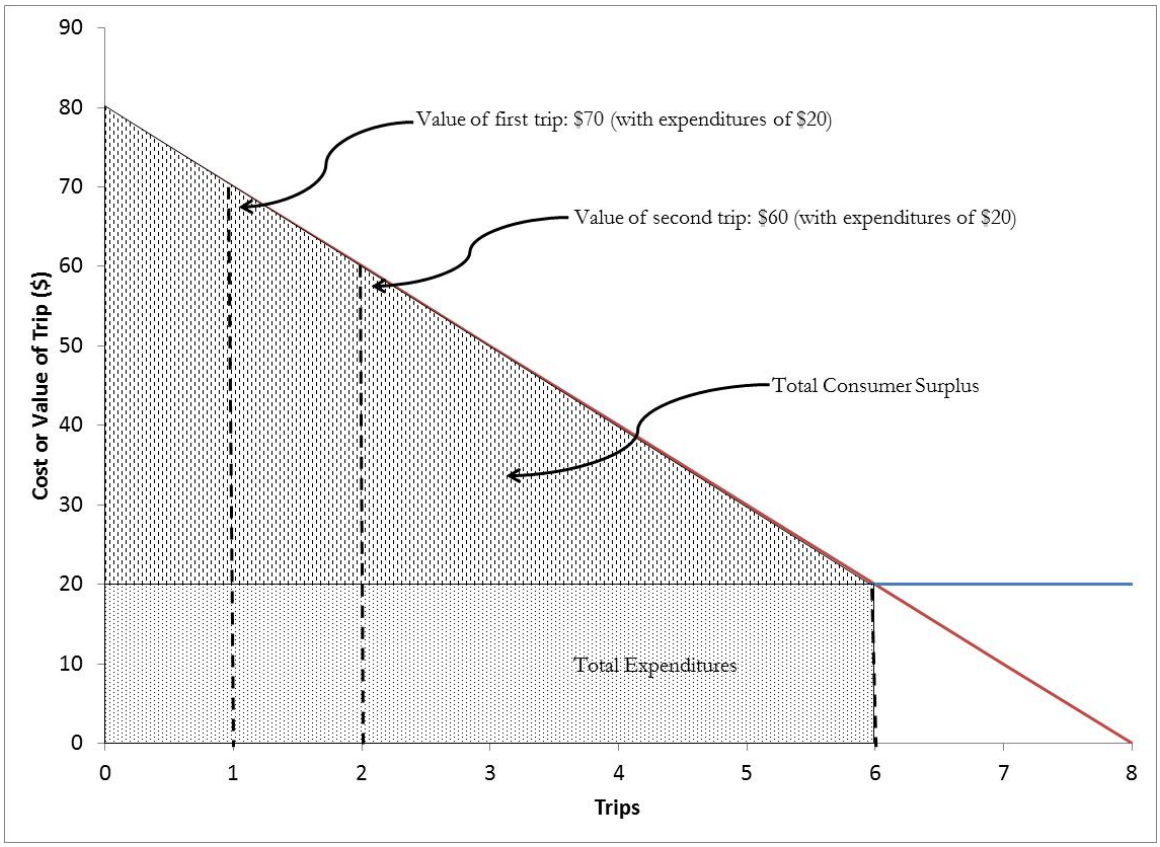
Figure U.1, Consumer Demand Curve and Consumer Surplus for Recreation Trips, provides an illustration of a demand curve for recreation on a particular site. In **Figure U.1**, the aggregate demand is shown on an average basis, that is, for an average individual consumer. The downward-sloping diagonal 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**, Consumer Demand Curve and Consumer Surplus for Recreation Trips, 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**, Consumer Surplus for Recreation Activities, 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**, Total Consumer Surplus for Recreation in Utah Sub-Region, 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**, Total Consumer Surplus for Recreation in Utah Sub-Region.

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**, Existing Estimates of Annual Total Economic Value of Protecting Habitat for Species Similar to GRSG, 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**, Existing Estimates of Annual Total Economic Value of Protecting Habitat for Species Similar to GRSG, 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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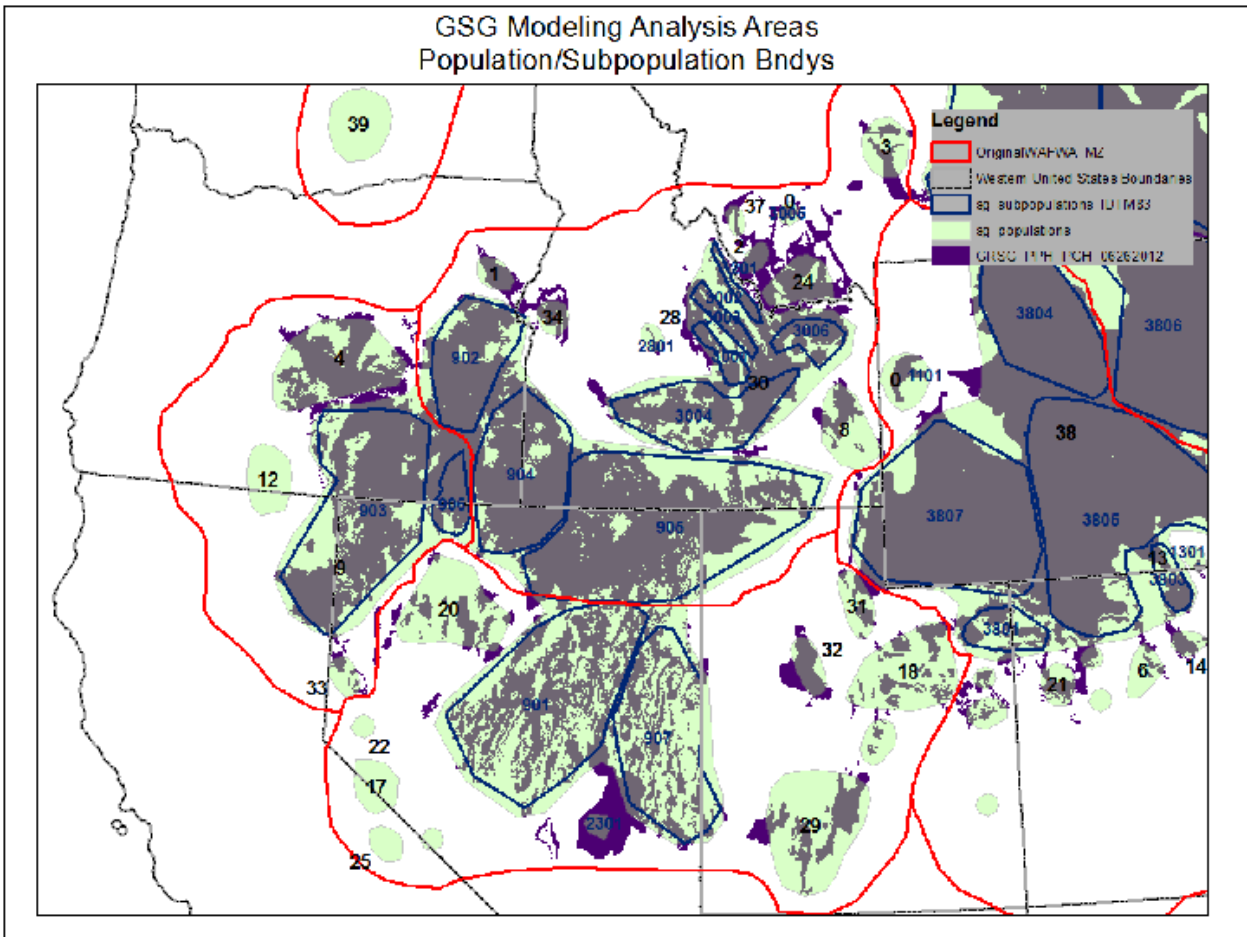
ATTACHMENT A – POPULATION AREA MAP



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 U.S. Forest Service 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 Utah BLM State Office has a precipitation GIS layer that breaks the landscape into 0-2, 2-4, 4-6, etc. inch breaks, which didn't 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

Table 4
Key to Models Used with LANDFIRE Data

13	EVT is one of the non-native types	14
13	EVT is not one of the non-native types	16
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

Table 4
Key to Models Used with LANDFIRE Data

29	BPS and/or dominated by any big sagebrush	Mtn-8
29	BPS and/or dominated by any low sagebrush	Low-7
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

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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

Low Sagebrush Types

- Colorado Plateau Mixed Low Sagebrush Shrubland
- Wyoming Basins Dwarf Sagebrush Shrubland and Steppe

[1] May be either big sagebrush or low sagebrush depending on Biophysical Setting determination
[2] Typically crested wheatgrass

- 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 **Chapter 4**, Environmental Consequences, **Section 4.22**, Social and Economic Impacts (Including Environmental Justice). 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. 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.

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 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. **Section 4.22** 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	Alternative C1	Alternative C2	Alternative A, B, D and E	Alternative C1	Alternative C2
Cedar City FO	139,816	66,229	110,381	95,643	45,039	75,401
Fillmore FO	256,674	229,493	245,802	165,696	141,354	155,959
GSENM	76,816	74,896	76,048	30,153	28,639	29,547
Kanab FO	18,686	9,695	15,090	5,937	681	3,834
Moab FO	89,648	89,648	89,648	53,981	53,981	53,981
Price FO	100,375	87,530	95,237	59,536	53,213	57,007
Richfield FO	98,462	83,032	92,290	79,760	68,598	75,295
Salt Lake FO	176,398	78,370	137,187	153,381	72,706	121,111
Vernal FO	127,839	36,150	91,163	75,407	25,602	55,485
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	983,723	489,813	786,159

Sources: Calculated based on data from BLM 2012a and Forest Service 2013. Billed AUMs for Forest Service are a 10-year average and, for this reason, may be higher than Active AUMs in 2011.

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**, Assumptions for Analysis of Impacts on Output for Livestock Grazing, 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.3, Assumptions for Analysis of Employment Impacts for Livestock Grazing, provides a summary of the employment impacts that would result, according to IMPLAN, based on unit changes in livestock AUMs.

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
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

Table W.3
Assumptions for Analysis of Employment Impacts for Livestock Grazing

Employment Impact	Primary Study Area	Primary and Secondary Study Area
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).

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 priority habitat and would be closed to new fluid mineral leasing
- Alternative C – All GRSG occupied habitat would be designated as priority habitat and would be closed to new fluid mineral leasing
- Alternative D – Some GRSG occupied habitat would be designated as priority habitat but would not be closed to new leasing. Rather, NSO would be placed within 4-miles of an occupied lek
- Alternative E – Based on the State of Utah's Sage-Grouse Management Plan, minor constraints would be placed on management areas.

Only wells in new leases were considered to be affected by GRSG management. 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, Oil and Gas Well Numbers, presents the total number of wells drilled and completed in the Primary Socioeconomic Study Area for each alternative.

Table W.4
Oil and Gas Well Numbers in New Leases in GRSG Habitat, 15-Year Period

Item	Primary Study Area
Federal Surface	
Alternative A – Wells Drilled	268
Alternative A – Wells Completed	207
Alternative B – Wells Drilled	157
Alternative B – Wells Completed	125
Alternative C – Wells Drilled	0
Alternative C – Wells Completed	0
Alternative D – Wells Drilled	204
Alternative D – Wells Completed	156
Alternative E – Wells Drilled	268
Alternative E – Wells Completed	207
Federal, State, and Fee Surface	
Alternative A – Wells Drilled	356
Alternative A – Wells Completed	276
Alternative B – Wells Drilled	216
Alternative B – Wells Completed	173
Alternative C – Wells Drilled	0
Alternative C – Wells Completed	0
Alternative D – Wells Drilled	271
Alternative D – Wells Completed	207
Alternative E – Wells Drilled	356
Alternative E – Wells Completed	276

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information

The production per new well was assumed based on the typical production of existing wells in the area. 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. Total oil and gas production under Alternative A was based on multiplying production per well and the number of wells drilled and completed (estimated as described above). 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. **Table W.5**, Projected Oil and Gas Production, 15-Year Period, presents the projected quantity of oil and gas over the 15-year forecast period on federal surface and on federal, state, and fee surface.

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, a mid-point in the $1,500,000 to $5,000,000 range typical for the region (BLM 2013a). 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. **Table W.6**, Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion, provides a summary of the costs of drilling and completion used for the economic analysis.

Table W.5
Projected Oil (MBO) and Gas (MMCF) Production in New Leases in GRSG Habitat, 15-Year Period

Alternative A		Alternative B		Alternative C		Alternative D		Alternative E	
Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil
Federal Surface									
189,759	5,250	111,428	3,600	0	0	143,422	3,900	189,759	5,250
Federal, State, and Fee Surface									
234,992	9,450	134,597	7,650	0	0	177,623	6,900	234,992	9,450

Sources: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information (BLM 2013a).
MMCF = million cubic feet; MBO = thousand barrels

Table W.6
Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion

Economic Impact	Primary Study Area	Primary and Secondary Study Area
Drilling Impacts		
Total Drilling Costs[1]	$1,581,225	$1,581,225
Total Local Drilling Costs[2]	$1,387,397	$1,387,397
Local Direct Impact ($/well)	$1,387,397	$1,387,397
Local Indirect Impact ($/well)	$288,595	$462,057
Local Induced Impact ($/well)	$308,692	$418,811
Local Total Impact ($/well)[3]	$1,984,684	$2,268,265
Multiplier (total impact/direct impact)	1.43	1.63
Completion Impacts		
Total Completion Costs[1]	$1,668,775	$1,668,775
Total Local Completion Costs[2]	$1,014,729	$1,014,729
Local Direct Impact ($/well)	$1,014,729	$1,014,729
Local Indirect Impact ($/well)	$244,048	$376,782
Local Induced Impact ($/well)	$231,683	$314,021
Local Total Impact ($/well)[3]	$1,490,460	$1,075,532
Multiplier (total impact/direct impact)	1.47	1.68

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. Remaining data is from IMPLAN, as described in the text.
[1]Conventional wells. In the case of coalbed natural gas wells, a drilling cost of $503,431 (local cost of $420,075) was assumed. Completion costs for coalbed natural gas wells were assumed to be $996,569 (local cost of $542,101). Coalbed natural gas costs correspond to the lower end of the range provided by BLM (2013), based on the notion that coalbed natural gas wells are typically cheaper than conventional wells.
[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 on Output for Oil and Gas Production, 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. **Table W.8**, Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion, shows the direct and total employment impacts attributable to drilling and completion.

Table W.9, Assumptions for Employment Impact Analysis for Oil and Gas Production, shows the direct and total employment impacts associated with production.

Table W.7
Assumptions for Analysis of Economic Impacts on Output for Oil and Gas Production

Economic Impact	Primary Study Area	Primary and Secondary Study Area
Oil Production (per thousand barrels)		
Direct Economic Impact[1]	$82,530[2]	$82,530[3]
Indirect Economic Impact[4]	$8,309	$12,123
Induced Economic Impact[5]	$2,924	$4,573
Total Economic Impact	$93,763	$99,226
Multiplier (total impact/direct impact)	1.14	1.20
Gas Production (per million cubic feet)		
Direct Economic Impact[1]	$4,230.00	$4,230.00
Indirect Economic Impact[4]	$425.87	$621.35
Induced Economic Impact[5]	$149.89	$234.40
Total Economic Impact	$4,805.75	$5.085.75
Multiplier (total impact/direct impact)	1.14	1.20

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.

Table W.8
Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion[1]

Employment Impact	Primary Study Area	Primary and Secondary Study Area
Drilling Impacts		
Direct Employment (jobs/well)	8.0	8.0
Indirect Employment (jobs/well)	2.5	3.4
Induced Employment (jobs/well)	3.0	3.8
Total Employment Impact (jobs/well)	13.5	15.2
Multiplier (Total Impact/Direct Impact)	1.69	1.90
Average Earnings per Job (2011 dollars)	$51,377	$51,337
Completion Impacts		
Direct Employment (jobs/well)	6.3	6.3
Indirect Employment (jobs/well)	2.1	2.8
Induced Employment (jobs/well)	2.2	2.8
Total Employment Impact (jobs/well)	10.6	11.9
Multiplier (Total Impact/Direct Impact)	1.68	1.89
Average Earnings per Job (2011 dollars)	$49,031	$49,108

Note: Direct and total employment impact and average earnings per job are calculated using IMPLAN.
[1]Conventional wells. Multipliers for coalbed natural gas wells are considerably smaller: 4.3 total jobs per well drilled in the primary study area and 5.3 jobs per well completed.

Table W.9
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
Oil Production (per thousand barrels)		
Direct Employment	0.028968	0.028968
Indirect Employment	0.067014	0.087647
Induced Employment	0.027978	0.040935
Total Employment	0.123960	0.157550
Multiplier (Total Impact/Direct Impact)	4.28	5.44
Average Earnings per Job (2011 dollars)	$52,485	$52,242
Gas Production (per million cubic feet)		
Direct Employment	0.001485	0.001485
Indirect Employment	0.003435	0.004492
Induced Employment	0.001434	0.002098
Total Employment	0.006353	0.008075
Multiplier (Total Impact/Direct Impact)	4.28	5.44
Average Earnings per Job (2011 dollars)	$52,485	$52,242

Note: Direct, indirect, and induced employment impact and average earnings per job are calculated using IMPLAN.

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.[1] **Table W.10**, Tax Collections from Oil and Gas Production, Annual Average, 2011 $ shows tax collections for the annual average production under each alternative.

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 the State of Utah to 2028 based on information from the US Energy Information Administration (EIA) and the Utah Geological Survey (BLM 2013; Utah Geological Survey 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
- New coal leases would be required for underground coal production from 2017 onwards
- BLM made the assumption for analysis purposes only that no new subsurface 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 subsurface materials.
- 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). 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.

[1] 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.10
Tax Collections from Oil (MBO) and Gas (MMCF) Production, 15 Year Period, 2011 $

	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E	
	Gas	Oil	Gas	Gas	Gas	Oil	Gas	Oil	Gas	Oil
Total production	189,759	5,250	$111,428.25	$3,600	0	0	143,423	3,900	189,759	5,250
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	$702,345,499	$379,122,188	$412,423,810	$259,969,500	$0	$0	$530,842,528	$281,633,625	$702,345,499	$379,122,188
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	$87,793,187	$47,390,273	$51,552,976	$32,496,188	$0	$0	$66,355,316	$35,204,203	$87,793,187	$47,390,273
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	$35,117,275	$18,956,109	$20,621,191	$12,998,475	$0	$0	$26,542,126	$14,081,681	$35,117,275	$18,956,109
Total taxes	$122,910,462	$66,346,383	$72,174,167	$45,494,663	$0	$0	$92,897,442	$49,285,884	$122,910,462	$66,346,383

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

The estimated annual average volume of coal produced on federal lands under each alternative is presented in **Table W.11** below.

Table W.11
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

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.12 and **Table W.13** show the multipliers for output and employment, respectively, estimated for coal.

Table W.12
Assumptions for Analysis of Impacts on Output for Coal

Economic Impact	Primary Study Area	Primary and Secondary Study Area
Underground		
Direct Economic Impact ($/MT)	$33,800	$33,800
Indirect Economic Impact ($/MT)[1]	$8,147	$15,218
Induced Economic Impact ($/MT)[2]	$5,305	$8,258
Total Economic Impact ($/MT)	$47,251	$57,276
Multiplier (Total Impact/Direct Impact)	1.40	1.69
Surface		
Direct Economic Impact ($/MT)	$23,680	$23,680
Indirect Economic Impact ($/MT)[1]	$5,149	$7,886
Induced Economic Impact ($/MT)[2]	$3,018	$4,357
Total Economic Impact ($/MT)	$31,847	$35,923
Multiplier (Total Impact/Direct Impact)	1.34	1.52

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.

Table W.13
Assumptions for Analysis of Impacts on Employment for Coal

Employment Impact	Primary Study Area	Primary and Secondary Study Area
Underground		
Direct Employment (jobs/MT)	0.089502	0.089502
Indirect Employment (jobs/MT)	0.048266	0.079295
Induced Employment (jobs/MT)	0.050768	0.073988
Total Employment Impact (jobs/MT)	0.188536	0.242785
Multiplier (Total Impact/Direct Impact)	2.11	2.71
Average Earnings per Job (2011 dollars)	$63,113	$61,601
Surface		
Direct Employment (jobs/MT)	0.044862	0.044862
Indirect Employment (jobs/MT)	0.026481	0.038363
Induced Employment (jobs/MT)	0.028898	0.039331
Total Employment Impact (jobs/MT)	0.100241	0.122556
Multiplier (Total Impact/Direct Impact)	2.23	2.73
Average Earnings per Job (2011 dollars)	$65,666	$63,715

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.

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.14**, Estimated Coal Royalties in Primary Study Area, 15-Year Period shows royalties collections for the estimated production under each alternative.

Table W.14
Estimated Coal Royalties in Primary Study Area, 15-Year Period

	Alternatives A, D and E			Alternative B			Alternative C		
	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
Output (2011 $000)	$516,857	$37,762	$554,619	$444,497	$0	$444,497	$408,317	$0	$408,317
Royalties (%)	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

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) 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.

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.

Tables W.15 and W.16 below show the estimated multipliers for output and employment during installation and operations.

Table W.15
Assumptions for Analysis of Impacts on Output for Wind Energy

Economic Impact	Primary Study Area	Primary and Secondary Study Area
	Installation	
Direct Economic Impact ($/MW)	$303,774	$303,774
Indirect Economic Impact ($/MW)[1]	$53,862	$94,884
Induced Economic Impact ($/MW)[2]	$46,892	$67,484
Total Economic Impact ($/MW)	$404,527	$466,142
Multiplier (Total Impact/Direct Impact)	1.33	1.53
	Operations	
Direct Economic Impact ($/MW)	$17,176	$17,176
Indirect Economic Impact ($/MW)[1]	$572	$845
Induced Economic Impact ($/MW)[2]	$5,390	$6,664
Total Economic Impact ($/MW)	$23,138	$24,685
Multiplier (Total Impact/Direct Impact)	1.35	1.44

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.16
Assumptions for Analysis of Impacts on Employment for Wind Energy

Employment Impact	Primary Study Area	Primary and Secondary Study Area
	Installation	
Direct Employment (jobs/MW)	1.77	1.77
Indirect Employment (jobs/MW)	0.37	0.57
Induced Employment (jobs/MW)	0.45	0.61
Total Employment Impact (jobs/MW)	2.58	2.94
Multiplier (Total Impact/Direct Impact)	1.46	1.67
Average Earnings per Job (2011 dollars)	$40,834	$42,141
	Operations	
Direct Employment (jobs/MW)	0.24	0.24
Indirect Employment (jobs/MW)	0.01	0.01
Induced Employment (jobs/MW)	0.05	0.06
Total Employment Impact (jobs/MW)	0.29	0.30
Multiplier (Total Impact/Direct Impact)	1.24	1.28
Average Earnings per Job (2011 dollars)	$41,985	$42,157

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.

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