APPENDIX M—FOREST SERVICE BIOLOGICAL EVALUATION AND MANAGEMENT INDICATOR SPECIES REPORT

Forest Service Biological Evaluation

for the

Greater Sage-Grouse Conservation Effort to Amend the Bridger-Teton and Medicine Bow National Forest Plans and the Thunder Basin National Grassland Management Plan

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Acronyms

BA	biological assessment
BE	biological evaluation
BT	Bridger-Teton National Forest
BLM	Bureau of Land Management
COA	condition of approval
COT	Conservation Objectives Team
DDTC	Density Disturbance Calculation Tool
ESA	Endangered Species Act
FEIS	final environmental impact statement
Forest Service	United States Department of Agriculture National Forest Service
FSM	Forest Service Manual
GA	geographic area
GH or PGH	general habitat
GHMA	general habitat management areas
GRSG	Greater Sage-Grouse
IM	Instruction Memorandum
LRMP	land and resource management plan
LUP	land use plan
MB	Medicine Bow
MIS	Management Indicator Species
NFMA	National Forest Management Act
NTT	National Technical Team
PH or PPH	priority habitat
PHMA	priority habitat management areas
ROW	right-of-way
SFA	sagebrush focal areas
SIA	Special Interest Area
SUA	special use authorization

T&Cs	terms and conditions
USFWS	United States Fish and Wildlife Service
WGFD	Wyoming Game and Fish Department

I. INTRODUCTION

The purpose of this biological evaluation (BE) is to identify the likely effects of the Greater Sage-Grouse (GRSG; *Centrocercus urophasianus*) land management planning decision for Regional Forester-listed sensitive species on the following:

- Bridger-Teton National Forest (BT) in Forest Service Intermountain Region (Region 4)
- Medicine Bow National Forest (MB; Region 2)
- Thunder Basin National Grassland (TBNG) in the Rocky Mountain Region (R2)

Regional Forester lists of sensitive species can include: plants, birds, mammals, amphibians, reptiles, fish, and invertebrates.

This BE addresses sensitive species that meet the following criteria:

1) Species that are known to occur on the units based on confirmed sightings
2) Species that may occur on the units based on reliable unconfirmed sightings
3) Species that may occur on the units based on the presence of potential habitat

Forest Service Policy—The 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 BEs for proposed Forest Service programs or activities are as follows:

1) To ensure that Forest Service actions do not contribute to the loss of viability of any native or desired nonnative plant or contribute to animal species or trends toward federal listing as sensitive by Forest Service R2
2) To comply with the requirements of the Endangered Species Act (ESA) that actions of federal agencies 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
4) To enhance opportunities for mitigation

A separate biological assessment (BA) will analyze impacts of the Alternatives on threatened, endangered, and proposed species and meet items 2 and 3 directly above.

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 ESA.

Forest Service Interim Recommendations—On October 9, 2012, the Forest Service Washington Office issued Interim Conservation Recommendations for the Greater Sage-Grouse and Greater Sage-Grouse Habitat (a supplement to the Forest Service GRSG recommendations issued July 1, 2010). This interim direction promotes conservation of sustainable GRSG populations and their habitats and applies to proposed Forest Service actions in all identified GRSG habitats.

The recommendations incorporate the following principles to protect and conserve GRSG habitat:

- Protect remaining unfragmented habitats
- Minimize further loss of fragmented habitat
- Enhance and restore habitat conditions to meet GRSG life history needs

These recommendations apply to 20 Forest Service units involved in the current land and resource management plan (LRMP) amendment process for GRSG management. They are applicable until interim directives from the Forest Service are adopted or until the amendment for the LRMP unit is completed. This document evaluates these LRMP amendments on the BT, the MB, and the TBNGTBNG. It does not include the interim recommendations since they will be terminated with the completion of these amendments.

II. PROJECT HISTORY

GRSG has emerged as a significant conservation concern over the last 10 years. It is a candidate for listing under the ESA due to the United States Fish and Wildlife Service (USFWS) determination in 2010 that listing was "warranted, but precluded due to higher priorities" (75 FR 13910 [March 23, 2010]). The two primary factors that warranted the species to be listed as threatened the large-scale loss and fragmentation of habitats across the species range and a lack of regulatory mechanisms to ensure its conservation.

The primary threats to GRSG habitat are summarized in the listing decision (*Federal Register* 75[55]: 13910-14014). The two dominant threats are infrastructure associated with energy development in the eastern portion of the species range and conversion of sagebrush

communities to annual grasslands from large uncharacteristic wildfires in the western portion of the species range.

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

In 2011 and 2012, the USFWS submitted letters to the BLM and Forest Service recommending the agencies amend land use plans (LUPs) to provide adequate regulatory mechanisms to conserve GRSG. Originally, this recommendation identified 10 National Forests viewed as high priority to ensure appropriate regulatory mechanisms. Following scoping and discussion, the Forest Service added 10 Forest Plans that would be considered for amendment. The Forest Service and BLM are participating in several joint environmental impact statements (EISs) to develop records of decision to amend LUPs, including LRMPs.

Since half of all GRSG habitat occurs on BLM-administered lands, the BLM is leading the effort to amend or revise LUPs, with the Forest Service as a cooperating agency. Together, they will provide direction to conserve and protect GRSG habitat and to assure the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species. The two agencies will complete EISs for the following 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 Forest Service is participating in six of these EISs (excluding eastern Montana/the 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)

This report supports the Wyoming 9-Plan Final EIS (FEIS). The Forest Service will amend the BT, MB, and TBNG LRMPs for the GRSG.

III. PURPOSE AND NEED

The purpose of the LRMP amendment for the GRSG is to identify and incorporate appropriate conservation measures to conserve, enhance, or restore GRSG habitat by reducing, eliminating, and 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's finding on the petition to list the GRSG. The USFWS identified conservation measures in Forest Service LRMPs (as well as BLM resource management plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the LRMP amendment focuses on areas

affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

IV. DESCRIPTION OF THE ALTERNATIVES

The BLM and Forest Service developed a range of alternatives specifically structured to identify and incorporate measures into LUPs to conserve, enhance, or restore GRSG habitat by reducing, eliminating, and minimizing threats to that habitat. Five alternatives are considered in this analysis: Alternative A, the No Action alternative, and four action alternatives. The action alternatives are based on national GRSG policy, public comments, Wyoming statewide GRSG management, the Conservation Objectives Team (COT) Report, and the National Technical Team (NTT) Conservation Measures Report (Instruction Memorandum [IM]-2012-044). The alternatives establish a framework for analyzing impacts from management decisions. The alternatives represent approaches to managing GRSG habitat and activities consistent with law, regulation, and policy. These are summarized below with a more detailed description to follow. For the full matrix of the Alternatives, see Chapter 2 of the FEIS.

Alternative A, the No Action Alternative, reflects current management direction contained in the Forest Service LRMP that is associated with the protection of GRSG and its habitat. Alternative B is based on the conservation measures developed by the NTT in IM-2012-044. Alternative C is based on the citizen groups recommended alternative which emphasizes improving and protecting habitat for GRSG and is applied to all occupied GRSG habitat. Alternative D provides opportunities to use and develop the planning area while protecting GRSG habitat based on scoping comments and input from agencies involved in the Alternatives development process. The final alternative, the Forest Service Proposed Plan Amendment is the preferred alternative (Proposed Plan Amendment) and incorporates the guidance from Forest Service interim direction, BLM IM WY-2010-012, the Wyoming Governor's Executive Order (WY EO 2011-05), and additional management based on the NTT's recommendations.

A brief description of each Alternative is provided below. For a full description, as well as project design criteria, mitigation, and monitoring requirements, please refer to Chapter 2 of the EIS.

One key difference among the Alternatives is the type of designated habitat applicable to each. Designated GRSG habitat is divided into main categories—core, connectivity, and general habitat—and for the Proposed Plan Amendment—sagebrush focal areas (SFAs). Core habitat is defined as areas that have the highest conservation value to maintain sustainable GRSG populations. These areas are breeding, nesting, brood-rearing, and winter concentration areas. General habitat is defined as areas of occupied seasonal or year-round habitat outside of core habitat. Connectivity habitat is important GRSG habitat that links core area habitats. Sagebrush focal areas (Proposed Plan Amendment) are the most important breeding and nesting habitat.

Alternative A: No-Action

Alternative A continues present management within each BLM and Forest Service unit. Ongoing programs initiated under existing legislation, regulations, and the LUPs would continue, even as new plans are developed or new planning is being conducted for the planning area. Alternative A describes current resource and land use management direction that is proposed to be revised or supplemented by some or all of the action alternatives. This management differs at times between BLM and Forest Service offices. Alternative A represents the baseline to which the other alternatives and their associated analyses and impacts are compared. Alternative A uses the terms "greater sage-grouse core habitat" (or "core areas"), as described in the Wyoming Governor's Executive Order 2011-5 (WY EO 2011-5); these terms are defined in this document's glossary as habitat that is most important for GRSG. Management actions proposed under Alternative A are presented in Tables 2-1, 2-5 (land use restrictions), 2-6, and 2-7 (oil and gas leasing stipulations).

Alternative B:

Alternative B is based on conservation measures developed by the NTT in the BLM IM WO-2012-044. As directed in the IM, all BLM state and field offices that contain occupied GRSG habitat must analyze the conservation measures developed by the NTT through the land use planning process and the National Environmental Policy Act (NEPA). Under this alternative, a land surface disturbance cap of up to 3 percent per 640 acres will be considered in GRSG PHMA (PHMA). In areas where the disturbance cap has been reached, the BLM/Forest Service will consider opportunities for reclaiming or removing surface-disturbing features that are no longer in use; this would be done to reduce the current disturbance before further projects are permitted. This alternative considers incorporating a light grazing strategy. It calls for using a 20 to 30 percent forage allocation for livestock allotments not meeting standards due to livestock grazing in GRSG. Alternative B uses the term "GRSG PH" and general habitat (GH), as described in BLM IM WO-2012-044 and defined in this document's glossary is combined core habitat and connectivity habitat. Management actions proposed under Alternative B are presented in Tables 2-1, 2-5 (land use restrictions), 2-6, and 2-7 (oil and gas leasing stipulations). Alternative B is not strictly based on the conservation measures developed by the NTT.

Alternative C:

Alternative C emphasizes improvement and protection of all occupied GRSG habitat. It limits commodity development in occupied GRSG habitat and would close or designate portions of the planning area to some land uses. A surface disturbance cap of 3 percent per 640 acres is considered within GRSG PH. This alternative considers closing GRSG PHMA to livestock grazing. Alternative C uses the term GRSG PHMA and GH, as described in BLM IM WO-2012-044 and defined in this document's glossary. PHMA is the combination of core habitat and connectivity habitat. Management actions proposed under Alternative C are presented in Tables 2-1, 2-5 (land use restrictions), 2-6, and 2-7 (oil and gas leasing stipulations).

Alternative D:

Alternative D provides opportunities to use and develop the planning area while protecting GRSG habitat. It is based on scoping comments and input from cooperating agencies involved in developing the alternatives. This alternative increases the potential for development and resource use and reduces GRSG habitat protections; protective measures would be applied to GRSG habitat. Under this alternative, a surface disturbance cap of 9 percent per 640 acres is considered within GRSG priority core habitat. Alternative D uses the terms GRSG core habitat or core areas and GH, as described in WY EO 2011-5 and defined in this document's glossary. Management actions proposed under Alternative D are presented in Tables 2-1, 2-5 (land use restrictions), 2-6, and 2-7 (oil and gas leasing stipulations).

Proposed Amendment (Selected Alternative):

The Proposed Plan Amendment incorporates the guidance from the Forest Service Interim Direction, BLM Interim Direction (IM WY-2010-012), the Wyoming Governor's Executive Order (WY EO 2011-05), the USFWS's COT report and the NTT's recommendations. This alternative emphasizes managing GRSG seasonal habitats and maintaining habitat connectivity to support population objectives set by the Wyoming Game and Fish Department (WGFD). This guidance is consistent with guidelines provided in the Governor's Sage-Grouse Implementation Team's Core Population Area strategy and the Governor's Executive Order (WY EO 2011-05).

In the Forest Service proposed plan amendment, three management areas are described: PHMA, SFAs, and general habitat management areas (GHMA). The Proposed Plan Amendment differs from Alternatives A through D in the distribution of land in these management areas on National Forest System (Forest Service) lands. Approximately 145,486 acres of habitat managed as general habitat under Alternatives A through D are proposed to be managed as core habitat (83,263 acres) or connectivity habitat (62,223 acres) in the Proposed Plan Amendment. The management described in Table 2.1 for core and connectivity management areas includes these "proposed core" and "proposed connectivity" management areas. Maps 2-8, 2-13, 2-18, 2-27 23, 2-28, and 2-33 display the locations of core, proposed core, connectivity, proposed connectivity, and GHMA for the Proposed Amendment. Specific acres of other land use restrictions by Alternative, including the proposed plan, are presented in Appendix 1 of this document.

Under the Proposed Amendment Alternative, a surface disturbance cap of 5 percent per 640 acres is considered within GRSG PHMA and SFA. Management actions proposed under the Proposed Plan Amendment are presented in Tables 2-1, 2-8 (land use restrictions), 2-9, and 2-10 (oil and gas leasing stipulations). The acres of land use restrictions by Alternative are presented in Appendix 1 of this document.

V. ANALYSIS AREA

The analysis areas consist of the BT National Forest, MB National Forest, and TB National Grassland that have been identified as GRSG habitat. Table 1 identifies the amount of GRSG

core, general, and connectivity habitat by management unit. The amount of GRSG habitat varies considerably among the units.

Table 1. Existing GRSG Habitat by Management Unit (Acres) (Percent of Total Acres).

Management Unit	Total Unit Area	Priority Core Habitat	Priority Connectivity Habitat	General Habitat
Bridger-Teton	3,400,000	5,933 (1.7)	0	324,243 (9.5)
Medicine Bow	1,262,325	5,019 (0.4)	0	22635 (1.8)
Thunder Basin	553,864	217,768 (39.2)	6,356	336,096 (60.7)

VI. SPECIES CONSIDERED IN THE ANALYSIS

THREATENED, ENDANGERED, PROPOSED AND CANDIDATE SPECIES

A BA has been prepared on the selected Alternative developed for the Record of Decision (ROD) included with the FEIS for this project. The BA conforms to the legal requirements set forth under section 7 of the ESA (19 US Code 1536 (c), 50 CFR 402.12 (f) and 402.14). Section 7(a) (1) of the ESA requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a) (2) requires that federal agencies ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of federally-listed species, destroy, or adversely modify designated critical habitat. A BA must be prepared to evaluate the potential effects of the proposal on listed or proposed species for federal actions. The contents of the BA are at the discretion of the federal agency and will depend on the nature of the federal action (50 CFR 402.12(f)).

Species identified by the USFWS as ‘candidate’ species have no ESA protections except Forest Service policy. They are designated as Regional Forester ‘sensitive species’ and afforded special management attention by the Forest Service. They are analyzed in this BE for the FEIS and discussed in the sensitive species section of this report if they occur on one of the Forest Service units.

FOREST SERVICE SENSITIVE SPECIES

The R2 and 4 sensitive species lists are composed of: plants, birds, mammals, amphibians, fish, and invertebrates identified for each Region. Staff conducted a review for sensitive species that may occur or be affected by activities associated with the Planning EIS and subsequent plan amendments for the GRSG. Information on existing occurrences as well as known or potential habitat was reviewed. Sources of information contained in this database include Forest Service records and files, the Wyoming Natural Diversity Database, Wyoming Game and Fish Department information, and published research.

The Forest Service, R2 Threatened, Endangered, and Sensitive Species Program has developed a Technical Conservation Assessment program to assist Forest Service wildlife biologists and others in conducting project impact analysis on many of R2 Sensitive Species. These Assessments produced by the Rocky Mountain Region's (R2) Species Conservation Project are intended to serve a variety of purposes. Ultimately, they are a component of a broad science platform being developed to reshape planning and management of national forests into one that is strategic in nature and founded on scientific knowledge of sound ecosystem principles. Species Conservation Assessments are intended to stand alone as premier conservation resources for approximately 225 species. They also provide input to a process that synthetically marries ecological processes and conditions with the needs of species to lay a foundation for ecologically-based forest management. (R2 Species Conservation Assessment Project website-project background).

Where available these assessments are the first source and primary reference for this analysis. Due to their size they will not be restated completely in this analysis, but they have been used extensively. They can be found at: http://www.fs.fed.us/r2/projects/scp/assessments.

Table 3 is a list of R2 and Region 4 (R4) Forest Service sensitive species. Threatened, endangered, and proposed species are addressed separately in the BA prepared for this project. All of the species in Table 2 were considered for this analysis and they were compared to the five criteria listed below. The criteria was 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 3:

1. Analysis area is outside the 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; however, no affiliation or dependence on these habitat(s) has been shown.
5. The associated conservation design or mitigations eliminate any potential for impact on the species.

Species in Table 3 that are likely to occur within or near the analysis area or within potential habitat in or near the analysis area and may be affected negatively or positively, directly, indirectly and/or cumulatively by implementation of an action Alternative if it would be carried forward into Table 4, a more detailed analysis of the project effects would be subsequently be conducted.

The Analysis of the Management Situation for this GRSG amendment originally evaluated a number of species for consideration in the analysis process. Subsequent review of the

Alternatives indicates that several of these species originally thought to be affected will not experience effects on their primary habitat or populations. No Alternative is expected to impact any identified limiting factors for these species or their life requirements. Based on these factors, the following species will not be analyzed in greater detail:

- Birds: peregrine falcon
- Fish: lake chub, Plains minnow, Northern redbelly dace, Southern redbelly dace, finescale dace, flathead chub
- Amphibians: Columbia spotted frog, boreal chorus frog, and Northern leopard frog

Habitat for several species overlapped with GRSG habitat on some planning units but not on other planning units. For example, habitat for Rocky Mountain bighorn sheep overlapped with GRSG habitat on the MB in FS Region 2 but not on the BT in FS Region 4 (Moreno 2012). Therefore, Rocky Mountain bighorn sheep was analyzed only as a Region 2 Sensitive Species. Similarly, spotted bat and Townsend's big-eared bat habitats overlap with GRSG habitat on the MB and TBNG but not the BT (Moreno 2012).

Table 3. Forest Service Regions 2 and 4 sensitive species occurring or potentially occurring on the BT, MB, or TBNGTBNG that may be influenced by an action Alternative and further analyzed in this document.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Forest Service Regions 2 and 4 Sensitive Species				
MAMMALS (13)				
Bighorn Sheep *Ovis canadensis*	High elevation alpine habitats with steep escape terrain adjacent to open foraging areas during summer. Habitat overlap on MB. There is no habitat association with sage-grouse on the BT (Moreno 2012).	Y		See detailed analysis below
Fisher *Martes pennanti*	Extensive, mature to old-growth spruce-fir forests with high levels of canopy closure on BT.	N	2	No impact
American marten *Martes americana*	SF and LPP	N	2	No impact
Spotted Bat *Euderma maculatum*	Desert scrub to coniferous forest most often in low deserts and juniper woodlands. Forages over meadows, along forest edges, or in open coniferous woodlands. Habitat overlap on MB and TBNG. Habitats are not known to occur within the project area, and there is little potential for habitat associations with sage-grouse on the BT (Moreno 2012).	Y		See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Townsend's Western Big-eared Bat *Corynorhinus townsendii*	Strongly correlated with the availability of caves and abandoned mines for roosts. Habitat overlap on MB and TBNG. Caves and abandoned mines that provide habitat for this species are not known to occur within the project area, and there is little potential for habitat associations with GRSG on the BT (Moreno 2012).	Y		See detailed analysis below
Fringed myotis *Myotis thysanodes*	Forages in PP, oak, shrublands, pinyon-juniper on MB and TBNG.	Y		See detailed analysis below
Hoary bat *Lasiurus cinereus*	Conifer forest woodland on MB and SS areas on TBNG.	Y		See detailed analysis below
Pygmy shrew *Sorex hoyi*	Wetland edges in SF above 9000 feet on MB.	N	1	No impact
Black-tailed prairie dog *Cynomys ludovicianus*	Grasslands on TBNG.	Y		See detailed analysis below
White-tailed prairie dog *Cynomys leucurus*	Colony at Six-Mile/Platte River on MB.	Y		See detailed analysis below
Swift fox *Vulpes velox*	Grasslands on TBNG.	Y		See detailed analysis below
Wyoming pocket gopher *Thomomys clusius*	SS and grassland near MB.	Y		See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
River otter *Lontra canadensis*	Rivers on MB.	N	2	No impact
BIRDS (32)				
American bittern *Botaurus lentiginosus*	Marshes on TBNG.	N	3	No impact
Bald eagle *Haliaeetus leucocephalus*	Lakes and rivers	N	4	No impact
Greater Sage-Grouse *Centrocercus urophasianus* (C)	Sagebrush and diverse native grass and forb understory.	Y		See detailed analysis below
Ferruginous hawk *Buteo regalis*	SS and grassland on MB and TBNG.	Y		See detailed analysis below
American Peregrine Falcon *Falco peregrinus anatum*	Vertical cliff habitat preferentially near high avian prey populations on BT, MB, and TBNG.	Y	4	No impact
Northern harrier *Circus cyaneus*	Grassland, marsh, and SS near water, <2400m on MB and TBNG.	Y		See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Columbian sharp-tailed grouse *T. phasianellus columbianus*	MS west of Continental Divide on MB.	Y		See detailed analysis below
Northern Goshawk *Accipiter gentilis*	Mature forests with large trees, relatively closed canopies, and open understories for nesting. Foraging areas include forests with a high density of large trees interspersed with shrublands and openings. Habitat overlap on BT.	Y		See detailed analysis below
White-tailed ptarmigan *Lagopus leucurus*	Alpine willow currently considered extirpated on the MB.	N	1,2	No impact
Short-eared owl *Asio flammeus*	SS, grasslands, and marshes might occur only on the Laramie Peak unit of MB.	Y		See detailed analysis below
Burrowing owl *Athene cunicularia*	Grasslands on TBNG.	Y		See detailed analysis below
Lewis' woodpecker *Melanerpes lewis*	PP occurs on the Laramie Peak unit of MB.	N	2	No impact
Black-backed woodpecker *Picoides arcticus*	SF and PP and recently burned conifer forest on MB.	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Olive-sided flycatcher *Contopus borealis*	SF, LP, WET, FM on MB.	N	2	No impact
Purple martin *Progne subis*	AS in specific area on west side of Continental Divide on MB.	N	2	No impact
Loggerhead shrike *Lanius ludovicianus*	Grassland with shrubs <8000 feet on MB and TBNG.	Y		See detailed analysis below
Brewer's sparrow *Spizella breweri*	SS on MB and TBNG.	Y		See detailed analysis below
Grasshopper Sparrow *Ammodramus savannarum*	Grasslands on TBNG.	Y		See detailed analysis below
Sage sparrow *Amphispiza bellii*	SS below 6500 feet on MB and TBNG.	Y		See detailed analysis below
McCown's longspur *Calcarius mccownii*	Grasslands on TBNG.	Y		See detailed analysis below
Chestnut-collared longspur *Calcarius ornatus*	Grasslands on TBNG.	Y		See detailed analysis below
Boreal Owl *Aegolius funereus*	Large expanses of contiguous forests that are typically structurally complex Engelmann spruce/subalpine fir forest types.	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Great Gray Owl *Strix nebulosa*	Dense coniferous forest types usually associated with mature or old growth Douglas fir for nesting on BT.	N	2	No impact
Flammulated owl *Otus flammeolus*	Ponderosa pine and Douglas fir stands mixed with aspen on BT and MB.	N	2	No impact
Three-toed Woodpecker *Picoides tridactylus*	Mixed conifer forests of lodgepole pine, Douglas-fir, Engelmann spruce, and subalpine fir; large numbers of recently killed trees provide the best habitat. *GRSG general habitat boundary on BT broadly includes this conifer habitat, but there is no habitat association with GRSG.	N	2	No impact
Harlequin duck *Histronicus histronicus*	Low gradient streams with dense shrubs, braided channels, swift currents, and abundant aquatic insects on BT.	N	2	No impact
Trumpeter Swan *Cygnus buccinator*	Wide variety of freshwater ponds, lakes and occasionally rivers; areas with abundant and diverse communities of aquatic plants on BT.	N	2	No impact
Common loon *Gavia immer*	Breeding habitat includes secluded, clear-water lakes more than 10 acres in size located between 6-8,000feet elevation on BT.	N	2	No impact
Long-billed curlew *Numenius americanus*	Grasslands on TBNG.	Y		See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Mountain plover *Charadrius montanus*	Grassland habitat overlap on TBNG.	Y		See detailed analysis below
Black tern *Chlidonias niger*	Wetlands on TBNG.	Y	3	No impact
REPTILES AND AMPHIBIANS (4)				
Columbia spotted frog *Rana luteiventris*	Subalpine forests, grasslands, and sagebrush habitats at elevations from 1,700 feet to 6,400 feet on BT.	Y	3	No impact
Boreal Toad *Bufo boreas*	Montane forests between 7,000 feet and 12,000 feet elevation. Adults are primarily terrestrial and have been observed in a variety of habitats including sagebrush on BT.	Y		See detailed analysis below
Northern leopard frog *Lithobates pipiens*	Wide variety aquatic habitats and wetlands on MB.	Y	3	No impact.
Wood frog *Lithobates pipiens*	Sedge, grass meadows, willow hummocks, aspen, lodgepole forests, and woodlands on MB.	N	1	No impact
FISH (13)				
Bonneville Cutthroat Trout *Oncorhynchus clarki utah*	Native to Salt Creek and Smith Fork drainages of the Bear River system on BT.	N	3	No impact.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Colorado River Cutthroat Trout *Oncorhynchus clarki pleuriticus*	Native to the Green River drainage on BT and Little Snake on MB.	N	3	No impact
Northern Leatherside *Lepidomeda copei*	Native to Bear Creek and Snake River drainages on the Kemmerer, Greys River, and Jackson Ranger Districts on BT.	N	3	No impact
Yellowstone/Snake River fine-spotted cutthroat *Oncorhynchus clarki* spp	Native to the Yellowstone and Snake River systems on the Jackson and Buffalo Ranger Districts on BT.	N	3	No impact
Mountain sucker *Catostomus platyrhynchus*	Clear, cold creeks, small to medium-sized rivers with sand, gravel, and rubble substrate on MB,	N	3	No impact
Hornyhead chub *Nocomis biguttatus*	Isolated populations in the Laramie and North Laramie rivers on MB,	N	3	No impact
Lake chub *Couesius plumbeus*	Permanent spring flow usually at the headwaters of small streams on TBNG,	Y	3	No impact
Plains minnow *Hybognathus placitus*	Great Plains streams with fluctuating stream flows and shifting sand substrates on TBNG.	Y	3	No impact
Sturgeon chub *Macrhybopsis gelida*	Great Plains rivers on TBNG.	N	3	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Northern redbelly dace *Phoxinus eos*	Permanent spring seeps usually at the extreme headwaters of small streams.	Y	3	No impact
Southern redbelly dace *Phoxinus erythrogaster*	Streams and ponds clear with sand and silt substrates.	Y	3	No impact
Finescale dace *Phoxinus neogaeus*	Permanent spring seeps usually at the extreme headwaters of small streams on TBNG.	Y	3	No impact
Flathead chub *Platygobio gracilis*	Big Horn, Tongue, Powder, Little Powder, Belle Fourche, and Cheyenne river systems on TBNG.	Y	3	No impact
INSECTS (1)				
Hudsonian emerald *Somatochlora hundsonica*	Boggy ponds on MB.	N	2	No impact
PLANTS (49)				
Pink agoseris *Agoseris lackschewitzii*	Wet meadow habitat without a sagebrush component on BT.	N	1	No impact
Sweet-flowered rock jasmine *Androsace chamaejasme ssp. carinata*	Exposed rocky ridge crests and slopes with rock outcrops and thin soils of limestone or dolomite substrate at 8,500 to 10,800 feet elevation on BT.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Barr's milkvetch *Astragalus barrii*	In badland islands in sagebrush and grassland matrices. 3,500-6,700 feet on TBNG.	Y		See detailed analysis below
Meadow milkvetch *Astragalus diversifolius var. diversifolius*	Moist, often alkaline meadows and swales in sagebrush valleys at 4,400 to 6,300 feet elevation often described as a playa vegetation type on BT.	Y		See detailed analysis below
Astragalus jejunus var. jejunus Starveling milkvetch	Dry barren ridges and bluffs of shale and stone, clay, or cobblestones at 6,000 to 7,100 feet elevation on BT	N	1	No impact
Astragalus paysonii Payson's milkvetch	Disturbed areas on sandy soils that have a low cover of forbs and grasses at elevations of 5,850 to 9,600 feet which often occur as a mosaic component of sage shrublands on BT.	Y		See detailed analysis below
Aquilegia laramiensis Laramie columbine	Crevices in north facing granite boulders 6,250-8,000 feet on MB.	N	2	No impact
Astragalus leptaleus park milkvetch	Willow carrs/sedge-grass transition to shrub 8,800 feet on MB.	N	2	No impact
Botrychium lineare narrowleaf moonwort	Grass, stream, forest edges, and upland habitats 0 feet -10,500 feet on MB.	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Carex diandra lesser panicled sedge	Peatland-fens and pond edge 6,100 to 8,600 feet on MB.	N	2	No impact
Carex incurviformis Seaside sedge	Alpine and subalpine moist tundra and wet rock ledges 10,000 to 12,200 feet elevation on BT.	N	1	No impact
Carex livida livid sedge	Floating mats, bogs, fens, and marls with Carex, hummocks 9,000 to 10,000 feet on MB.	N	2	No impact
Carex luzulina var. atropurpurea Black and purple sedge	Subalpine wet meadows and stream sides at 10,000 to 10,600 feet elevations on BT.	N	1	No impact
Cypripedium parviflorum lesser yellow lady's slipper	Mossy woods, streams, and bogs (13,120 – 20,992 feet on MB	N	2	No impact
Wyoming tansymustard *Descurainia torulosa*	Southern Absaroka Range and the Rock Springs Uplift. Sandy soil at the base of cliffs composed of volcanic breccia or sandstone, under slight overhangs, in cavities in the volcanic rock, or on ledges 7,700 to 10,500 feet on BT.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Draba exunguiculata Clawless draba (Gray's peak draba)	Alpine fell fields 10,000 feet+ on MB.	N	2	No impact
Draba globosa Rockcress draba	Moist, gravelly alpine meadows and talus slopes often on limestone-derived soils from 8,100 to 12,400 feet on BT.	N	1	No impact
Draba grayana Gray's draba	Alpine fell fields >10,000 feet on MB.	N	1	No impact.
Drosera rotundifolia roundleaf sundew	Acid fens, float mats, and bogs 9,100 to 9,800 feet on MB.	N	1	No impact
Eleocharis elliptica Elliptic spike rush (boreal spike rush)	Thermal seeps/springs and stock ponds 6,200 to 7,250 feet on MB.	N	2	No impact
Ericameria discoidea var. linearis Narrowleaf goldenweed	Semi-barren, whitish clay flats and slopes, gravel bars, and sandy lakeshores at elevations of 7,700 to 10,300 feet on BT.	N	1	No impact
Erigeron lanatus Woolly daisy	Alpine or subalpine limestone talus slopes at 11,000 feet elevation on BT.	N	1	No impact.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Eriogonum exilifolium dropleaf (slender leaved) buckwheat	Semi-bare sandy bunchgrass communities and seleniferous gumbo 6,900 to 8,800 feet on MB.	Y		See detailed analysis below
Eriophorum altaicum var. *neogaeum* whitebristle cottongrass	Fens 9,500-14,000 feet on MB.	N	1	No impact
Eriophorum gracile slender cottongrass	Sedge meadows and floating bogs saturated soil to shallow water 6,900 to 10,500 feet on MB.	N	2	No impact
Festuca hallii plains rough fescue (Hall's fescue)	Sloped montane meadows and edges open conifer 6,800 to 11,000 feet on MB.	N	2	No impact
Ipomopsis aggregata ssp. weberi scarlet gilia (Rabbit Ears gilia)	Openings in conifer forest slopes, ridges 7,200 to 8,300 feet on MB.	N	2	No impact
Kobresia simpliciuscula simple bog sedge (Kobresia)	Flooded marl wetlands with *Carex simulata* 6,000 feet on MB.	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Lesquerella paysonii Payson's bladderpod	Carbonate mountain ranges of west-central Wyoming, eastern Idaho, and southwestern Montana. Rocky, sparsely-vegetated slopes, and often calcareous substrates at elevations of 5,500 to 10,600 feet. Wide elevation range indicates possible association with GRSG habitat on BT.	Y		See detailed analysis below
Machaeranthera coloradoensis var. coloradensis Colorado tansyaster	Gravelly places in mountain parks, sparsely vegetated knolls with cushion plants in sagebrush and grassland matrices 6,800-8,500 feet	Y		See detailed analysis below
Mimulus gemmiparus Rocky Mountain monkeyflower	Granitic seeps, slopes, and alluvium in open sites with SF and aspen 8,500 to 10,500 feet on MB.	N	2	No impact
Parnassia kotzebuei Kotzebue's grass of Parnassu	Moist seeps, wet tundra on thin clay soil, and moist ledges 10,000 to 12,000 feet on MB.	N	1	No impact
Parrya nudicaulis Naked-stemmed parrya	Alpine talus often on limestone substrates at 10,700 to 11,400 feet elevation on BT.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Penstemon harringtonii Harrington's beardtongue	Open sagebrush moderate slopes calcareous soils 6,800 to 9,200 feet on MB.	N	2	No impact
Physaria integrifolia var. monticola Creeping twinpod	Barren, rocky, and calcareous hills and slopes at 6,500 to 8,600 feet elevation on BT.	N	2	No impact
Potentilla rupincola rock cinquefoil (front range cinquefoil)	Mountain gravel soils or shelves/niches cliffs-often granite 6,900 to 10,500 feet on MB.	N	2	No impact
Pinus albicaulis Whitebark pine	Whitebark pine distribution on the BT.	N	2	No impact
Primula egalikensis Greenland primrose	Wet meadows along streams and calcareous montane bogs from 6,600 to 8,000 feet Sagebrush is not a component of this habitat type on BT.	N	2	No impact
Ranunculus karelinii ice cold buttercup	Ridges, peaks, in rocks and scree, and low-lying snow banks 10,000-14,100 feet on MB.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Rubus arcticus ssp. *acaulis* dwarf raspberry (nagoon berry)	Dense canopy in lodgepole and spruce-fir with *Linnaea borealis* 7,000 to 10,000 feet on MB.	N	2	No impact
Salix candida sageleaf willow (hoary willow)	Cool, boreal forests and prairies in remnant fen and seeps 6,600 to 10,600 feet on MB.	N	2	No impact
Salix serissima autumn willow	Calcareous fen meadow 7,800-9,300 feet on MB.	N	2	No impact
Saussurea weberi Weber's saussurea	Restricted to the Gros Ventre and northern Wind River ranges on alpine talus slopes and gravel fields at 9,600 to 11,500 feet on BT.	N	1	No impact
Selaginella selaginoides Club spikemoss (northern spikemoss)	Mossy banks, wet meadows, and marsh wet spruce forests 7,700 to 8,000 (9,500) feet on MB.	N	2	No impact
Sphagnum angustifolium sphagnum	Fens, acid fens, and floating vegetation mats 7,000-12,000 feet on MB.	N	2	No impact
Sphagnum balticum Baltic sphagnum	Iron fens and wetter areas of ombrotrophic bogs 7,000-12,000 feet on MB.	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Symphyotrichum molle Soft aster	Sagebrush grasslands and mountain meadows in calcareous soils at 6,400 to 8,500 feet elevation. The identification of a Hoback Canyon occurrence has been questioned, but unresolved. Presence is acknowledged for the project area on BT.	Y		See detailed analysis below
Triteleia grandiflora largeflower triteleia	Grassy areas in sagebrush at edge of aspen and lodgepole to 8,400 feet on MB.	Y		See detailed analysis below
Utricularia minor lesser bladderpod	Shallow fens, wetland, and subalpine ponds 6,600 to 8,600 feet on MB.	N	2	No impact
Viola selkirkii Selkirk's violet	Moist, shaded ravines and cold boreal forest 8,500 to 9,100 feet on MB.	N	2	No impact
AL-alpine, AS-aspen, FM-forest meadow, LPP-lodgepole pine, SS-sagebrush shrub, MS-mountain shrub, PP-ponderosa pine, RIP-riparian, RO-rock/cliff/cave, SF-spruce-fir, WET-wetland; (C) – Candidate species for ESA listing.				

Table 4. R2 or R4 Sensitive Species from the BT National Forest, MB National Forest, and TB National Grassland that may be influenced by an action alternative and further analyzed in this document.

Species Name	Carried forward as:
Greater Sage-Grouse *Centrocercus urophasianus*	R2/R4 Sensitive
Columbian sharp-tailed grouse *T. phasianellus columbianus*	R2 Sensitive
Northern Goshawk *Accipiter gentilis*	R4 Sensitive
Ferruginous Hawk *Buteo regalis*	R2 Sensitive
Northern Harrier *Circus cyaneus*	R2 Sensitive
Short-eared Owl *Asio flammeus*	R2 Sensitive
Burrowing owl *Athene cunicularia*	R2 Sensitive
Loggerhead Shrike *Lanius ludiovicianus*	R2 Sensitive
Sage Sparrow *Amphisiza bellii*	R2 Sensitive
Grasshopper Sparrow *Ammodramus savannarum*	R2 Sensitive
Brewer's Sparrow *Spizella breweri*	R2 Sensitive
McCown's longspur *Calcarius mccownii*	R2 Sensitive
Chestnut-collared longspur *Calcarius ornatus*	R2 Sensitive
Long-billed curlew *Numenius americanus*	R2 Sensitive
Mountain Plover *Charadrius montanus*	R2 Sensitive
Boreal Toad *Bufo boreas boreas*	R4 Sensitive
Rocky Mountain Bighorn Sheep *Ovis canadensis canadensis*	R2 Sensitive
Swift fox *Vulpes velox*	R2 Sensitive

Species Name	**Carried forward as:**
White-tailed Prairie Dog *Cynomys leucurus*	R2 Sensitive
Black-tailed prairie dog *Cynomys ludovicianus*	R2 Sensitive
Wyoming Pocket Gopher *Thomomys clusius*	R2 Sensitive
Hoary bat *Lasiurus cinereus*	R2 Sensitive
Fringed Myotis *Myotis thysanodes*	R2 Sensitive
Spotted Bat *Euderma maculatum*	R2 Sensitive
Townsend's Big-eared Bat *Corynorhinus townsendii*	R2 Sensitive
Astragalus barrii Barr's milkvetch	R2 Sensitive
Astragalus diversifolius var. diversifolius Meadow milkvetch	R4 Sensitive
Astragalus paysonii Payson's milkvetch	R4 Sensitive
Lesquerella paysonii Payson's bladderpod	R4 Sensitive
Symphyotrichum molle soft aster	R4 Sensitive
Eriogonum exifolium Dropleaf (slender leaved) Buckwheat	R2 Sensitive
Machaeranthera coloradoensis var. coloradensis Colorado tansyaster	R2 Sensitive
Triteleia grandiflora Largeflower Triteleia	R2 Sensitive

VII. SPECIES INFORMATION AND EFFECTS ANALYSIS

(Direct, Indirect and Cumulative)

A. Greater Sage-Grouse (Centrocercus urophasianus)

Greater Sage-Grouse as an Umbrella Species

GRSG populations require largea landscapes and specific habitat conditions at broad scales to meet their seasonal life requisite requirements. Rowland et al. (2010) and Hanser and Knick (2006) provide evidence that GRSG habitats at broad scales have substantial overlap with habitats of other species similarly associated with sagebrush and sagebrush-steppe communities. The plan amendment is specially designed to provide protections for GRSG and their habitats. Although individual species have specific habitat requirements at fine scales that differentiate their use of habitats, habitat protections for GRSG will likely benefit other species similarly dependent on these habitats. The structure of this BE reviews the efficacy for conservation and management actions for GRSG, and then evaluates the adequacy of these protections for other sensitive species including those associated with sage-brush habitats.

Distribution

GRSG historically inhabited 13 western states and three Canadian provinces, but they have declined across their range and now occupy approximately 56 percent of their historic range. They are currently found in only 11 states and two Canadian provinces (USFWS 2013).They are an R2 and R4 sensitive species found in association with shrub steppe and grassland habitats specifically having sagebrush as a component. In Wyoming, GRSG habitats within the National Forest lands to support GRSG population include the Medicine Bow (MB) National Forest, Bridger-Teton (BT) National Forest, and Thunder Basin (TB) National Grassland. Table 4 below shows the amount of GRSG habitat found in acres and unit percent on each unit for Alternatives B, C, and D. Alternative A has no designated PHMA direction.

Table 5: Acres of Greater Sage-Grouse Habitat on Forest Service Lands for Alternatives B, C, and D.

Management Unit	Total Unit Area	Sagebrush Habitat[1]	Priority/ Core[2]	Priority Connectivity[2]	General Habitat[3]
Bridger-Teton	**3,400,000**	**430,870 (12.7 %)**	**5,933 (1.7%)**	**0**	**324,243 (9.5%)**
Medicine Bow	**1,262,325**	**132,863 (10.5%)**	**5019 (0.4)**	**0**	**22,635 (1.8%)**
Thunder Basin	**553,864**	**438,500 (77.4%)**	**217,768 (39.2%)**	**6,356 (1.2%)**	**329740 (59.6%)**

[1]*Acres of sagebrush habitat mapped by unit.*

[2]*Areas identified by the Forest Service, in coordination with respective state wildlife agencies, as having the highest conservation value to maintaining sustainable GRSG populations. PHMAs and SFAs are sub-identified as either core or connectivity habitat. Priority-core habitat management areas and SFAs are the most important breeding and nesting habitat. Priority-connectivity habitat management areas are known migration corridors that connect populations or population segments.*

[3]*Areas identified by the Forest Service, in coordination with respective state wildlife agencies, as those outside of PHMAs and SFAs and occupied seasonally or year-round.*

Table 6 shows the Proposed Plan Amendment habitat by unit, which includes additional habitat designated as Priority Core, Priority Connectivity, or Sagebrush Focal areas that were added by the Forest Service to help meet the need for viable populations.

Table 6: Acres of Greater Sage-Grouse Habitat on Forest Service Lands for the Proposed Plan Amendment.

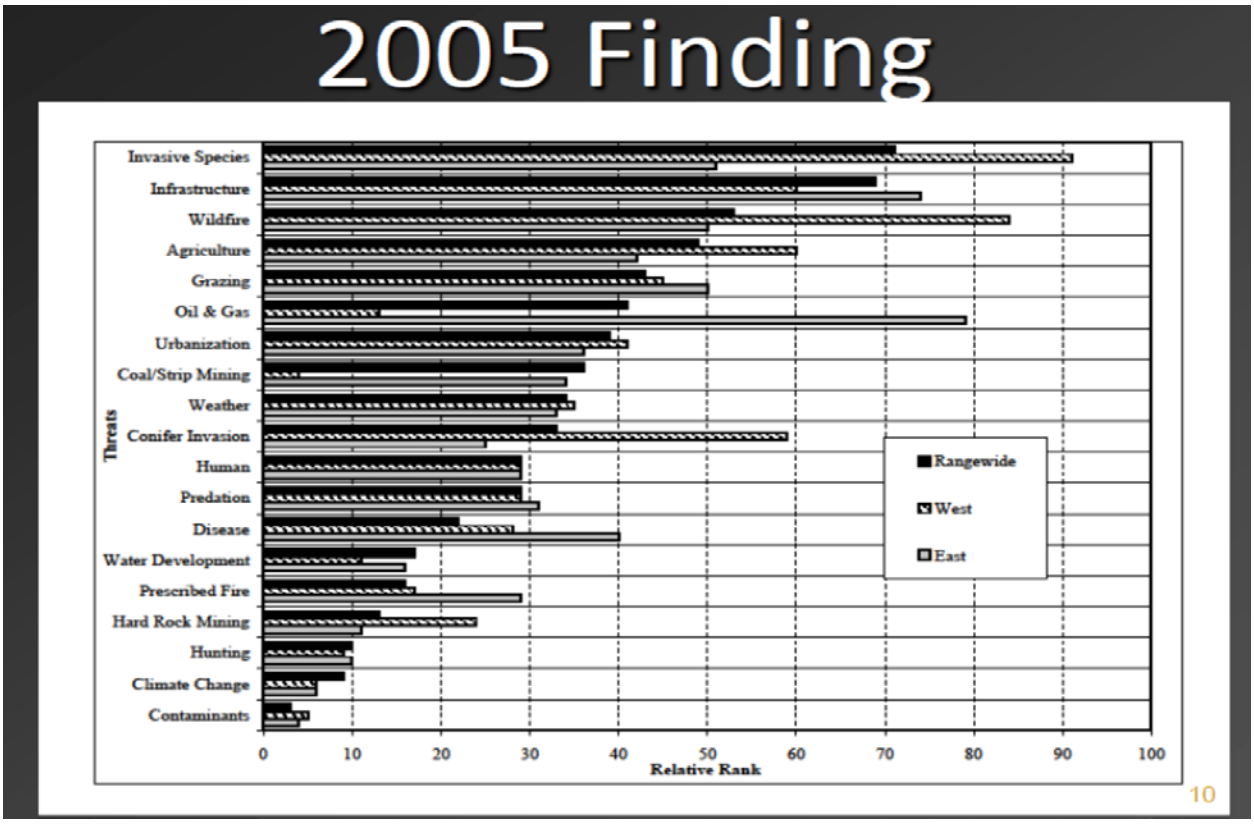
Management Unit	Total Mapped GRSG Habitat	Priority Core	Priority Connectivity	Sagebrush Focal Areas	General Habitat
Bridger-Teton	**333,510 (100%)**	**35,318 (10.6%)**	**62,435 (18.7%)**	**3336 (1.0)**	**232,423 (69.7%)**
Medicine Bow	**27,654 (2.2%)**	**5,019 (0.4%)**	**0**	**0**	**22,635 (8168%)**
Thunder Basin	**553,864 (100%)**	**268,835 (48.5%)**	**6,356 (1.2%)**	**0**	**278,673 (50.3%)**
Total Acres	**915,028**	**309,172**	**68,791**	**3336**	**533,731**

Habitat Associations and Threats

GRSG requires a variety of sagebrush structural stages and associated herbaceous components to meet seasonal habitat requirements. Sagebrush is essential for GRSG during all seasons of the year. However, this relationship is perhaps tightest in the late fall, winter, and early spring when GRSG are dependent on sagebrush for both food and cover. During the spring and summer, succulent forbs and insects become important additional food sources (Wyoming Game and Fsih Department 2003).

The primary threats to GRSG in Wyoming include conversion and fragmentation of sagebrush habitats through infrastructure development including energy development, habitat loss to wildfire, invasive species encroachment, disturbance from noise, drought, and mortality due to the emergence of the West Nile Virus in the Powder River Basin. Other factors limiting populations include mortality from roads, fences, and predatation (e.g. raptors as result of increased perches, raptors and mammals due to decreased hiding cover). Below is the list of range-wide threats to GRSG identified by the USFWS in 2005. Wyoming is considered a part of the eastern population in Table 7.

Table 7: USFWS list of impacts on the Greater Sage-Grouse.



The 2010 listing decision (USFWS 2010) identified energy development and associated infrastructure as the most significant threats facing GRSG in the eastern portion of its range. The USFWS Conservation Objectives Team (COT) Report (USFWS 2013) identified the following as threats for Priority Areas for Conservation (PACs) that include the National Forest Units. The TB National Grassland and MB National Forest are located in the Powder River Basin population area (#3) and the BT National Forest is located in the Jackson population area (#8).

Table 8. Potential threats to populations of Greater Sage-Grouse and National Forests associated with these areas (USFWS 2013).

Population Area	Isolated/Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
Management Zone I: Great Plains TBNG/MBNF	**N**	**L**	**N**	**L**	**L**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**L**
MZ II: Wyoming Basin BTNF	**Y**	**L**	**N**	**L**	**L**	**Y**	**N**	**N**	**N**	**N**	**N**	**Y**	**L**

Note: Threats are associated with the population areas. The discussion below discusses those threats that are germane to National Forest System land. TBNG – TBNG, MBNF – Medicine Bow National Forest, BTNF – Bridger-Teton National Forest. Y – Yes (Threat is a concern), N – No (Threat is not a concern), L – Low threat potential.

The Northeast Wyoming Local Working Group determined oil, gas, and coal bed natural gas (CBNG) development and associated infrastructure, weather, vegetation management, invasive plants, parasites, and diseases were the most significant threats for the northeast Wyoming GRSG population.

Population Status and Trend

Conservation Objectives Team Report (2013) Population Overview

The COT (USFWS 2013) reviews population persistence for each of the GRSG population areas based on the analysis of Garton et al. (2011) where quasi-extinction rates were modeled for a number of GRSG populations. The Garton et al. (2011) analysis evaluates the likelihood of short-term (2037) and long-term (2107) persistence of GRSG populations. In general, larger populations are more resilient to extirpation than smaller ones; however, trends in habitat and changes in threats strongly influence persistence probability (Caughley 1994). Hence, although small populations are at greater risk, they can persist for long periods under favorable habitat conditions or their proximity to larger adjacent populations.

Garton et al. (2015) published a follow-up report building on the range-wide analysis of Garton et al. (2011). The 2011 book chapter in Knick and Connelley (eds.) 2011 evaluated changes in GRSG populations from roughly 1965 to 2007 examining population trajectories at multiple spatial scales. The more recent manuscript employed the same analytical methods but extends the field survey data to include 2008 through 2013. Garton et al (2015) provides reconstructed estimates for population trajectories across the species' range using for the array of populations examined in 2011.

From 2007 to 2013, data suggests that minimum counts for breeding males range-wide fell from 109,990 to 48,641, a decline of 56%. Using population persistence models consistent with those

from Garton et al. (2011), Garton et al. (2015) examines future scenarios for males range-wide (excluding Colorado) and for individual populations at multiple spatial scales. For example, a minimum number of males counted at leks for the entire range-wide distribution, excluding Colorado, were 40,505 birds in 2013 and projected to decline to 19,517 males in 30 years (2030), and 8,154 males in 100 years (2107) based on the scenario examined.

As outlined in past review, many factors potentially contribute to projected declines (Stiver et al. 2006, NTT 2011, and USFWS 2014 (COT report); e.g. drought, climate change, disease, invasive plants, wildfire, habitat destruction,). Garton et al (2015) suggests that environmental conditions and management actions through 2013 have not reversed the pattern of population declines observed in most populations since the 1970's or 1980's. Alternative A (continue current management) as outlined in this FEIS, most closely reflects the scenario examined in Garton et al (2011) and Garton et al (2015). As noted earlier, the Determinations in this biological evaluation reflect an evaluation of conditions for GRSG and the consequences of management for future populations of GRSG under each of the analyzed alternatives for NFS lands based on requirements for providing environmental conditions to assure the persistence of GRSG habitats within the capability of the unit to support these habitats when GRSG use them. . The evaluation for each alternative carefully considers the context provided by the Garton et al (2011) and Garton et al (2015) analysis for those population using NFS lands.

The Powder River Basin population currently is large population with >500 birds/200 males. It has a low probability of extinction by 2037. However, threats facing this population could result in a high probability of extirpation by 2107. Energy development and infrastructure have had significant effects on the Powder River population including the sub-populations that use the TBNG. West Nile Virus also had profound impacts on this population. Conversely, the Jackson population is a small population with < 500 birds/200 males. Although the population is small, it currently does not face the threats of energy development and infrastructure. The population is expected to remain below the 500 birds/200 males threshold, but it has a high likelihood for short-term persistence. Based on data available through 2007, the long-term quasi-extinction probability is 27.3% (Garton 2011, as Cited in the COT Report) (USFWS 2013). The population is approximately 20 km from core habitats that support large populations of the GRSG.

Table 9: COT Population Persistence Overview (Garton 2011, as Cited in the COT Report (USFWS 2013))

Population Area	<200 Males/500 Birds	Percent Chance of population dropping below 50 birds/20 males in 2037	Percent Chance of population dropping below 500 birds/200 males in 2037	Percent Chance of population dropping below 50 birds/20 males in 2107	Percent Chance of population dropping below 500 birds/200 males in 2107
Management Zone I: Great Plains		**9.5**	**11.1**	**22.8**	**24.0**
Powder River Basin (3) Thunder Basin NG/Medicine Bow NF	N	2.9	16.5	85.7	86.2
Management Zone II: Wyoming Basin		0.1	0.3	16.1	16.2
Jackson Hole (8) Bridger-Teton NF	Y	11.2	100	27.3	100

The Wyoming Game and Fish Department monitors GRSG populations throughout the state including TBNG, BTNF, and the MBNF. Similar to managers throughout the range of GRSG they use the number of males per lek as a reliable index to track population change (see Garton et al 2011). This indicates population fluctuations and it is generally accepted as a reflection of the GRSG population's dynamics, but it does not result in a direct population estimate.

Thunder Basin National Grassland

TBNG is in the Northeast Wyoming Sage-Grouse Local Working Group Area. Figure 1 displays the average number of males/lek for lek counts from 1967 to 2013 for northeast Wyoming. Based on this information, the regional trend suggests about a 10 year cycle of periodic highs and lows. A concern is that generally each subsequent peak in the population is usually lower than the previous peak. Additionally, each periodic low in the population is generally lower than the previous population low. The long-term trend suggests a steady declining GRSG population.

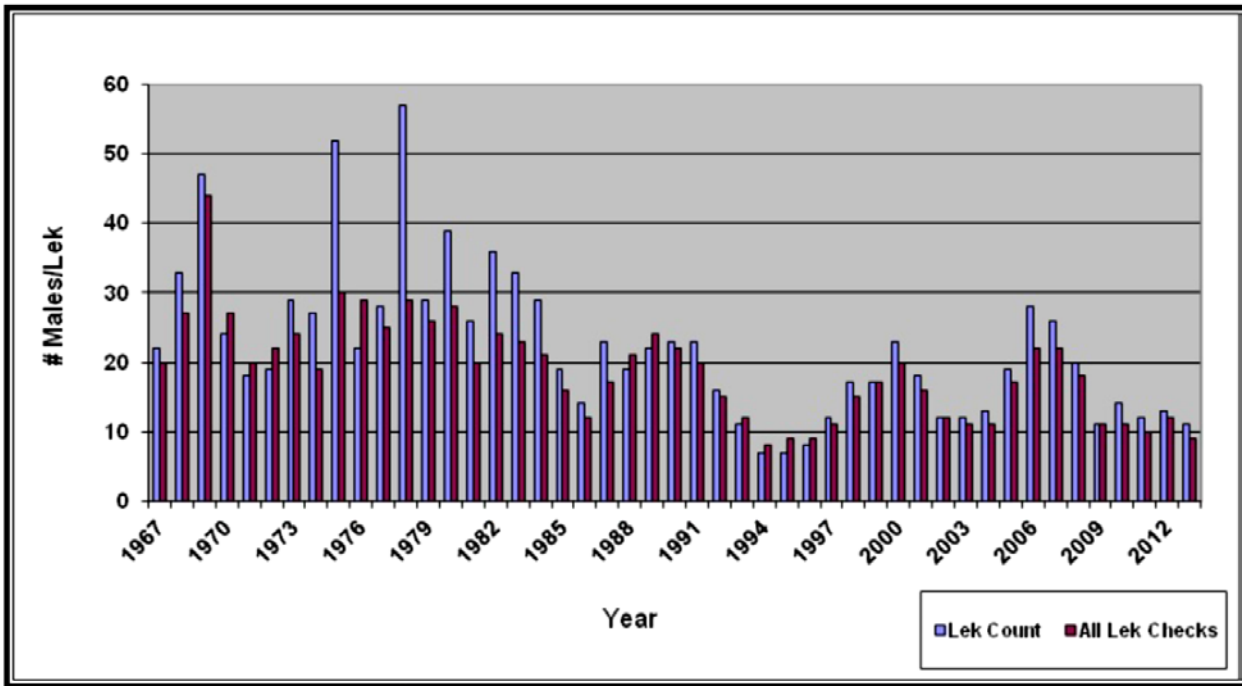


Figure 1. Northeast Wyoming Local Working Group Area Average Number of Males/Lek for Lek Counts and All Leks (1967-2013).

Source: Wyoming Game and Fish Department Greater Sage-Grouse Job Completion June 1, 2012- May 31, 2013

Figure 2 illustrates the mean male attendance per lek for the state, Local Working Group Area, and TBNG. Of the six working groups, Northeast Wyoming has the lowest average male lek attendance in the state averaging nine males per active lek in 2013 compared to the statewide average of 17 males per active lek (Figure 2). Male lek attendance for the other working group areas ranged from 9.5 to 35 males per active lek. In 2013, the average males per lek on TBNG were 3.4.

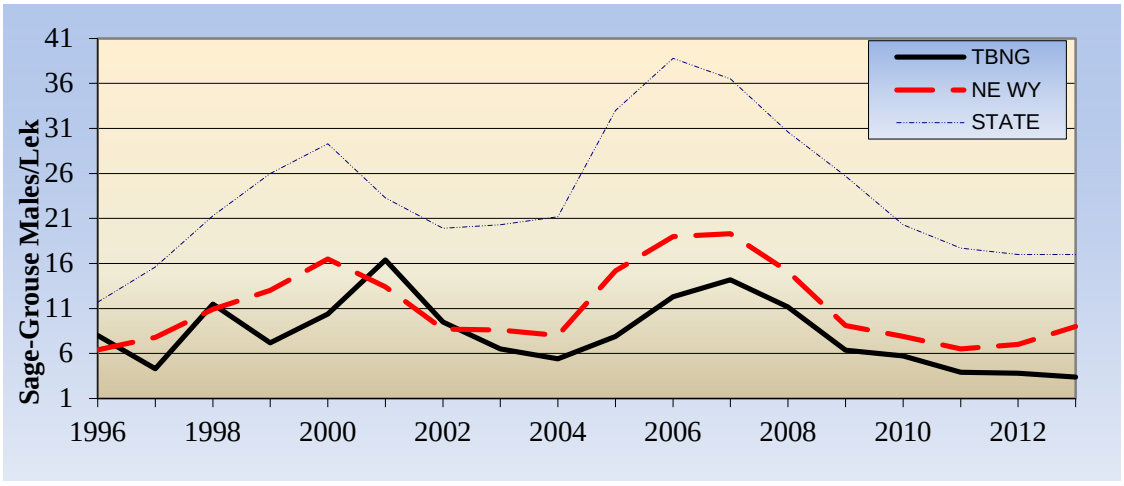


Figure 2. Mean Males/Lek for Wyoming, Northeast Wyoming, and TBNG (1996-2013)

The most recent peak minimum estimated population of GRSG on the TB National Grassland was in 2007 at 2,762 birds. The population has been in a steady decline since that time. The current 2013 population estimate is 368 birds. This is a loss of 2,394 birds, or an 87 percent reduction over the last six years. The current population estimate is the lowest it has been in 16 years (Figure 3).

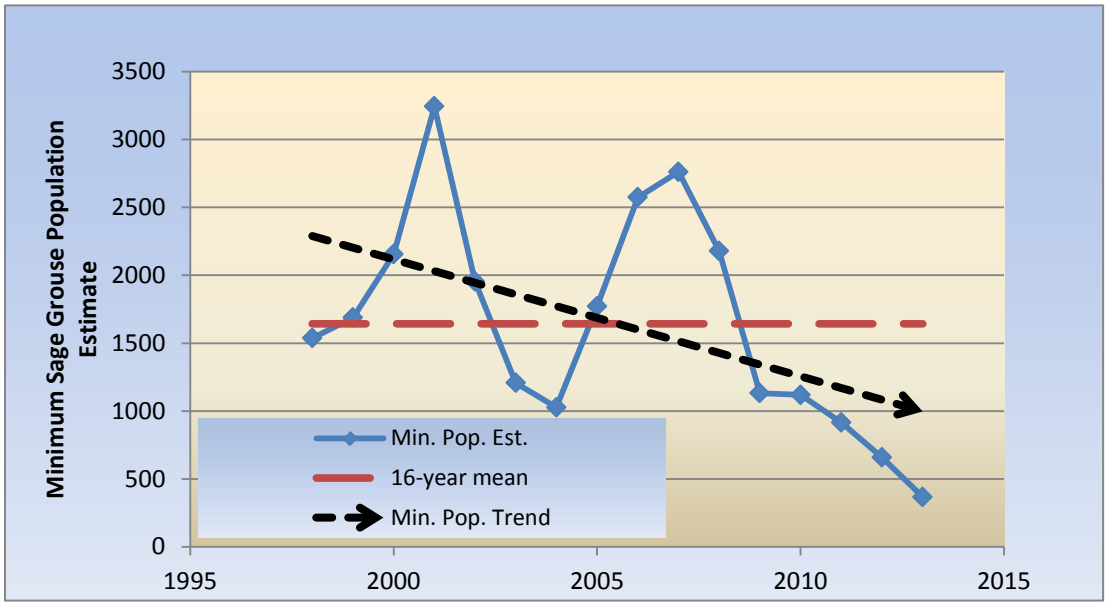


Figure 3. Minimum Greater Sage-Grouse Population Estimates for TBNG and the 15 Year Average.

The TB National Grassland Plan divides the grassland into six subunits called geographic areas (GAs) for management purposes. Each GA identifies GRSG as a Management Indicator Species and, therefore, the species is monitored in each GA. Currently on TBNG GRSG lek attendance shows a decline in all GAs.

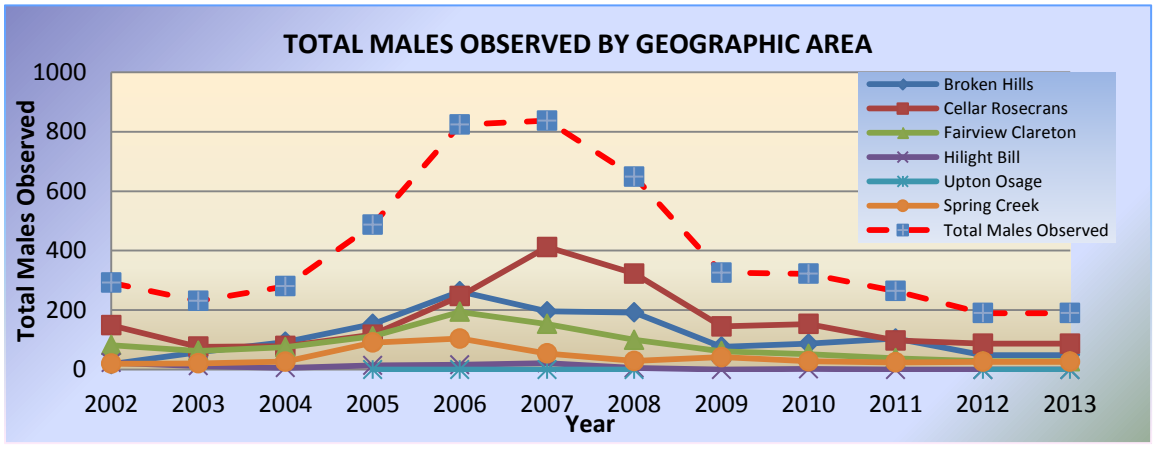


Figure 4: Total Males Observer by Geographic Area on Thunder Basin National Grassland

As noted above, based on current management strategies, threats, and known population numbers in this area, Garton et al. (2011) suggested that there was a 16.5 percent chance of the population dropping below 500 birds/200 males by 2037.

The Bridger-Teton National Forest

The BT populations exists within the Upper Snake River Basin and the Upper Green River Basin State Working Group Areas. The USRB Working Group includes the Jackson Hole population (COT Population #8) and the Upper Green River Basin includes the Wyoming Basin populations (COT Population #9a) in Management Zone 2. These populations include some of the smallest (i.e. Jackson Hole) and largest populations in Wyoming (e.g. Wyoming Basin). The majority of habitat for the Wyoming Basin populations is under the jurisdiction of the BLM, and the National Park Service manages the bulk of the Jackson Hole Population year-long habitat. However, the BTNF does manage a significant amount of GRSG habitat within their boundary.

There are three active and one satellite lek(s) known to occur on the BT; one active and one satellite lek is located on the Jackson Ranger District within general habitat and one active lek is located on the Big Piney Ranger District within BT general habitat. The third active lek is in the Upper Green River Basin. None of the known lek sites on the BT are located within core habitat. Although this indicates there are breeding habitats on NFS lands, GRSG, the majority of the GRSG habitats on the BTNP likely function as summer brood rearing habitat.

Though the population on the BT is peripheral to larger populations, there are approximately 330,176 acres of combined priority and general habitat management areas on Forest Service lands. GRSG numbers within the Jackson Hole population are small and hence the probability of long-term persistence is a concern. WDGF data suggests the population has undergone declines from 2007 (Figure 5). When looking at the same leks over the last 17 years, the Upper Green River populations appear generally stable over the last four (4) years and exceed numbers in the late 1990's and early 2000's.

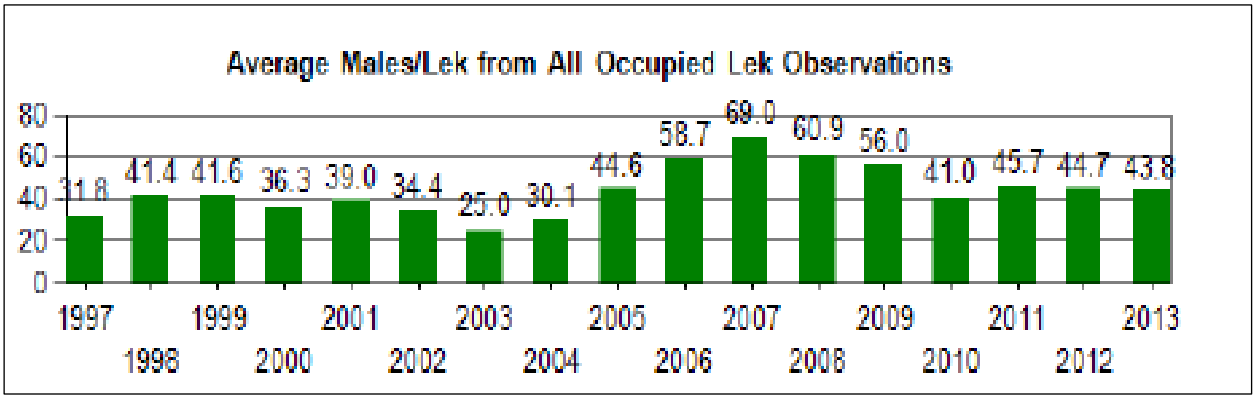


Figure 5: Upper Green Average Peak Males Sage-grouse Lek Attendance 1997-2013 for Selected Leks (leks found after 1997 are not included in order to maintain consistency in the evaluation).

Source: Wyoming Game and Fish Upper Green River Basin Sage-Grouse Conservation Plan Addendum – 2014

Peak males per active lek within the Upper Snake River Basin show declines from the 1990s, but have been relatively stable over the last four years (Figure 6). Counts in 2013 are similar to 2012. In 2012 there were 129 birds observed, and in 2013, 149 males were observed. This was slightly higher than the previous 9 year average (2004 – 2012) of 133 males. The long term trend continues to be declining.

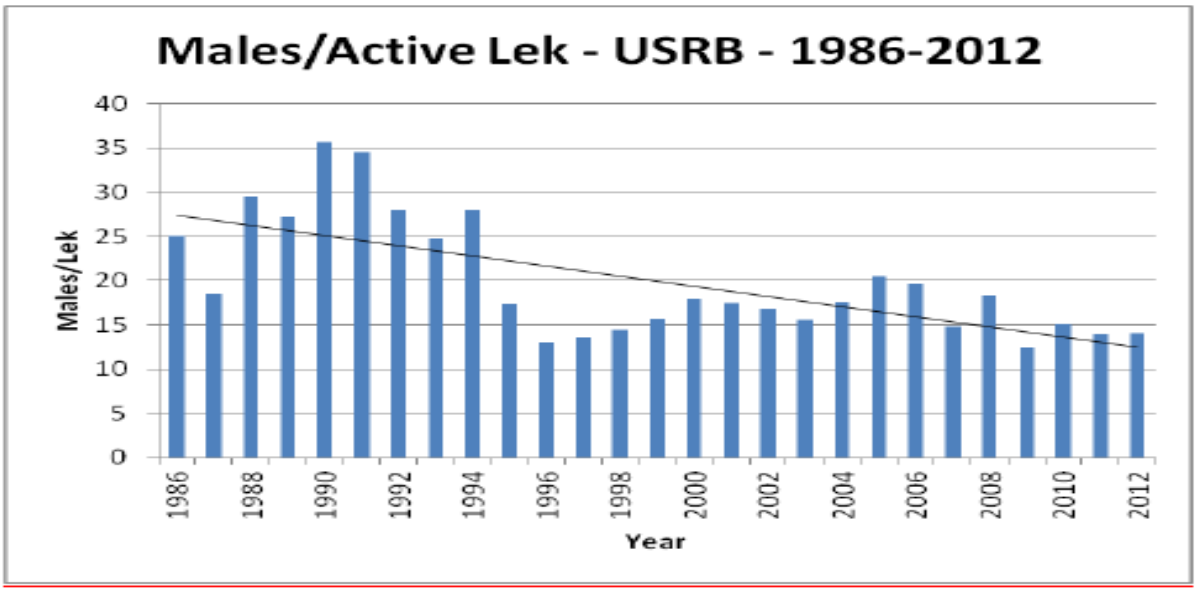


Figure 6: Upper Snake River Males Per Active Lek

Wyoming Game and Fish Department 2011 Greater Sage-Grouse Job Completion Report

Since the BT comprises about 60 percent of mapped GRSG habitat within the Snake River Basin and less than 3 percent of mapped GRSG habitat within the UGRB, BT management may have a large influence on the USRB GRSG and more specifically, the Jackson Hole GRSG population. Garton et al. (2011), suggested that the Jackson Hole population would likely never attain 500 birds/200 males. Proper management that reduces threats to this population and retains connectivity to adjacent larger populations is important to the sustainability of this population. The Medicine Bow National Forest

The MB National Forest contains a very small amount of GRSG habitat. Of the more than one million acres on the MB National Forest, only 3 percent or 27,654 acres of combined core and general habitat exists, mostly as summer brood rearing habitat. GRSG habitats on the MB National Forest are peripheral to extensive sagebrush habitats on other land ownerships for example, the BLM.

Table 10: MBNF Units and their Associated General and Core Sage-Grouse Habitat

Unit	Unit Acres	General Acres/Percent of Unit	Core Acres/Percent of Unit
Laramie Peak	437,781	5,523 (1)	2,838 (0.6)
Sierra Madre	362,217	14,987 (4)	1,549 (0.4)
Snowy Range	406,743	2,025 (0.5)	632 (0.2)
Total	**1,262,325**	**22,635 (0.4)**	5,019 (3)

GRSG habitat on the MB National Forest is within the Bates Hole/Shirley Basin and the South Central Working Groups. This habitat is largely an ecological transition from lodgepole pine forests to sagebrush steppe interspersed with rock outcrops and is the outside fringe of the occupied habitat. There are no known leks on the MB to provide population information related to the GRSG use on Forest Service lands.

Within the Working Group Areas, the Bates Hole/Shirley Basin Area as of 2011 has an average of approximately 15 males per Wyoming Game and Fish Count lek. The larger South Central Working Group Area had a 2011 average of 24.7 males per Wyoming Game and Fish Count lek. Both areas experienced increases from 2003 until 2005 -2006 and then they declined through 2011. These declines are being attributed to normal population fluctuations. Based on current management strategies and threats and known population numbers in the Wyoming Basin population, USFWS (2013), estimated that there was no chance of the population dropping below 500 birds/200 males by 2037 and a low probability (~ 11%) of falling below below 500 birds/200 males by 2107.

Key Threats by Forest

Bridger-Teton National Forest

Key threats to GRSG on and around the BT National Forest include: energy development and transfer for renewable and non-renewable resources and associated activities, long-term drought, sagebrush eradication programs, and residential development.

Medicine Bow National Forest

Key threats to GRSG on and around the MB National Forest include: energy development, infrastructure within the habitat, livestock grazing, and recreation. In addition, there are localized threats affecting differing portions of the population including the elimination of sagebrush; wildland fire; subsequent invasion of weeds and annual grasses; and conifer encroachment.

Thunder Basin National Grassland

The largest threats to GRSG and their habitat on and adjacent to the TB National Grassland include: energy development (oil, natural gas, and coal bed methane); habitat degradation due to pinyon-juniper encroachment and cheat grass invasion post-disturbance; habitat fragmentation

leading to a lack of connectivity; noise pollution; and West Nile Virus due to the readily available water from energy development.

Evaluating Viability

Forest Service policy based on the National Forest Management Act (NFMA) and associated regulations motivates careful consideration of the conservation status of sensitive species. In this section we briefly outline the legal foundation and the policy which establishes our approach to evaluating the contribution of habitat on NFS land to the overall viability of the GRSG, and how that evaluation differs among NFS units depending on the inherent capability and suitability of the environment.

The statutory underpinning for evaluating viability of species expressed in 16 U.S.C. §1604(g)(3)(B) requires the Secretary to promulgate regulations that shall include, but not be limited to:

> (3) specifying guidelines for land management plans developed to achieve the goals of the Program which –
> (B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives….

The Department published planning regulations in 1982, under which the land management plans associated with the current amendment for GRSG were written. The 1982 regulations included the viability provision at 36 CFR 219.19:

Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

All Forest Plans being considered for amendment to address GRSG conservation and recovery were developed under the 1982 planning regulations. This Biological Evaluation considers management guidance for GRSG on NFS lands in Wyoming, and assesses the outcomes of five alternatives for amendment of plans for each of three NFS land management units. The three NFS units differ substantially in the inherent distribution and quality of GRSG habitat. Two NFS units (BTNF and Medicine Bow NF) occur at an elevation and in ecological settings such that they support certain life history needs, but not others. As a result, GRSG use National Forest System lands for only a portion of the year (e.g. for summer brood-rearing habitat). In contrast, the Thunder Basin National Grassland provides year-round habitat. Differences among NFS units result largely from the environmental setting, and therefore the inherent capability of the environment to support particular sage brush ecosystems varies.

As outlined in the [*FEIS and referenced in this Biological Evaluation*, the capability of NFS lands to support self-sustaining populations of GRSG is limited. The national forests contain relatively small areas of GRSG habitat, and often the habitat on NFS land only contributes to particular life cycle requisites. This is the case on both the Bridger Teton National Forest and Medicine Bow National Forest.

Consequently, the assessment of whether habitat on NFS land is sufficient to maintain viable populations of GRSG must consider the contribution of habitat on NFS land to GRSG persistence generally, recognizing the inherent limitations on the ability to meet needs for all GRSG life stages from habitat located exclusively on NFS land. As recognized in the NFMA, the ability of the Forest Service to provide for diversity of animal communities is limited by "the suitability and capability of the specific land area..." 16 U.S.C. & 1604(g)(3)(B). Accordingly, this BE considers the contribution of these three NFS units to GRSG viability as follows:

- Forest plans provide for management of the environment to provide habitat to meet species' requirements associated with the particular seasons and life history stages supported on National Forest System (NFS) lands;
- Because GRSG spend only a portion of the year on NFS lands in response to the inherent capability and suitability of the lands (e.g. breeding habitat occurs off NFS), there are threats and stressors to species' which occur off of NFS land, and therefore over which the Forest Service has no jurisdiction or control;
- Managing habitats on NFS land to contribute to the support of persistent populations on NFS land is not the same as ensuring species viability over its entire range;
- The scale of analysis to assess the contribution of habitat on NFS land to GRSG viability is the planning unit, which is generally considered a national forest.

The five alternatives represent various scenarios for multiple resource management on NFS land with differing outcomes for GRSG. For each alternative, we end our discussion in this Biological Evaluation with a determination regarding the likelihood that the scenario provides conditions to support the ***persistence*** of GRSG on the NFS units ***to meet the associated life cycle requisites*** that land is suitable for and capable of providing, based on the combined outcomes of regulatory restrictions and restoration of habitat.

Alternative Comparison

Table 11 identifies the acreage of federal surface ownership and federal mineral leases protected from disturbance within the analysis area for each of the Alternatives for NFS lands on the BT, MB, and TBNG. (Additionally, refer to Tables 1-4 in Appendix 1 at the end of this document for acres of activity restriction by Alternative for each forest unit.)

Table 11. Land Use Restrictions by Alternative on Federal Surface and Federal Mineral Leases

Resource/Activity	Land Use Restriction	Alternative A (Continuation of Existing Management) (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)	Proposed Plan Amendments (acres)
Surface Disturbing Activities	Prohibited Areas	0	0	0	0	8542
	Restricted Areas	6789	0	0	1078	2514
Fluid Mineral Leasing	Closed	3345	348,750	1,439,673	6740	3343
	No Surface Occupancy	8092	114,919	114,901	0	28,677
	Controlled Surface Use	343,789	0	0	143,238	478,715
Rights-of-Way	Exclusion Areas	4186	106,023	585,834	106,092	5362
	Avoidance Areas	38,551	479,811	0	28,482	240,650
Mineral Materials	Closed Areas	0	384,523	384,523	0	0
Locatable Minerals	Existing Withdrawals	97	101	101	97	3366
	Proposed Withdrawals	0	384,422	384,422	0	0
Solid Leasable Minerals (non-energy)	Closed Areas	0	384,523	384,523	0	156,623
Wind Energy	Excluded	957	106,778	585,834	957	1212
	Avoided	48,777	0	0	105,821	228,757

Alternative A - No Action

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

Thunder Basin National Grassland

Motorized access to most of TBNG is present on authorized roads which usually means higher concentrations of human use adjacent to motorized routes and in habitat areas. In addition, with increased road use, comes increased noise which has been identified as a specific stressor on GRSG (Holloran 2005), particularly during breeding and nesting periods. These disturbances can cause impacts on reproduction and survival (Blickley and Patricelli.2012). Under this alternative most recreational activities and noise associated with traffic would not be moderated in GRSG habitat.

Bridger Teton National Forest

Motorized travel is currently limited to designated routes (roads and trails). New or modified management practices may be permissible. Through site specific NEPA projects and land transactions, the transportation system may be modified as necessary to provide for forest management, public health and safety, and access to public lands. Again, this may develop into higher concentrations of human use adjacent to motorized routes and in habitat areas. In addition, with increased road use comes increased noise. In this alternative most recreational activities and noise associated with traffic would not be moderated in GRSG habitat.

Medicine Bow National Forest

Travel Management Plans are currently in place across the MB. Motorized travel is currently limited to designated routes (roads and trails). Some Level 2 and 3 roads traverse the GRSG areas on the MB. Since there is infrequent maintenance received on these level 2 roads, they typically have low traffic volumes throughout the year with a potential increase during big game hunting seasons. These roads are all located along the forest boundary and are typically connected to roads that access adjacent federal, state, or private lands. Given expected increases in recreational and other uses of NFS lands, higher concentrations of human use adjacent to these motorized routes and in the associated habitat is expected. In addition, with increased road use, increased noise is expected. In this alternative most recreational activities and noise associated with traffic would not be moderated in GRSG habitat.

Analysis

There would be no changes to the current Forest Service roads, transportation plan, or recreation management. There would be few seasonal restrictions on vehicle access, some new roads, and upgrades to existing roads permitted. These activities would continue on 235,076 acres of PHMA and 676,618 acres of general habitat. There would be no density or disturbance limit for sagebrush habitat lost to road construction. There is a current Travel Management Plan in place for all three Forest Service units which address all non-special use travel. Restrictions on special uses may apply, but off-road permits are still issued. In general, more area and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance to GRSG.

Lands and Realty

Thunder Basin National Grassland

As a R2 Sensitive Species, GRSG habitat acquisition may be emphasized, however, some GRSG habitat could be traded to other ownership where the parcels are isolated lands that would reduce boundary conflicts with other ownerships or are otherwise in the public interest. Permitted rights-of-way (ROWs) would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation. Other impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat.

Bridger Teton National Forest

The ownership pattern is quite solid with only a few non-Forest Service parcels remaining within the forest boundary. Opportunities exist to secure additional lands for inclusion in the BT through land adjustments including purchase, exchange, and donation. Although the 1990 Forest Plan does not speak to the GRSG specifically, it is listed as an R4 Sensitive Species and GRSG habitat acquisitions may be emphasized.

Medicine Bow National Forest

As a R2 Sensitive Species, GRSG habitat acquisition may be emphasized, however, some GRSG habitat could be traded to consolidate ownership or to reduce boundary conflicts with other ownerships or are otherwise in the public interest.

Analysis

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 within all three units. There would be 4186 acres of ROW exclusion areas in GRSG habitat (Appendix 1). All Forest Service lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation. Other impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat.

Range

Thunder Basin National Grassland

Under current management direction, livestock annually graze on most rangelands and GRSG habitats. Exceptions are areas which are inaccessible or areas which are not capable of supporting grazing. On the TBNG, 86 percent of the rangelands are classed as primary range, 14 percent as secondary, and just under 1 percent are inaccessible. Classification of the secondary range is almost exclusively the result of topography. The distance from water has a minimal effect on this determination. These results suggest that most suitable rangeland is primary range that receives relatively uniform grazing in most years. The current grazing systems in use on the TBNG, expressed as a percentage of land in each allotment, are 1) continuous system-7 percent; 2) deferred use - 3 percent; and 3) deferred rotation - 90 percent. Although most suitable acres of rangeland are grazed annually, not all acres are grazed simultaneously. Generally, no more than 40 percent of the TBNG suitable acres are grazed at any one time.

Bridger Teton National Forest

A total of 54 active allotments are managed under current (post-1990) NEPA decisions. Another 35 allotments (19 for cattle and 16 for sheep) are in various stages of analysis for subsequent decisions affecting grazing authorization. The remaining allotments are managed in accordance with current Forest-wide goals, objectives, standards, and guidelines until an allotment of

specific desired conditions and management plans can be developed. The BTNF allotments are managed under various grazing systems including rotational rest, rotational deferment, herded once-over grazing (sheep), and season-long grazing. Livestock grazing is permitted on 3270 acres (55 percent) of priority core habitat on four active BTNF cattle allotments. Data reflecting stream-bank disturbance has been used to identify grazing-related issues in some GRSG habitat areas of allotments currently under analysis.

Medicine Bow National Forest

Allotments are managed under a variety of grazing systems including rotational rest, rotational deferment, and season-long grazing. Grazing in GRSG habitat would continue as directed in the Forest Plan to achieve the vegetative use guidelines based on other resource issues.

Maximum allowable use guidelines in the Forest Plan are moderate; no more than 50 percent use of forage under a deferred rotation system and no more than 55 percent use of forage under a rest rotation system. Lower allowable use guidelines (40-45 percent) are applied to rangelands in unsatisfactory condition. Additional guidelines for riparian areas include leaving four-six inches of residual stubble in riparian areas at the end of the grazing season.

Analysis

There would be no change in the numbers, timing, or method of livestock grazing on any of the three Forest Service units. While most range improvements are designed to avoid a direct negative effect on GRSG, some range improvements may still create negative impacts on GRSG. Un-marked fences and stock water tanks without escape ramps suitable for GRSG would exist. Other potential adverse effects on GRSG habitat could include habitat fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

Mineral resources include the individual resources of leasable, locatable, and salable (common variety) minerals. Leasable minerals include: oil, gas, coal, oil shale, phosphate, and sodium brine. Locatable minerals include: iron, gold, copper, silver, lead, and zinc. Salable minerals include common variety materials such as: sand, gravel, stone (e.g., decorative stone, limestone, and gypsum), clay (e.g., shale and bentonite), limestone aggregate, borrow material, clinker (scoria), leonardite (weathered coal), and petrified wood. In addition, renewable energy is generally defined as energy derived from sources continuously replenished by natural processes including wind, solar, biomass, and geothermal.

Thunder Basin National Grassland

Energy development consisting of coal, oil, and natural gas has been a predominant use of public lands on the TBNG. Given that the TBNG may in its entirety be described as occupied GRSG habitat, energy development will continue to be an issue relevant to the conservation of GRSG. Energy development on TBNG is also of national importance. The TBNG produces significant quantities of coal. There are four coal mines on the TBNG either in production or in some phase of planning or construction. The four mines have a collective footprint of over 120,000 acres within the planning area of which approximately 44,500 acres is on Forest Service lands. These lands produced 22.2 percent of the entire nation's coal in 1997 and they have continued to increase production. In addition, there are significant oil and gas exploration and development activities occurring and planned on TBNG. The majority of all GRSG habitats are open to leasing including expansion of existing leases with no cap on surface disturbing activities.

Bridger Teton National Forest

A small percentage of Forest Service lands are subject to present oil and gas operations or future oil and gas leasing subject to valid existing rights. There are a limited number of oil and gas leases in a variety of dispositions and few areas available to future oil and gas leasing. There are 14 leases held by production and have authorized and ongoing activities. Of the remaining areas available to future leasing on the BT, most areas are in the far eastern portion of the BT National Forest and on the front range of the Wind River Range outside of the Wind River Wilderness. The Wyoming Range Legacy Act allows a very limited area for future leasing adjacent to existing leases held by production. Since the passage of the Wyoming Range Legacy Act, one oil and gas lease has been terminated by the BLM. Per the Wyoming Range Legacy Act, this parcel may never be leased again and is, therefore, permanently closed to further mineral leasing. Natural gas demands and consequently supplies are expected to increase in the next decade due to the use of natural gas as a transition fuel from crude oil to greener energy technologies. There is no active coal lease or an expressed interest on the BT National Forest in the near future. There were two placer mines in operation on the BT National Forest in the recent past. There are no current placer operations on the BT National Forest. Locatable minerals are limited to gravel and sand sales. Gravel and sand mines are limited in number. There are numerous past geothermal exploration sites on the BT National Forest. There are no renewable energy projects on the BT National Forest, nor any foreseeable interest in these types of projects.

Medicine Bow National Forest

Mineral resource use on the MB National Forest has historically been widespread but sporadic. Mineral activity is presently concentrated in a few scattered areas. In 1995 the MB National Forest had 12 active oil and gas leases all of which expired without drilling activity by the year 2000. There are no oil and gas leases on the MB National Forest or any requests for leases on the MB National Forest. The MB National Forest has experienced limited seismic exploration. Most of the current mining activity on the MB National Forest has been considered "recreational" in nature which includes panning and suction dredging with a suction diameter of

three inches or less for short durations in specified timeframes. There are between one and three bonded small mining operations on the MB National Forest annually. Exploration, development, and production of locatable minerals will continue to depend on market prices and commodity supply and demand. There are exploratory core drilling operations on the MB National Forest about every third year, but after the exploratory drilling is completed, no further interest has been shown. While there has been some exploration of wind, solar, biomass, and geothermal resources, none of this has occurred in core or general GRSG habitat in this area.

Analysis

All leasing and lease operations are conducted in accordance to applicable laws, Forest Service policies, current forest or grassland LRMP, and lease stipulations. This energy development is a significant threat to GRSG as noted by the USFWS in the 2010 finding (75 FR 13910-14014) which is energy development is a significant risk to the GRSG in the eastern portion of its range (Montana, Wyoming, Colorado, and northeastern Utah – MZs I, II, VII and the northeastern part of MZ III). The primary concern is the direct effects of energy development on the long-term viability of GRSG by eliminating habitat, leks, and whole populations and fragmenting, some of the last remaining large expanses of habitat necessary for the species' persistence.
Energy development has also been identified as a major GRSG stressor in the Powder River Basin of Northeast Wyoming (Taylor et al. 2012).The above listed energy development impacts are a result of: increased anthropogenic disturbance of GRSG habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and development or removal of mineral materials.

Fire and Fuels Management

Thunder Basin National Grassland

In the Powder River Basin, sagebrush patch size has been reduced from an average of 820 acres to an average of less than 300 acres from 1966 to 2006, a 63 percent reduction (WGFD 2014). This reduction has come about from a variety of activities including wildfire and prescribed burning. There were 205 wildfires on the TB National Grassland surface from 2001-2011 averaging19 fires per year. (This does not include all wildland fires occurring on private and state lands during this time.) The average size of a fire on TB National Forest during this time was 173.5 acres with a total of 35,562 acres burned. The largest single fire was 5,670 acres and five of the 11 years had more than 2,500 acres burned each year. The dominant fuel types on TB National Forest are GRSG habitat (sagebrush and mixed-grass prairie) with lightening being the primary cause of wildfire (61 percent), and fires caused by the railroad (sparks) being the next most frequent cause (20 percent), and the remaining wildfires are caused by a variety of other sources.

Bridger Teton National Forest

Wildland fire on the BTNF are suppressed by means of full perimeter control; partially suppressed by means of full perimeter control on only certain portions of the fire; or managed entirely for resource benefits by methods of point protection for any values and monitoring of fire progression and effects. The prescribed burn program has treated 52,521 acres on the BT National Forest. Early burns focused on range and wildlife improvement with most acres burned in lower elevation sagebrush/grass and aspen. While much of the prescribed burning still occurs in using these types, more burning now occurs in conifer. Following the 2000 fire season, priority shifted to treating wildland urban interface areas with a resultant decrease in prescribed burn treatments. With the stabilization of the wildland urban interface program, landscape burning has slowly increased since 2003.

Medicine Bow National Forest

The MB National Forest encompasses a variety of different vegetation communities in a range of seral stages. Vegetation communities that are susceptible to fire include sagebrush, shrubland, and grassland communities at the lower elevations, mixed mountain shrub, aspen, and conifer stands at mid-elevations, and subalpine fir and Engelmann spruce at the highest elevations. Fire management options in critical GRSG habitat include Direct Control (not specifically identified but always an option), Perimeter Control, and Prescription Control, depending on the specific location

Analysis

Impacts from wildfires include removal or loss of large tracts of sagebrush habitat resulting in a direct loss of nests and loss of nesting habitat as well as hiding cover and winter range. Wildfire can also increase nonnative or exotic grasses or weeds causing additional impacts. For example, as cheatgrass invades habitat types it can out-compete many native grasses. With the increase in cheatgrass come potential increases in wildfire. Fire within a cheatgrass invaded vegetation type becomes cyclic because fire removes the vegetation, cheatgrass re-grows to denser conditions, and it creates a fine fuel accumulation ready to burn again at a much reduced fire return interval (Davies et al., 2011).

In Alternative A the use of prescribed fire generally is designed to maintain or improve habitat for desired plants and animals. However, prescribed burning is by design used to reduce the structure and seral condition when used in sagebrush. Recovery of sagebrush after burning can vary depending on the type of sagebrush and amount of annual precipitation. Mountain big sagebrush and silver sagebrush resprout and recover from burning far more readily than species such as Wyoming big sagebrush which may take decades.

Most of the published literature concludes that fire has a negative effect on GRSG (Braun 2006; Knick and Connelly 2011; Beck et al. 2012, USFWS 2013). Little research exists involving the use of prescribed fire as a tool to thin Wyoming big sagebrush stands. Most literature evaluates intensive burning with a result that is near total removal of sagebrush within the burn area. In this

alternative burning is permitted in GRSG breeding, nesting, and winter range. This type of treatment could result in a localized loss or reduction in nesting, wintering, or hiding cover habitat while at the same time potentially increasing brood rearing habitat.

Prescribed fire can be a useful tool to remove conifer encroachment into GRSG habitat, but mechanical treatment was recommended in order to provide the most rapid recovery of the sagebrush community (Davies et al. 2011).

CUMULATIVE EFFECTS

The prognosis for continuation of the current management actions on GRSG habitat is a trend toward fewer suitable GRSG habitats due to the combination of impacts from habitat modification, fragmentation, or loss resulting from anthropogenic disturbance, wildfire, and invasion of undesirable vegetation such as cheatgrass and juniper. GRSG populations have been steadily declining on and adjacent to Forests Service lands since 2006 with cyclic trends showing declines over a much longer period. Given the previous discussion about habitat, it could be expected that the populations associated with Forest Service lands will continue to decline under current management direction. On the T BNG this trend combined with the potential for impacts associated with disease such as West Nile is likely to result in further reductions in the distribution of GRSG within geographic areas and across the entire TBNG. Alternative A, the "No Action" Alternative, provides the least protection for GRSG and lowest level of conservation.

DETERMINATION

The 36 CFR 219.19 defines a "viable population" as one that has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. Garton et al. (2011, Ch. 15), Garton et al. (2015) and the COT Report (USFWS 2013) indicate that the persistence of GRSG under current management is at risk.
This is further supported by the USFWS listing decision (2010) stating that the GRSG is "warranted, but precluded due to higher priorities" for listing under ESA. The two primary factors for this determination were: 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. In 2011 and 2012, the USFWS submitted letters to the BLM and Forest Service recommending that the agencies amend LUPs to provide adequate regulatory mechanisms to conserve the species.

Based on this information, the current management standards in the TB National Forest, MB National Forest, and BTLRMP are not sufficient to maintain viability across each of the planning units. Therefore, it is my determination that Alternative A is "likely to result in a loss of viability in the Planning Area, or in a trend toward federal listing" for the GRSG for all three planning units.

Alternative B

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

In priority GRSG habitats (PPH) new road construction would be limited to areas with less than 3 percent habitat disturbance allowing only the minimum necessary road standard and no upgrading of current roads. Existing roads not designated in a Travel Management Plan would be reclaimed. All travel would remain on designated routes. Recreational use permits would only be permitted in PPHs if there was a neutral or beneficial impact on GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels which are lower in Alternative B (20-24 decibels) than Alternative A. All GRSG PPH and important bird areas could be designated as Special Interest Areas (SIAs). There would be less disruption of habitat and breeding in addition to reduction of road associated mortality. These measures allow less habitat loss and disturbance than Alternative A retaining more suitable habitat.

Lands and Realty

The PPH would be managed as an exclusion area and PGH (General Habitat) would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PPH. These conservation measures are more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PPH. (See Appendix 1 at the end of this document for specific acres of land use restriction by Alternative.)

Range

Alternative B adjusts grazing direction in GRSG PPH. Livestock improvements could occur only if beneficial to upland or riparian habitat conditions. Areas not meeting grazing standards will be only lightly grazed with 20-30 percent forage allocation for livestock. Fencing would be developed to reflect GRSG needs in all GRSG habitats. Outside of PPH, the potential effects due to livestock grazing, vegetation disturbance, and range improvements would be the same as Alternative A. Potential adverse effects on GRSG habitat include habitat fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

The PPH would be closed to new coal, energy and non-energy leasable materials as well as fluid mineral leases. Existing leases would have a four mile no surface occupancy buffer around leks. Conditions of approval (COAs) would be attached to existing leases during analysis and

approval of exploration and development activities to minimize or avoid the impacts on GRSG through a project design. Exceptions, waivers, modifications to lease stipulations, COAs, and terms and conditions (T&Cs) for GRSG would not be considered within PPH. Outside of PPH, mineral development would be the same as Alternative A. This alternative better conserves PPH GRSG habitat than Alternatives A, D, and E and it is equal to Alternative C. (See Appendix 1 at the end of this document for specific acres of land use restriction by Alternative.)

Fire and Fuels Management.

Prescribed fire in sagebrush would be very limited in PPH and emphasize protection of existing sagebrush ecosystems. Suppression and habitat protection also would be emphasized. In PPH areas within precipitation zones of 12 inches or less, fire is not used to treat sagebrush unless as a last resort for fuel breaks and it must be within a 3 percent disturbance limit. This would promote the conservation of sagebrush habitats and reduce disturbances to habitat associated with fire in PPH. Habitat restoration would be a priority. This alternative conserves more habitat than Alternatives A, D, and E but conserves less than Alternative C.

CUMULATIVE EFFECTS

Disturbance limitations in PPH would limit anthropogenic impacts on GRSG structural habitat conditions to a 3 percent disturbance cap. With the increased emphasis on fire suppression, reduced energy development, noise restrictions, and livestock grazing modifications within PPH, GRSG habitat usability should remain stable with a potential for improving habitat in areas already exceeding the 3 percent disturbance limitation. Additional management direction for PGH will increase habitat protections under this alternative. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C. Based on the above habitat discussion and protections, the GRSG population would have a modest probability of developing a stable or upward trend. Many of the documented stressors are reduced in PGH, and have been removed in the case of PPH. This alternative would encourage an improvement in habitat conditions that would be reflected by an increase in male attendance at more leks. While the potential for West Nile has not been removed, the potential for a larger population distributed across the landscape would improve the probability of more birds surviving an outbreak. The expected increase in population size also provides the opportunity GRSG to re-populate geographic areas where they are absent or decreasing under Alternative A management.

DETERMINATION

In Alternative B the GRSG population would likely be stable or show an upward trend on TBNG. Many of the documented stressors would be stabilized, reduced, or removed in much of the GRSG habitat across the national forests and grassland. This alternative would encourage better habitat conditions. This alternative focuses primarily on PHMA protections.

Within the BT National Forest there is only 5,933 acres of PHMA. This represents less than 3 percent of the GRSG habitat on the BT National Forest. On the MB National Forest the PHMA makes up less than 19 percent (5,019 acres) of the GRSG habitat. Only on the TB National

Grassland is there a substantial amount of PHMA. This habitat designation represents approximately 40 percent or 235,076 acres of the TB National Grassland.

Therefore, it is my determination that Alternative B "may impact individuals but is not likely to cause a trend to federal listing or loss of viability" for the GRG on the TB National Grassland. Alternative B is "likely to result in a loss of viability in the Planning Area, or in a trend toward federal listing" for the GRSG within the BT National Forest and MB National Forest.

Alternative C

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

Conservation measures would be more beneficial to GRSG and their habitat than all other alternatives. These conservation measures are generally applied to both PPH and PGH. GRSG PPH and PGH habitat areas would be managed as ROW exclusion areas for new ROW or special use authorization (SUA) permits. New road construction would be prohibited within four miles of active GRSG leks and avoided in PPH and PGH. Existing road management would be designed to maintain or improve both PPH and PGH. Road associated noise would be limited to less than 10 decibels above ambient levels of 20-24 decibels. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. There would be less disruption of habitat, breeding, and reducing road associated mortality. These measures allow the least habitat loss and disturbance of all Alternatives, retaining more suitable habitat.

Lands and Realty

Alternative C would have the most protective measures for GRSG. No GRSG habitat in PPH would be exchanged away. The Forest Service will strive to acquire important private lands in areas identified as GRSG Special Areas. Alternative C would encourage consolidation and acquisition of GRSG habitat. This alternative would promote the greatest distribution and highest density of suitable GRSG habitat.

Range

Livestock grazing would be prohibited within PPH. All new structural range developments and location of supplements would be avoided in both PPH and PGH unless they show benefits to GRSG. Grazing and trailing within lekking, nesting, brood-rearing, and winter habitats would be avoided during periods of the year when these habitats are utilized by GRSG. Within all GRSG habitats, sagebrush reduction/treatments to increase livestock or big game forage would be avoided. Post-fire which includes both prescribed fire to protect existing sagebrush ecosystems and wildfire monitoring is required in all GRSG habitat before re-establishing grazing. Within PPH and PGH, livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve GRSG habitat objectives.

Livestock grazing can have positive or negative effects on GRSG habitats (Beck and Mitchell 2000). The prohibition of livestock grazing in PPH would result in higher herbaceous vegetation

cover for nest concealment, nest success, reduced predation, and increased chick survival (BER, Manier et al. 2013). Reduced structural developments would lower mortalities associated with fence collisions; disease such as West Nile when it is associated with stock water development; and habitat fragmentation associated with water pipelines. Livestock grazing can also be beneficial in the establishment and maintenance of GRSG leks (Beck and Mitchell 2000), and can stimulate forbs and increase their availability (BER, Manier et al. 2013). With monitoring and rest from grazing, post-burned habitat is more likely to return to quality GRSG habitat.

Energy and Minerals

No exceptions, waivers, or modifications to lease stipulations, COAs, and T&Cs will be considered within PPH and PGH. Both PPH and PGH areas would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations/expressions of interest would be accepted for parcels within PPH or PGH. Oil and gas leasing would not be allowed in PPH. Geophysical exploration would only be allowed in PPH and PGH to obtain exploratory information for areas outside of and adjacent to PPH and PGH habitat. It also would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing, and winter habitats during their season of use by GRSG. Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. No construction of evaporation or infiltration reservoirs to hold coalbed methane wastewater would be allowed. All PPH would be closed to non-energy leasable mineral leasing. PPH areas would be closed to mineral material exploration, sales, and free use permits.

Conservation measures would be applied to more GRSG habitat, in many cases for both PPH and PGH. Habitat effectiveness would be improved and fragmentation reduced or minimized. Since nearly all of TB National Grassland is in either PPH or PGH, many of these restrictions would be applied for the entire National Grassland. This alternative would have the greatest benefit to GRSG and their habitat as it relates to energy development. (See Appendix 1 at the end of this document for specific acres of land use restriction by alternative.)

Fire and Fuels Management

Within all GRSG habitats, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all GRSG habitats, sagebrush reduction/treatments to increase livestock or big game forage would be avoided. Sagebrush canopy cover would generally not be reduced to less than 15 percent within any GRSG habitat. Vegetation treatments in both PPH and PGH would only be performed to improve landscapes that improve GRSG. For all GRSG habitat, fire would not be used to treat sagebrush in precipitation zones with less than 12 inches except as a last resort as a fuel break. Post fuels management projects will be designed to ensure the long-term persistence of seeded or pre-treatment native plants including sagebrush. Any vegetation treatment plan will include pretreatment data on wildlife and habitat condition; establish non-grazing enclosures; and include long-term monitoring where treated areas are monitored for at least three years before

grazing resumes. Grazing will not occur on burn areas until woody and herbaceous plants achieve GRSG habitat objectives. No fuels treatments would be allowed in known GRSG winter range unless treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. Fuels reduction projects including roadsides or other areas in all GRSG habitats would utilize mowing. In PPH habitat areas, fire suppression to conserve GRSG habitats would be prioritized immediately after firefighter and public safety.

Prescribed fire in sagebrush would be very limited in all GRSG habitats, and suppression would be emphasized in PPH. This would promote habitat conservation and reduce disturbance associated with fire. In addition, habitat restoration would be a priority. These measures would help improve overall GRSG habitat. This alternative conserves more sagebrush habitat, with higher shrub canopy cover, than all other alternatives. Management should result in a localized increase in nesting, wintering, or concealment habitat, while at the same time potentially allowing sagebrush encroachment into brood rearing habitat. The loss of fire as a tool could also limit the removal of conifer encroachments into some sagebrush habitats.

CUMULATIVE EFFECTS

This alternative provides habitat protections for both PPH and PGH habitats. While these two habitats combined represent only a small portion of the MB National Forest and the BT National Forest, they represent the entire GRSG habitat on TB National Forest and the majority of the TB National Grassland excluding only the coal mine areas and ponderosa pine habitat type. This would result in very limited anthropogenic impacts on GRSG structural habitat conditions on all units. With the increased emphasis on fire suppression, reduced energy development, noise restrictions, and livestock grazing limitations, overall GRSG habitat usability should remain stable with a high potential for an improving trend. However, there are negative impacts to this alternative with the complete exclusion of grazing and the loss of fire. These tools, if used properly, can contribute to the maintenance and improvement of key habitats including brood rearing habitat and conifer removal.

Overall, this alternative provides more suitable habitat than Alternatives A, B, D, and E. Based on the above habitat discussion and protections, the GRSG population would have a higher probability of achieving a stable or upward trend. Many of the documented stressors have been reduced or removed in much of the GRSG habitat across the National Forests and Grassland. This alternative would facilitate improved habitat conditions that would be reflected by increased male attendance at leks across most geographic areas. While the threat of West Nile virus cannot been eradicated, habitats will be managed to allow the potential for a larger population distributed across the landscape which may increase the potential for more birds to survive an outbreak. The expected increase in population would also provide the opportunity for GRSG to re-populate areas where they are currently absent or decreasing under current management in Alternative A.

DETERMINATION

In Alternative C, the GRSG population would have a higher probability for population recovery and persistence. Many of the documented stressors have been reduced or removed in habitat across the National Forests and Grassland. This alternative would result in better habitat conditions for GRSG. Therefore, it is my determination that Alternative C "may impact individuals but is not likely to cause a trend to federal listing or loss of viability" for the GRSG for all three units comprising the BT National Forest and MB National Forests and the TB National Forest.

Alternative D

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than Alternatives B, C, or E. Most management measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap in PPH and it does require consideration of GRSG needs for recreation special uses in PPH (Core). The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to GRSG than Alternative A due to the 9 percent disturbance cap that Alternative A does not have.

Lands and Realty

Surface disturbance and surface occupancy in PPH and PPH connectivity habitat will be allowed greater than 0.25 miles from GRSG leks. This is closer than the disturbance allowed under the other alternatives except Alternative A.

New ROWs and SUAs in PPH (Core) would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in PGH (Core). (See Appendix 1 at the end of this document for specific acres of land use restriction by Alternative.)

Range

Conservation measures are similar to Alternative A. Grazing management strategies would be developed cooperatively with permitees, lessees and other landowners on an allotment-by-allotment basis to improve GRSG habitat. As grazing permits are renewed in PPH, GRSG habitat objectives and management considerations could be incorporated. Up to 15 percent of PPH could be retired from domestic livestock grazing where permitees or lessees voluntarily relinquish their grazing preference.

Vegetative management and grazing infrastructure is essentially the same as Alternative A. Potential adverse effects on GRSG habitat could include habitat fragmentation due to

infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

Conservation measures are similar to Alternative A. However, there is a 9 percent disturbance cap that does not exist in Alternative A. The lack of conservation measures in sagebrush outside of PHMA could lead to: increased anthropogenic disturbance of GRSG habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas;, noise; industrial campsites; and development or removal of mineral materials. (See Appendix 1 at the end of this document for specific acres of land use restriction by alternative.)

Fire and Fuels Management

There would be few restrictions for fuels management in sagebrush habitats. Treatment is restricted only by the 9 percent disturbance cap in priority. This treatment would follow Wyoming Game and Fish Department Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011) for determining whether proposed treatment constitutes a “disturbance” that will contribute toward the 9 percent threshold. Treated areas would not be rested from grazing resulting in the potential to promote the expansion of noxious weeds and reducing hiding cover. Also, treatment is permitted in GRSG breeding, nesting, and winter range. These limited conservation measures in PHMAs and the lack of measures in the remainder of GRSG habitat would have detrimental impacts on GRSG. This management approach could result in a localized loss or reduction in nesting, wintering, or hiding cover habitat while at the same time potentially increasing brood rearing habitat.

CUMULATIVE EFFECTS

This alternative mirrors much of the management direction in Alternative A. As displayed in Alternative A, there is a downward trend in habitat suitability and availability which can also be expected for this alternative. The few conservation measures included in this alternative are limited to PHMA and with this only representing small portions of the GRSG habitat within TB National Grassland and the BT National Forest, they are not expected to be sufficient to create a noticeable positive change in GRSG habitat across either planning unit (TB National Grassland or BT National Forest). With implementation of this alternative, energy development, wildfire, road development, and increased noise would likely work together to continue to fragment and reduce suitable and effective GRSG habitat. Considering all of this, habitat could be expected to continue to decrease in effectiveness and size in this alternative.

Since this alternative uses the Alternative A management direction, it is reasonable that the population trend associated with the Alternative A management would be similar to the results expected in that alternative. GRSG populations have been steadily declining since 2006 in populations associated with the National Forest Service lands with cyclic trends in decline from a longer period of time. With the above discussion about habitat in mind, it is expected that the GRSG population would continue to decline. This trend combined with the potential for West Nile is likely to lead to additional reductions in the distribution of GRSG.

DETERMINATION

This alternative mirrors much of the management direction in Alternative A, therefore, its impacts and determinations also mirror results expected in that Alternative. As displayed in Alternative A, there is a continued downward trend in habitat suitability and availability which can also be expected for this alternative. The few conservation measures included in this alternative are limited to PHMA and with this only representing small portions of the GRSG habitat within the MB National Forest and the BT National Forest, they are not expected to be sufficient to create a noticeable positive change in GRSG habitat across either planning unit in the MB National Forest or BT National Forest. These conservation measures do not substantially improve the GRSG habitat management on the TB National Grassland to the point of being significantly different from Alternative A as well.

With this alternative being similar to Alternative A, the concerns expressed in Garton et al. (2011) and the COT report (USFWS 2013) would likely not be remediated in this alternative. The persistence of GRSG in this management framework would result in further declines of GRSG populations on Forest Service units.

Therefore, it is our determination that Alternative D is “likely to result in a loss of viability in the Planning Area, or in a trend toward federal listing” for the GRSG for all three planning units.

Proposed Plan Amendment (Preferred Alternative)

Forest plan amendment language was specifically developed for this alternative and detail management direction for desired conditions, goals, objectives, guidelines and standards focused on the management of Forest Service units. Management direction was specifically developed to provide assurances for the retention and improvement of GRSG habitats that would allow the persistence of GRSG populations on Forest Service lands in Wyoming. The following summarizes the management direction associated with the implementation of Alternative E under the Forest Plan Amendment.

In this alternative, the Forest Service would add additional area to PHMA for the BT National Forest and the TB National Grassland. This is habitat that had been previously classified as GHMA. Table 12 shows the Proposed Forest Plan Amendment habitat by unit which includes these additional habitat acres designated as Priority Core, Priority Connectivity, or Sagebrush Focal areas. Unless otherwise noted, Priority Core and Priority Connectivity are considered

PHMA. GHMA will continue as GHMA and Sagebrush Focal Areas will be identified separately. They were added by the Forest Service to help meet the "well distributed, viable populations" needs described in 36 CFR 219.19.

Table 12: Greater Sage-Grouse Habitat on Forest Service Lands for the Proposed Plan Amendment (Acres).

Management Unit	Total Mapped GRSG Habitat	Priority Core	Priority Connectivity	Sagebrush Focal Areas	General Habitat
Bridger-Teton	**333,510 (100%)**	**35,318 (10.6%)**	**62,435 (18.7%)**	**33362798**	**232,432 (51.9%)**
Medicine Bow	**27,654 (2.2%)**	**5,019 (18.2%)**	**0**	**0**	**22,635 (81.6%)**
Thunder Basin	**553,864 (100%)**	**268,835 (48.5%)**	**6,356 (1.2%)**	**0**	**278,673 (50.3%)**
Total Acres	**915,012**	**309,172**	**68,791**	**3336**	**533,731**

Table 12 in contrast to Table 13 below displays the amount of GRSG habitat by acres and percent of unit on each Forest Service unit for Alternatives B, C, and D. Alternative A has no designated PHMA direction and hence was omitted **from the Table.**

Table 13: Acres of Greater Sage-Grouse Habitat on Forest Service Lands for Alternatives B, C, and D.

Management Unit	Total Unit Area	Sagebrush Habitat	Priority Core	Priority Connectivity	Sagebrush Focal Areas	General Habitat
Bridger-Teton	**3,400,000**	**430,870 (12.7 %)**	**5,933 (1.7%)**	**0**	**0**	**324,423 (9.5%)**
Medicine Bow	**1,262,325**	**132,863 (10.5%)**	**5019 (0.4)**	**0**	**0**	**22,635 (1.8%)**
Thunder Basin	**553,864**	**438,500 (77.4%)**	**217,768 (39.2%)**	**6,356 (1.2%)**	**0**	**329740 (59.6%)**

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

New primary (category level four and five) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA management area in ROW exclusion areas (2164 acres) and SFAs (1178 acres) (see Appendix 1 Table 1). Similarly, road construction of any category would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs within 0.25 miles of a lek in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance cap on sagebrush habitats in PHMA areas and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs.

Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat loss or degradation; less disruption of nesting, hatching, abandonment of young; or temporary displacement of sagebrush habitat compared to Alternatives A and D.

Lands and Realty

Some short-term impacts could occur. Small amounts of sagebrush habitat could be lost, degraded, or disturbed due to the 5 percent disturbance cap for sagebrush habitat in PHMA or SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors; power lines >0.6 miles from occupied leks in PHMA and SFAs; and some special uses. However, there would be 5362 acres of ROW exclusion areas in GRSG habitat on Forest Service lands. Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership though this is expected to be only for limited situations. Overall, impacts on sagebrush habitat, predominantly PHMA and SFAs, would be reduced compared to Alternatives A and D, but would be greater than impacts on sagebrush habitat in Alternatives B and C.

Range

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. In particular, grazing will be managed to meet a 7-inch residual grass height within 5.3 miles of a lek during breeding and nesting and four inches during the post-nesting period. There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands ≤ 200 acres.

TB National Grassland also has several additional exceptions applied for this direction. First, if 90 percent or more of the allotment falls within nesting or brood rearing habitat, 25 percent of the allotment would be exempt from meeting residual stubble height requirements. This direction

is not applied to areas where GHMA overlaps with Management Area 8.4 (Mineral Production), Management Area 3.63 (Black-Footed Ferret Reintroduction Habitat), or other designated areas for short-grass species (approximately 98,000 acres or 18 percent of TB National Forest). There are also areas of the TBNG that do not fall within 5.3 miles of a GRSG lek, adding additional areas where the residual stubble height would not apply. Potential adverse effects on sagebrush habitat from this exception could result in habitat loss or degradation, or fragmentation due to infrastructure development. Other conservation measures apply to all PHMA and SFAs.

Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. There could be areas of improved habitat for productive breeding, nesting, and brood rearing in PHMA and SFAs and sometimes in GH.

The conservation measures for this alternative improve sagebrush habitat in PHMA, SFAs, and GHMA better than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, none in SFAs, and less than those in general habitat. Alternative C excludes livestock grazing in PHMAs. While grazing can have a detrimental effect on GRSG habitat, it can also promote habitats such as lekking and brood rearing. Appropriate grazing can also reduce fine fuel loading to reduce the threat of wildfire. Overall, Alternative E would provide improved grazing management to maintain GRSG seasonal habitats.

Energy and Minerals

In all GRSG habitats but especially PHMA and SFAs, mineral operators will be encouraged to reduce disturbance to GRSG habitat for existing lease areas. There is a 5 percent disturbance cap plus a one facility per 640 acres density limit in PHMA and SFAs. Habitat disturbing activities within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. For example, fluid mineral leasing would be closed on 3343 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA on GRSG breeding and winter concentration areas. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed in a manner to reduce the potential for West Nile virus.

The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA better than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternatives B and C are generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs and also primarily in GH. There is a 5 percent disturbance cap for sagebrush disturbance in PHMA and SFAs. Prescribed fire would be restricted in areas of Wyoming big sagebrush or other xeric sagebrush species where fire-invasive species occur, such as cheatgrass, and/or within areas of less than 12-inch precipitation zones within priority and GH or SFAs.

In addition, vegetation treatment in PHMA and SFAs in nesting and wintering habitat in northeast Wyoming that would reduce sagebrush canopy to < 15 percent would also be restricted.

Conservation measures would maintain sagebrush habitats better than Alternatives A and D which utilize a no disturbance limit and a 9 percent disturbance limit for these Alternatives respectively. Sagebrush treatment would be guided by Table 1, Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in priority and GHMA management areas. In summary, impacts on mature sagebrush habitat would be reduced.

Cumulative Effects

In Alternative E the Forest Service added additional acreages to PHMA for the BT National Forest and the TB National Grassland to help ensure sufficient legal for NFMA and CFR direction to meet viability requirements on each unit. These areas are associated with important GRSG populations that are well distributed within the suitable habitat across each unit. This is habitat that had been previously classified as GHMA and is now designated as Priority Core, Priority Connectivity, or Sagebrush Focal areas. These areas in addition to the previously classified PHMAs increase the area managed as priority GRSG habitats. On the BT this is an increase of 91,586 acres and on the TBNG it is an increase of 51,067 acres. There was no increase in these areas on the MB National Forest. This represents a change in PHMAs from 1.7 percent to over 29.5 percent of the GRSG habitat on the BT National Forest and a change of 40.4 percent to 49.2 percent on the TB National Grassland.

Most of the aforementioned conservation measures apply to PHMAs and Sagebrush Focal areas. Of importance for all resource areas is the 5 percent disturbance cap and one facility per 640 acres density limit in PHMA and SFAs. These measures provide additional protection from further habitat loss due to anthropogenic development. However, these disturbance allowances will still result in minor losses of GRSG habitat.

In this alternative, many of the conservation measures are extended to the GHGHMA; increasing their effectiveness; and reducing the loss or fragmentation of mature sagebrush habitat in these areas. Also key to this alternative is the residual cover direction that is applied to grazing within

5.3 miles of a lek in both priority and general (with some exceptions) habitats. This direction will provide quality GRSG habitat to most of the occupied GRSG habitat.

In addition to other conservation measures, this alternative attempts to implement the Wyoming Governor's Greater Sage-Grouse Core Area Protection Executive Order as well as to provide additional areas of conservation. The sites associated with the TB National Grassland have been identified as important to the local core (PPH) areas. This is supported by the following guidance from USFWS GRSG data call and submitted by Wyoming Game and Fish Department, October 31, 2014.

Associated with the Newcastle Core Area: "The Forest Service has identified and proposed additional sites to manage under core area stipulations that will be outlined in the GRSG amendment for the TBNG. These additional areas do not have existing threats and will provide habitat for the viability of the Newcastle core area."

Associated with the Thunder Basin Core Area: "The Forest Service has identified and proposed additional sites to be managed under core area stipulations that will be outlined in the sage-grouse amendment for the TB National Grassland which will likely benefit sage-grouse in this core area."

While this strategy has not been fully implemented in all areas, it is resulting in improved conditions for Core Areas associated with these three Forest Service Planning units. Below are trend graphs for these Core Areas. Of particular interest are the changes since 2013 to the present. While not all of the graphs show a positive change, most of them show a stable or increasing trend. In 2012 both the BLM and the Forest Service provided direction on implementing the Wyoming Governor's Executive Order. Before this change, there was no consistent implementation of management direction. In addition, these core areas include private and state ownership as well. Although these data are preliminary, they do suggest that the populations may be stabilizing and possibly increasing with the implementation of more protective management direction. It is also important to note that Alternative E does not rely only on the implementation of the Executive Order, there are additional conservation measures that are designed to influence and improve the conservation and recovery of the GRSG.

Core Areas Associated with the Thunder Basin National Grassland

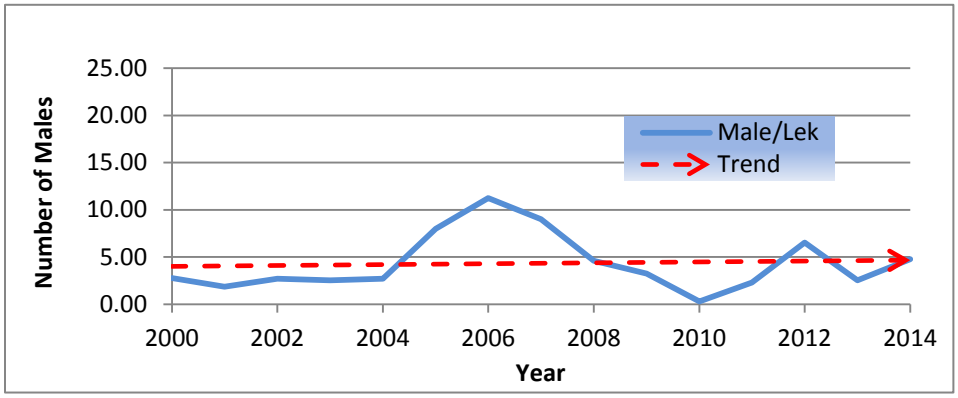


Figure 10. Average Males/Checked Lek for the North Gillette Core (2000-2014)

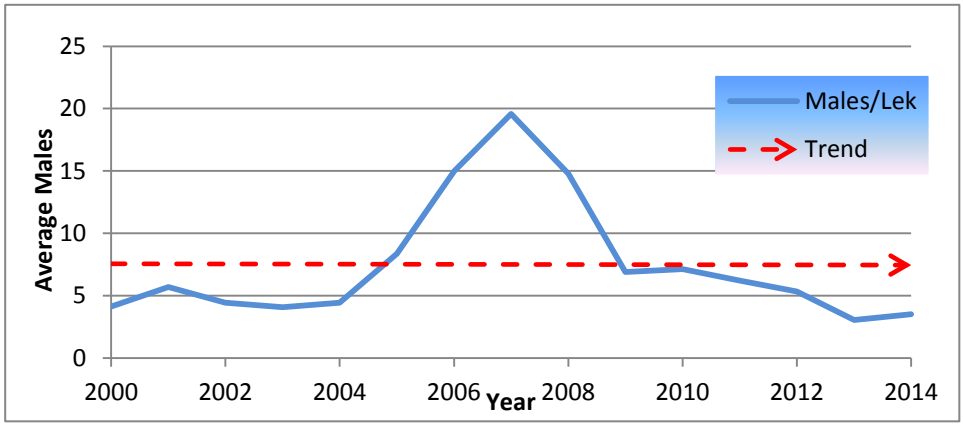


Figure 11. Average Males/C Lek for the Thunder Basin Core (2000-2014)

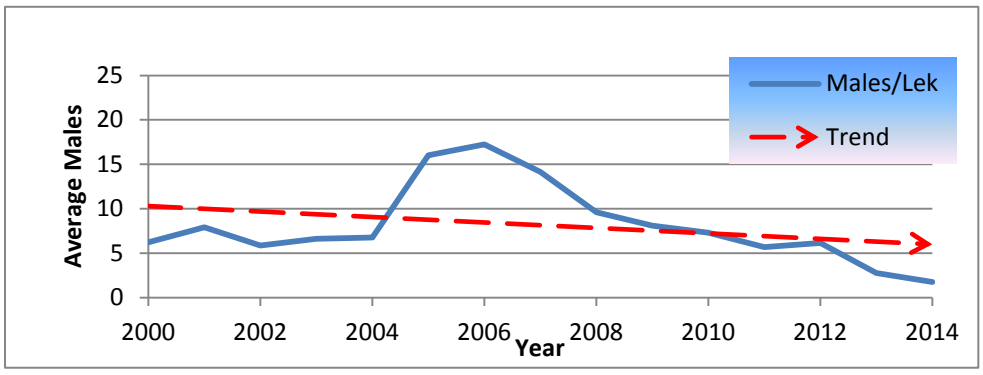


Figure 11. Average Males/Checked Lek for the Newcasatle Core (2000-2014)

Core Areas Associated with the Bridger Teton National Forest

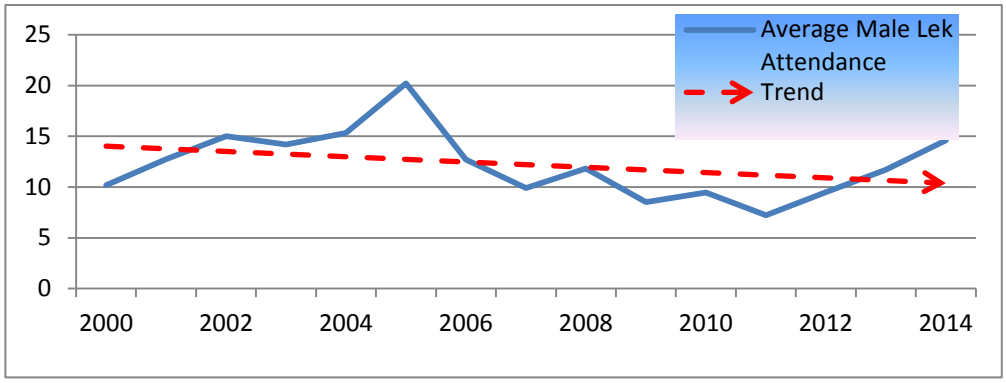


Figure 5: Jackson Hole Core Area

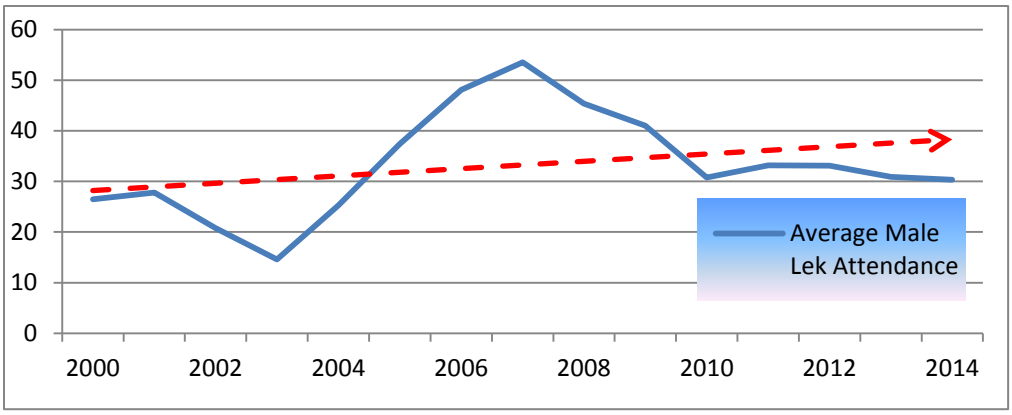


Figure 6: Daniel Core Area

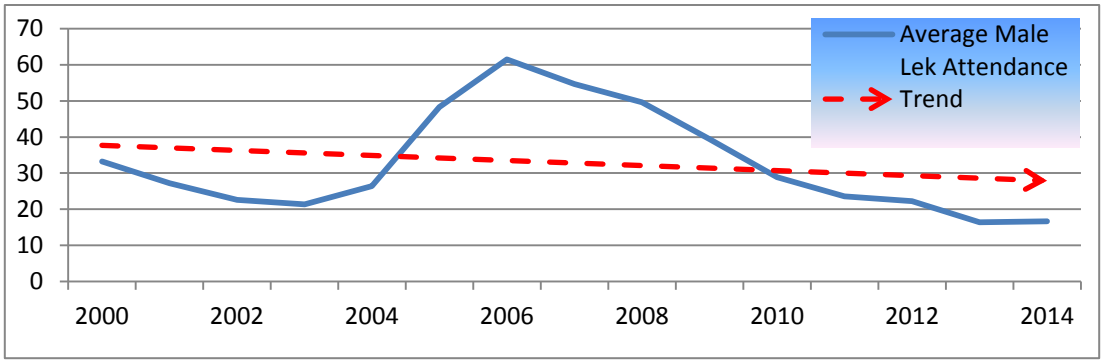


Figure 7: Greater South Pass Core Area

Core Areas Associated with the Medicine Bow National Forest

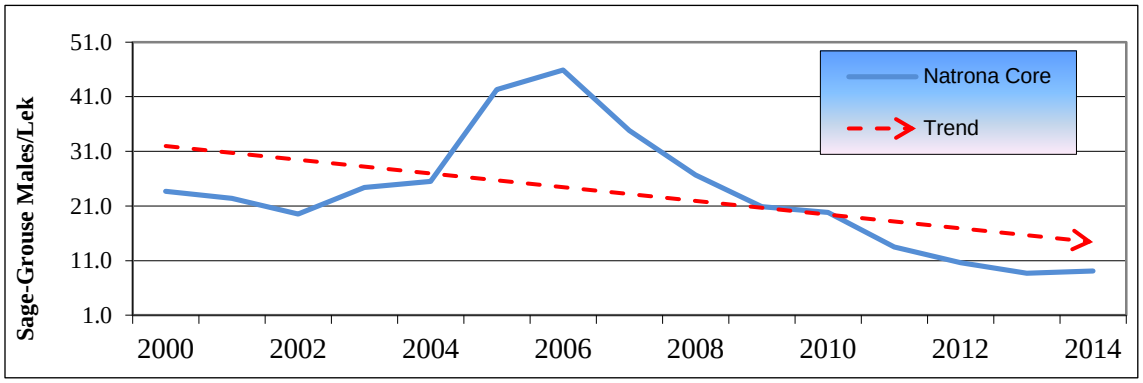


Figure 8. Average Males/Checked Lek for the Natrona Core (2000-2014)

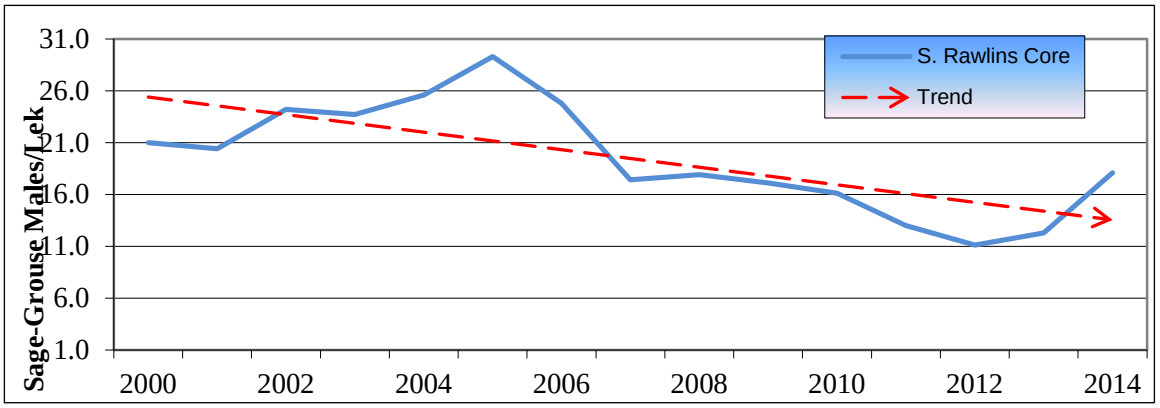


Figure 9. Average Males/Checked Lek for the South Rawlins Core (2000-2014)

Overall, the effects of management in the Proposed Alternative result in fewer negative impacts than Alternatives A and D, but are also greater than those impacts associated with Alternative C or Alternative B. Based on the above habitat discussion and protections, the GRSG populations have a high probability of stabilizing or improving under the management direction of Alternative E. Many of the documented stressors have been stabilized, reduced, or removed in GRSG habitat across the National Forests and Grassland. This alternative would encourage better habitat conditions that would be reflected by increased male attendance at leks. While the potential for West Nile virus is not removed, the potential for a larger population distributed across the landscape could increase the potential for more birds to survive an outbreak. The expected increase in population trend would also provide the opportunity for GRSG to re-populate areas where they are absent or decreasing under current management.

DETERMINATION

In Alternative E the GRSG population would have high probability of achieving a stable or upward trend. Many of the documented stressors are stabilized, reduced, or removed in GRSG habitat across the National Forests and Grassland. This alternative would encourage better

habitat conditions. Therefore, it is my determination that Alternative E "may impact individuals but is not likely to cause a trend to federal listing or loss of viability" for the GRSG for all three planning units.

SUMMARY OF THE GREATER SAGE-GROUSE ANALYSIS

The following table illustrates the findings of the analysis for each of the alternatives. It reflects a ranking of those alternatives that best provide for conservation of the GRSG. The alternative ranking from least to most protective is A, D, B, E, and C with those in red "likely to result in a loss of viability in the Planning Area, or in a trend toward federal listing" and those in green "may impact individuals but is not likely to cause a trend to federal listing or loss of viability." The yellow blocks indicate the alternatives by resource area that provide the best conservation for the GRSG by resource area.

Table 14. General findings of the Greater Sage-grouse analysis for the 3 Wyoming National Forests.

Resource Area	Alt A	Alt B	Alt C	Alt D	Alt E
Recreation and Travel	Least Protective	More protective than Alternatives A, D, E Not C	Alternative C m most protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
Lands and Realty	Least Protective	More protective than Alternatives A, D, E Not C	Alternative C most protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
Range	Least Protective	More protective than Alternatives A, D Not C & E	More protective than A, B and D Not E	Better than A Not B, C, or E	Most protective
Energy and Minerals	Least Protective	More protective than Alternatives A, D, E Not C.	More protective than Alternatives A, D, E and B.	Better than A Not B, C, or E	More protective than A, and D Not B or C
Fire and Fuels	Least Protective	More protective than Alternatives A, D, E Not C	Alternative C most protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
CUMULATIVE EFFECTS	Least Protective	More protective than Alternatives A, D, E Not C	Alternative C most protective	Better than A Not B, C, or E	More protective than A, and D Not B or C

B. Sagebrush Associated Species

The Northern goshawk, ferruginous hawk, Northern harrier, short-eared owl, loggerhead shrike, sage sparrow, Brewer's sparrow, Columbian sharp-tailed grouse, Rocky Mountain bighorn sheep, white-tailed prairie dog, Wyoming pocket gopher, fringed myotis, Townsend's big-eared bat, spotted bat, hoary bat, and boreal toad were grouped for this analysis due to their similarity of using sagebrush habitats though species' specific effects may differ slightly, the programmatic nature and landscape scale effects will be analyzed generally and collectively for these species. As the nature of the project is to amend the Forest and Grassland Plans to include the regulatory mechanisms and conservation measures used to protect sagebrush habitats for GRSG, these measures would have similar effects on sagebrush associated species.

Table 14a provides a comparison of Alternative impacts on species addressed in these analyses. Specific Alternative impacts on some species can vary slightly from these general comparisons but these comparisons are a useful tool for categorizing effects on wildlife and plants.

Table 14a. General Summary of Alternative Comparisons for Species Addressed.

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Recreation and Travel	Least Protective	More protective than Alternative A, D, E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
Lands and Realty	Least Protective	More protective than Alternative A, D, and E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
Range	Least Protective	More protective than Alternative A and D Not C & E	More protective than A, B and D Not E	Better than A Not B, C, or E	Most Protective
Energy and Minerals	Least Protective	More protective than Alternative A, D, and E Equal to C in PHMA.	More protective than Alternative A, D, and E Equal to B in PHMA.	Better than A Not B, C, or E	More protective than A, and D Not B or C
Fire and Fuels	Least Protective	More protective than Alternative A, D, and E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
CUMULATIVE EFFECTS	Least Protective	More protective than Alternative A, D, and E Not C	Alternative C most protective	Better than A Not B, C, or E	More protective than A, and D Not B or C

Northern Goshawk (*Accipiter gentilis*)

Distribution

The goshawk is a R2 and R4 Sensitive Species and a MIS for the MB National Forest. Goshawk habitat overlaps with some GRSG habitat on the BT National Forest. Northern goshawks are a holarctic species occupying a wide variety of boreal and montane forest habitats over the northern hemisphere (Kennedy 2003). They are found in forested habitats across Wyoming.

Habitat Associations and Threats

Goshawks are strongly associated with late seral lodgepole pine, mixed lodgepole/aspen, and aspen forest for nesting and they are associated with a variety of age classes and shrub stands for

capturing prey species (Squires and Ruggiero 1996, Kennedy 2003). The goshawk captures a wide variety of prey and it is classified as a prey generalist (Kennedy 2003). Goshawks use late-successional forests for foraging, but also take prey in all -successional forest stages and in some cases open habitats (Anderson et al. 2003). While some studies suggest population declines in the west, current information is insufficient to determine what populations are declining, increasing, or stationary (Kennedy 2003).

Their primary threat is alteration of preferred habitat from timber management practices (Kennedy 2003). The issues cited by researchers, agency personnel, and others as potential threats to habitat caused by various silvicultural treatments include forest fragmentation, creation of even-aged and monotypic stands, increase in area of younger age classes, and loss of tree species diversity (Kennedy 2003).

Ferruginous Hawk (*Buteo regalis*)

Distribution

The ferruginous hawk is an international migratory bird found from southern Canada, throughout the western US, and into northern and central Mexico. This hawk is a R2 Sensitive that overlaps with most GRSG habitat. Wyoming is the approximate center of the ferruginous hawk breeding range and has one of the largest breeding populations of any state or province (Olendorff 1993). Oakleaf (as cited in Call 1985) estimated more than 800 pairs of ferruginous hawks reside in the state. The ferruginous hawk breeds throughout most of Wyoming, excluding the northwestern corner with highest nesting densities found in the Shamrock Hills of Carbon County (Call 1988, 1989).

Habitat Associations and Threats

The following is a habitat description of the ferruginous hawks selected from the Forest Service R2 Conservation Assessment for this species (Collins, C.P. and T.D. Reynolds 2005).
"Range-wide, ferruginous hawks occupy a variety of habitat types including open grasslands, shrub-steppe, croplands, desert, and the periphery of western pinyon (*Pinus edulis*) – juniper (*Juniperus spp*.) woodlands (Jasikoff 1982, Gilmer and Stewart 1983, Olendorff 1993, Bechard and Schmutz 1995). Breeding habitat includes nesting, post-fledging, foraging areas and it includes all of the above habitat types. Within each broad category of ferruginous hawk habitat, smaller scale features are important for successful reproduction. Of all the large raptors, the ferruginous hawk is second only to the red-tailed hawk in the array of habitats used (Cottrell 1981, Knight and Smith 1982). In general, the fundamental habitat difference between eastern and western subpopulations of ferruginous hawks is the predominant use of shrub-steppe west of the Continental Divide and grasslands east of the Divide (Bechard and Schmutz 1995). The chief habitat requirement of ferruginous hawks, regardless of vegetation type, is an adequate supply of small rodents their primary food source (Weston 1969)."

Within R2 of the Forest Service, the Conservation Assessment for this species (Collins, C.P. and T.D. Reynolds 2005) identified the following threats:

- Habitat loss, fragmentation, or degradation resulting from land use practices including:
- Conversion of native habitat to agriculture,
- Urbanization,
- Improper grazing practices,
- Conversion of shrubland to grassland.
- Human disturbance during the reproductive period,
- Reduction of prey populations through poisoning and disease,
- Energy resource development,
- Altered fire regimes,
- Invasion of exotic species,
- Diseases

The Wyoming Game and Fish Department identified the following threats specifically for Wyoming:

- Energy development and other large-scale projects that destroy or impair suitable habitats.
- Impacted by conversion of native prairie to:
  - Cropland or other uses,
  - Urbanization,
  - Industrialization,
  - Loss of vegetative cover,
  - Poisoning,
  - Human disturbance near the nest site,
  - Reduced prey availability.
  - Decreased prey abundance
  - Reduced availability of nesting sites
  - Current monitoring efforts are not adequate to document population trends
  - Current monitoring efforts are not adequate to identify needed management over large areas of the State

Northern Harrier (*Circus cyaneus*)

Distribution

Northern harrier is a R2 Sensitive Species and uses GRSG habitat on the MB National Forest and TB National Grassland. Northern harriers are a wide ranging species with very large distributions. Some of them have large ranging seasonal migrations occurring from North America to South America. They are found across Wyoming and several have been documented

on both the MB National Forest (February 2013 NRM Database) and TB National Grassland (TBNG Raptor Database).

Habitat Associations and Threats

Most northern harrier nests are found in undisturbed wetlands or grasslands dominated by thick vegetation. They prefer open habitats characterized by tall, dense vegetation. They use native or tame vegetation in dry or wet grasslands, wetlands, croplands, fallow fields, lightly grazed management units, and brushy areas. Northern harriers forage over open habitats of moderate to heavy cover and hunt by flying close to the ground and taking small animals by surprise. The diet consists mainly of small mammals including mice and voles, but they are also known to consume birds and occasionally reptiles and frogs.

The species is considered globally "secure" by the NatureServe because it's widely distributed across North America. However, historic and recent evidence suggest the number of breeding harriers has declined across the species' range. The greatest threats are loss of wetland and grassland habitats and habitat fragmentation primarily from agricultural production (Slater and Rock 2005).

Short-eared Owl (*Asio flammeus*)

The following habitat description of the Short-eared Owl is selected directly from the Forest Service R2 Conservation Assessment for this species (Wiggins 2005a).

Distribution

The Short-eared Owl is found throughout Canada and the US. It breeds and occupies open habitats from the most arctic and temperate areas to the south and central portions of the United States. Short-eared Owls are nomadic within their range and may be absent from some breeding areas for several years. Within R2, there are is few data that analyses are hampered due to low statistical power. Within Wyoming, the Wyoming Game and Fish Department (Cerovski et al. 2012) have provided some sighting information locally. They have documented occurrences in all counties within the analysis area.

Habitat Associations and Threats

In North America Short-eared Owls nest in open habitats including grasslands, sagebrush, marshes, and tundra. Foraging habitat is similar to nesting habitat. In R2 habitat is typically composed of large (>500 hectares) tracts of native medium to tall grasslands ideally interspersed with wet areas or marshes.

The most significant factor thought to limit population growth in Short-eared Owls is the availability of suitable nesting and foraging habitat due to loss of native grassland and wetland habitats; degradation of existing grasslands due to overgrazing by livestock; and degradation of grassland habitat due to fragmentation

Loggerhead shrike (*Lanius ludovicianus*)

Distribution

Loggerhead shrike is a R2 Sensitive Species using GRSG habitat on the MB National Forest and TBNG. The loggerhead shrike is widespread in North America. Several of them have been documented in both the MB National Forest (February 2013 NRM Database) and TBNG (TBNG Wildlife Database).

Habitat Associations and Threats

The loggerhead shrike frequents open habitats such as deserts, sagebrush, grasslands, and pastures (Wiggins 2005). Important habitat requirements include: scattered trees, shrubs, or low bushes for nesting substrate; elevated perches for hunting and courtship activities; foraging areas comprised of open, short vegetation with some relatively bare areas; and thorny trees or barbed wire fences for impaling prey (Pruitt 2000).

Recent range contractions and declines in abundance have occurred in many areas of North America and in several different types of habitat. Factors responsible for the species' near range-wide declines are not yet clear, but include direct loss and degradation of native grassland and sagebrush habitats (Wiggins 2005) .

Sage sparrow (*Amphispiza bellii*)

The following is a habitat description of the Sage sparrow selected directly from the Forest Service R2 Conservation Assessment for this species (Holmes, J.A. and M.J. Johnson 2005a).

Distribution

The Sage sparrow breeds over much of the Great Basin east of the Cascades and Sierra Nevada and west of the Rocky Mountains. It winters in central California and central Nevada, southwestern Utah, south to northern Baja California, northern Sonora, southwestern Chihuahua in Mexico, and west Texas (Martin and Carlson 1998). Locally, Sage sparrows are found across most of Wyoming in prairie and foothills habitat where sagebrush is present (Cerovski et al. 2001) with the largest number of them found in southwestern Wyoming.

Habitat Associations and Threats

The Sage sparrow is considered a sagebrush obligate associated with shrublands dominated by big sagebrush with a perennial bunchgrass understory (Braun et al. 1976, Paige and Ritter 1999).

Landscape level attributes positively associated with Sage sparrow density include high sagebrush cover, large patch size, spatially similar patches, low disturbance, and little fragmentation (Knick and Rotenberry 1995). Knick and Rotenberry (2002) found that the occurrence of Sage sparrows grew with increasing area of sagebrush patches and decreasing fragmentation.

Within its sagebrush shrub steppe breeding habitat, local (e.g., within-patch), components positively correlated with Sage sparrow densities are the amount of big sagebrush, shrub cover, bare ground, and above-average shrub height. Conversely, density of Sage sparrows have been negatively correlated with greasewood (*Sarcobatus vermiculatus*) and grass cover (Rotenberry and Wiens 1980, Wiens and Rotenberry 1981, Larson and Bock 1984, Paige and Ritter 1999). Wyoming densities are negatively influenced by landscape-level habitat changes that increase fragmentation of shrublands and those numbers appear to be more sensitive to variation in landscape-level attributes than local-scale habitat attributes (Knick and Rotenberry 2000).

Brewer's sparrow (*Spizella brewerii*)

Distribution

Brewer's sparrow is a MIS for the BT National Forest and a R2 Sensitive Species using GRSG habitat on the TBNG, BT, and MB. Brewer's sparrows inhabit prairie and foothills shrublands where sagebrush is present. Brewer's sparrows summer in North America and winter in Central America or South America.

Habitat Associations and Threats

Brewer's sparrow is a sagebrush obligate nesting in live sagebrush or on the ground at the base of a live sagebrush shrub. Brewer's sparrow is globally "secure" by NatureServe because of its wide distribution across North America. However, according to the Breeding Bird Survey, Brewer's sparrow populations have declined by over 50 percent during the past 25 years. Brewer's sparrow populations in the west have exhibited similar long-term declines. Reported population declines on the breeding areas are likely linked to extensive alteration of sagebrush shrub steppe habitat (Holmes and Johnson 2005b). Alteration has occurred as a result of extensive, ecologically transformative influences of livestock grazing followed by alteration of natural fire regimes and invasion by exotic plant species, especially cheatgrass (Holmes and Johnson 2005b). Loss and fragmentation of habitat due to agricultural, urban, suburban, energy, and road development also threaten the species.

Columbian Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Distribution

The Columbian sharp-tailed grouse is a R2 Sensitive Species using a small area of GRSG habitat at the southwest edge of the MB National Forest in southern Carbon County, Wyoming. Columbian sharp-tailed grouse are found only in Colorado and Wyoming in the Rocky Mountains (Hoffman and Thomas 2007). Sixty-eight percent of the occupied range in the Rocky Mountain region is on private lands with 4 percent occurring on lands administered by the Forest Service. There are two Columbian sharp-tailed grouse leks on the MB National Forest that overlap with GRSG GHMA.

Habitat Associations and Threats

These birds inhabit the transition zone between the arid sagebrush rangelands and the start of the aspen-conifer forests at elevations of 1,890 to 2,591 m. It is endemic to big sagebrush, shrub steppe, mountain shrub, and riparian shrub plant communities (Hoffman and Thomas 2007).

The subspecies currently occupies less than 10 percent of its historic range with only three metapopulations remaining in central British Columbia, southeastern Idaho and northern Utah, northwestern Colorado, and south-central Wyoming (Hoffman and Thomas 2007). Within the Rocky Mountain region, this Columbian sharp-tailed grouse formerly could be found in as many as 22 counties in western Colorado and portions of 11 counties in west-central, southwestern, and south-central Wyoming. Today, viable populations occur in only three counties in Colorado and one county in Wyoming.

Possible loss of Conservation Reserve Program lands is the single most important immediate threat to Columbian sharp-tailed grouse in the Rocky Mountain Region (Hoffman and Thomas 2007). Other threats include habitat loss and degradation caused by conversion of native habitats to pasture and croplands; overgrazing by domestic livestock; energy development; use of herbicides to control big sagebrush; alteration of natural fire regimes; invasion of exotic plants; and urban and rural expansion.

Rocky Mountain Bighorn Sheep (*Ovis Canadensis canadensis*)

Distribution

Bighorn sheep is a R2 and R4 Sensitive Species using a small amount of GRSG habitat on the MB. Bighorn sheep were historically distributed from the Canadian provinces of British Columbia and Alberta south to Mexico. From the late 1800's through the mid-1900s, Bighorn sheep populations experienced significant declines across their range (Beecham et al. 2007). In the 1960's, many western states began active Bighorn Sheep transplant programs in an effort to augment small, remnant sheep populations and to reintroduce them into historic, but vacant, habitat. The lower elevation edge of Bighorn Sheep seasonal ranges in the Sierra Madre Mountains and Laramie Peak overlap with the upper elevation edge of GRSG preliminary GHMA totaling less than 5000 acres.

Habitat Associations and Threats

Bighorn sheep are primarily animals of open habitats such as: alpine meadows, open grasslands, shrub-steppe, talus slopes, rock outcrops, and cliffs; in some places, however, they may use areas of deciduous and conifer forests, especially where openings may have been created by clear-cuts or fire (Beecham et al. 2007). Records indicate that historically Bighorn Sheep were sometimes found distant from rugged mountainous terrain. However, their current distribution is confined to scattered populations in open or semi-open, often precipitous, terrain characterized by a mix of steep or gentle slopes, broken cliffs, rock outcrops, and canyons and their adjacent river benches and mesa tops.

As summarized from Beecham et al. (2007): Bighorn sheep populations declined to less than 25,000 individuals in the continental United States by 1960. Transplant programs initiated in Canada, the United States, and Mexico were successful in restoring Bighorn Sheep to over 200 historic sites by 1990. It was estimated there were more than 185,000 wild sheep in North America by 1991. Although Bighorn Sheep numbers and distribution have increased dramatically since 1960 due to transplant and habitat conservation efforts, many individual herds remain small (less than 150 individuals) and susceptible to extirpation.

The risk of disease outbreaks resulting from contact with domestic sheep and goats is widely believed to be the most significant threat facing bighorns across their range (Beecham et al. 2007). Other threats include the: lack of connectivity and/or loss of genetic variability (fitness) due to habitat fragmentation; habitat loss; increased human disturbance; competition with domestic livestock; and predation on small, isolated herds (Beecham et al. 2007).

White-tailed prairie dog (*Cynomys leucurus*)

Distribution

The white-tailed prairie dog is a R2 sensitive species. Approximately acres of the only colony on the MB National Forest overlap with GRSG habitat on the MB National Forest. The White-tailed prairie dog historically occurred across 43-51 million acres of high altitude (6,980 – 8,200 feet) grasslands, ranging from southern Montana to west-central Colorado and from eastern Utah to eastern Wyoming (Pauli et al. 2006). Current estimates suggest the species occupies roughly 840,000 acres within Wyoming, Colorado, Utah, and Montana.

Habitat Associations and Threats

Unlike other prairie dog species, White-tailed prairie dogs are capable of establishing colonies in a variety of habitat types including: shrub-steppe, short-grass prairie, meadow, mountain valley, and transitional areas with mixed stands of shrubs and grasses. Typically, colonies are located in plant communities with low vegetative height and in systems generally dominated by grasses, forbs, and low shrubs.

Their historical range was estimated between 42 and 49 million acres. Using this estimate of historic range occupation, the current occupied area would represent a range contraction of approximately 99 percent (Pauli et al. 2007).

Plague, an exotic and virulent disease, appears to be the single most important factor constraining the current distribution of White-tailed prairie dogs (Pauli et al. 2007). Other threats include mineral development, conversion of native habitat to agriculture and urban areas, poisoning, and recreational shooting.

Wyoming Pocket Gopher (*Thomomys clusius*)

Distribution

The Wyoming pocket gopher is a R2 Sensitive Species with the possibility that some potential habitat overlaps with GRSG habitat on the far west end of the Little Sandstone drainage on the MB. However, there are no confirmed occurrences on Forest Service-administered lands (Keinath and Beauvais 2006). The species occurs exclusively in Wyoming.

Habitat Associations and Threats

The Wyoming pocket gopher appears to segregate from northern pocket gophers by preferentially occupying dry, gravelly, and shallow-soil ridge tops rather than deeper soiled swales and valley bottoms. Many existing capture locations are from greasewood communities on the edges of eroding washes. The population status is unknown and it is assumed to be rare with a very restricted distribution, but there is a lack of extensive surveys for pocket gophers in central Wyoming (Keinath and Beauvais 2006). Ad hoc efforts failed to document gophers at several historic localities leading to speculation of population declines. Limiting additional disturbance to areas containing known, active Wyoming pocket gopher burrow complexes is presently the best conservation measure since little information is available about this species.

Fringed Myotis (*Myotis thysanodes*)

The following is a habitat description of the Fringed myotis (*Myotis thysanodes*) from the Forest Service R2 Conservation Assessment for this species (Keinath 2004).

Distribution

This is a R2 Sensitive Species that overlaps GRSG habitat. Fringed myotis appear to be relatively rare range-wide. Fringed myotis is predominantly found in western North America occurring from southern British Columbia, and south through southern Mexico. It occurs west to the Pacific coast and east to the Rocky Mountains of R2 with a potentially isolated population in the Black Hills of South Dakota, Wyoming, and Nebraska. Populations in Mexico are predominantly found in the central highlands. Occurrences have been documented in 14 states (Arizona, California, Colorado, Idaho, Nebraska, New Mexico, Montana, Nevada, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming). Fringed myotis occurs over most of R2 and the Black Hills subspecies (*M. t. pahasapensis*) is restricted to the Black Hills of South Dakota and Wyoming and extreme northwestern Nebraska all within R2. (Keinath 2004)

Habitat Associations and Threats

The Fringed myotis appear to use a fairly broad range of habitats (Cryan 1997). The most common habitats in which this species has been found are oak, pinyon, and juniper woodlands or ponderosa pine forest at middle elevations (Davis 1966, Barbour and Davis 1969, O'Farrell and Studier 1980, Cockrum et al. 1996, Wilson and Ruff 1999, Ellison et al. 2004). They also appear to use deserts (Cockrum et al. 1996), grasslands, and other types of woodlands. When trying to generalize all published information, one observes that M. thysanodes is mostly found in dry

habitats where open areas (e.g., grasslands and deserts) are interspersed with mature forests (usually ponderosa pine, pinyon-juniper, or oak), creating complex mosaics with ample edges and abundant snags. This can take a variety of forms in R2 where open areas are likely represented by short and mixed-grass prairie, sagebrush, and other xeric shrublands and forests. Ideal habitat includes nearby water sources and suitable cliff or snag roost habitat.

Suitable roosting sites are a critical habitat component and the availability can determine population sizes and distributions (Humphrey 1975, Kunz 1982). Throughout their range, this type of myotis use caves, mines, and buildings as maternity colonies, solitary day and night roosts, and hibernacula. They regularly roost underneath bark and inside hollows of tree snags, particularly ponderosa pine and Douglas-fir in medium stages of decay (Kurtzman 1994, Morell et al. 1994, Murphy 1994, Rasheed et al. 1995, Chung-MacCoubrey 2001, as cited in Cryan 1997). Possible declines are likely due to a combination of primary threats including roost loss and modification, habitat alteration, and toxic chemicals (see more specific information within the Species Conservation Assessment).

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

The following is a habitat description of the Townsend's big-eared bat (*Corynorhinus townsendii*). This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Gruver and Keinath 2006).

Distribution

Townsend's big-eared bat is distributed broadly throughout western North America, and it occurs in two disjunct, isolated populations in the central and eastern United States (Figure 4). In the West, this species' range extends from the Pacific coast north to southern British Columbia, south to central and southern Mexico and the Baja Peninsula. The eastern most extent of the western range includes the Black Hills of South Dakota and Wyoming, a small region of south-central Kansas, and western portions of Texas and inland eastern Mexico. In R2, the most widespread distributions of Townsend's big-eared bats occur in Colorado and Wyoming. This is a R2 Sensitive Species that overlaps GRSG habitat.

Habitat Associations and Threats

Townsend's big-eared bat is unequivocally associated with areas containing caves and cave-analogs for roosting habitat. Beyond the constraint for cavernous roosts, habitat associations become less well-defined and it has been noted foraging in a wide variety of habitats (Pierson et al. 1999). Generally, Townsend's big-eared bats are found in the dry uplands throughout the West, but they also occur in mesic coniferous and deciduous forest habitats along the Pacific coast (Kunz and Martin 1982). This may reflect the need to roost where structures are available as opposed to within a particular vegetative zone. Thus, suitable foraging habitat for *C. townsendii* will likely be a heterogeneous mosaic of forested and edge habitats including riparian zones which are also used for commuting and drinking (e.g., Fellers and Pierson 2002).

Areas with substantial beaver activity enhance the quality of foraging habitat by increasing ecosystem productivity (Naiman et al. 1986), providing gaps in the forest canopy, providing small, quiet ponds for drinking, and causing an increase in insect activity. In Wyoming there is little information available on colony size or status before 1994. At least three maternity colonies have been identified including one in an abandoned mine and two in caves, harboring 46, 50+, and 200+ individuals respectively, with an additional cave colony reported by Keinath (2005). At this time, only two hibernacula have been found with each containing fewer than four individuals (Gruver and Keinath 2006).

Townsend's big-eared bat is highly intolerant to human disturbance at roosts. Since the early 1970's, bat researchers have expressed concern about apparent declines in numbers of cave-dwelling species of bats (Henshaw 1972), and *Corynorhinus townsendii* appears not to have been immune to the forces driving these declines. The primary threats include loss, modification, and disturbance of roosting habitat and foraging habitat. These impacts can be the result of elimination of forest canopy or alteration of wetland habitat, including activities that reduce the productivity of wetlands. Activities that alter the surface and subsurface hydrology of wetlands including draining, stream diversion, and removal of shrub and overstory vegetation, ultimately may reduce the value of wetlands to this species. The conversion of native shrub and grasslands to urban or agricultural uses also may have negative impacts on this species. Exposure to environmental toxins including pesticides and heavy metals if ingested by bats can cause death or reduce reproductive ability. Pesticide application can also indirectly affect bats via reduction of insect prey.

Spotted Bat (*Euderma maculatum*)

The following is a habitat description of the Townsend's big-eared bat. This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Luce and Keinath 2007).

Distribution

The Spotted bat inhabits western North America from southern British Columbia through most of the western states to central Mexico. Spotted bat distribution in Wyoming is still unknown, although it may be more prevalent throughout the western part of the state (Hester and Grenier 2005). This species has not been documented within the TBNG but is suspected of occurring in suitable habitat on those lands. In R2 the most widespread distributions of Corynorhinus townsendii occur in Colorado and Wyoming. This is a R2 Sensitive Species that overlaps GRSG habitat.

Habitat Associations and Threats

This species occurs in a wide variety of habitats and roosts in cracks and crevices in cliffs and canyons (Hester and Grenier 2005). Roost sites have to be in close proximity of foraging and water sources (Luce 2004). The spotted bat has been reported from a wide variety of habitats from desert shrub to coniferous forest.

This species probably occurs naturally in highly localized sub-populations where suitable habitat conditions exist, leaving large areas unoccupied (Luce and Keinath 2007). The spotted bat occurs at very low population density. Hence, few surveys have documented occurrence and almost no surveys have been repeated that would assist in estimating abundance over time.

There are several threats to these bats. Main threats include habitat alteration (loss or reduction of wet meadows and other foraging areas from over-grazing by livestock, water diversion, or conversion of native habitats to tilled cropland). Main threats also include over-utilization by collection of specimens. Threats also include the use of pesticides that bats may bioaccumulate through their diet or that kill their prey and roost loss and modification (the direct destruction, loss, or disturbance of cliff and rock wall roosting habitat).

Hoary Bat (*Lasiurus cinereus*)

Distribution

The Hoary bat is the most widespread of all American bats. It occurs throughout the US north to the limit of trees in Canada and south to Argentina and Chile. In Wyoming, the Hoary bat occurs statewide during summer from the low elevations of the eastern plains to 3000 m (10,000 feet) in the mountains.

Habitat Associations and Threats

These bats are solitary and roost in deciduous trees on sites generally open only from below three-four meters above the ground. The Hoary bat is associated with forested habitats both deciduous and coniferous. It can be found in montane forests, cottonwood riparian forests, shelterbelts, tree rows, juniper woodlands, and urban parks. Diverse forest habitats with a mixture of forest and small open areas that provide edges are ideal habitat for this species (Hester and Grenier 2005). The Hoary bat is considered uncommon throughout most of the eastern U. S. and in the northern Rockies, but common in the prairie states and the Pacific Northwest.

Potential threats include degradation, fragmentation, and loss of forest habitats; pesticides and other contaminants; and human-caused mortality during migration (such as wind turbines and communications towers) (Hester and Grenier 2005). The Hoary bat was the most commonly found bat during mortality searches at a wind power facility in south central Wyoming, and most mortalities were probably migrants.

Boreal toad (*Bufo boreas boreas*)

Distribution

The Boreal toad is a R2 and R4 Sensitive Species and a MIS for the BT National Forest. Boreal toads overlap with some GRSG habitat on the BT. Boreal toads occur from northern New Mexico to Alaska including the Rocky Mountains and west to the Pacific Coast. In Wyoming, its range is restricted to mountains and foothills and relatively moist conditions (Baxter and Stone 1992), ranging in elevation from about 6,500 to 12,000 feet (WGFD 2005). Boreal toads were

formerly widespread and common, but have declined dramatically in the last three decades in many portions of its extensive range in western North America (Carey 1993, Corn 1994, Keinath and McGee 2005). It is a species of concern in Wyoming. “Boreal toad populations appear to be in a state of severe decline. Numerous factors may be contributing to these declines…” (WGFD 2005).

Currently, boreal toads appear to be rare to uncommon on the BT. In 2005, five Boreal toad breeding sites were selected as monitor sites based on information in Patla (2002). Three sites were between the Buffalo and Jackson Ranger Districts and two sites in the Big Piney/Pinedale Districts. In the first year of monitoring, evidence of breeding was only observed at one site (Buffalo Ranger District). The other sites were flooded out or somehow changed when the surveys took place. Since then a small number of possible breeding sites have been found in other locations including on the Kemmerer and Greys River Ranger Districts.

Habitat Associations and Threats

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. Breeding occurs in ponds, slow streams, river backwater channels, and along lake edges. They require three 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 (Keinath and McGee 2005). Any activity that alters mountain wetland habitats can affect boreal toad populations.

Alternative A - No Action

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use, and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance. These activities would continue on 235,076 acres of PHMA and 676,618 acres of GHMA and there would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in sagebrush habitat. These

can cause disruption of nesting or birthing activities, abandonment of young and temporary displacement. In this alternative most recreational activities and noise associated with traffic would not be moderated in GRSG habitat.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 4186 acres of ROW exclusion areas in GRSG habitat (Appendix 1). Some sagebrush habitat could be traded to other ownership where there is greater potential for development for economic benefits. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation of sagebrush habitat. Other impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance to sagebrush associated species.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT National Forest and almost all GRSG habitat on the MB National Forest and TBNG. Potential effects on sagebrush habitat could include: site specific overgrazing; reduction in cover; structure; diversity of residual vegetation from consumption; and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include higher predation and parasitism. Reduced cover could result in lower forage availability or fewer prey and, therefore, lower abundance of sagebrush associated species. Forest Plan standards and guidelines for grazing management usually provide sufficient cover and forage for sagebrush associated species across the Forests and Grassland.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of priority core habitat would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing including expansion of new leases. This alternative could cause a large amount of direct and indirect habitat loss, degradation, and fragmentation of sagebrush habitat. For example, fluid mineral leasing would be closed on 3345 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). There would be greater negative effects from related noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Recent work from developed natural gas fields in Wyoming (Gilbert and Chalfoun 2011) documents 10-20 percent declines in the abundance of certain sagebrush obligates.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Also, treatment is permitted in breeding, nesting, and winter range. Much sagebrush habitat could be treated. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. The liberal prescribed fire opportunity in this alternative could decrease late succession habitat. Impacts could include removing or losing large tracts of shrub cover to prescribed or wildfire, losing nests, and increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants. Additional forage would be created for species relying on herbaceous plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM-administered land adjacent to the Forest Service units. Activities occurring in the five resource areas also occur for these owners. There are some existing conservation measures on these other lands especially BLM., However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROW granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. The combined impact is a trend toward more loss and fragmentation of sagebrush habitat; more early succession grass-dominated habitat; more disturbances in sagebrush habitat; and higher occurrence of invasive and nonnative plants. Cumulative effects are discussed in greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative A

Existing levels of habitat alteration or loss and disturbance would continue or could increase. Limitations would be provided only by Forest Plan guidance which generally allows substantial disturbance and habitat loss in sagebrush habitat. Grassland Plan guidance is more restrictive. The limited conservation in the five resource areas could allow substantial changes in sagebrush habitat quantity, quality, and ownership on sagebrush habitat on the Forest.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of Alternative A conservation measures limits a few impacts on sagebrush associated species. Proposed management would have impacts on individuals of the sagebrush associated species. Determinations are consistent for the TBNG, BT, and MB.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Ferruginous hawk, Northern harrier, Loggerhead shrike, Sage sparrow, Brewer’s sparrow, Fringed myotis, Townsend’s big-eared bat, Spotted bat, and Hoary bat on TBNG.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Ferruginous hawk, Northern harrier, Short-eared owl, Loggerhead shrike, Sage sparrow, Brewer's sparrow, Columbian sharp-tailed grouse, Rocky Mountain bighorn sheep, White-tailed prairie dog, Wyoming pocket gopher, Fringed myotis, Townsend's big-eared bat, Spotted bat, and Hoary bat on the MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Northern goshawk and Boreal toad on the BT.

Alternative B

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 234,621 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A, retaining more sagebrush habitat across the Forest units. There would be less disruption of nesting and birthing, less abandonment of young, or temporary displacement.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some sagebrush habitat. There would be 106,023 acres of ROW exclusion areas in GRSG habitat (Appendix 1). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA, which also benefits sagebrush associated species. (See Appendix 1 at the end of this document for specific acres of land use restriction by Alternative.)

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG and sagebrush associated species. There are 235,076 acres of PHMA across the Forest Service units in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A except Alternative B provides more restrictions that would protect

sagebrush habitat. GRSG PHMA accounts for <2 percent of the land cover in the Forests and 39 percent of the Grassland so changes would be variable and localized. There would be areas of improved sagebrush habitat quality for productive breeding, foraging, and cover for sagebrush associated species.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. For example, fluid mineral leasing would be closed on 348,750 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). This alternative would conserve sagebrush habitat now and into the future for GRSG and sagebrush associated species. Energy and mineral development could still occur in the remaining sagebrush habitat. This alternative better conserves PHMA and, therefore habitat for sagebrush associated species than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration and recovery would be emphasized. Prescribed burning in PHMA would be avoided in the <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would promote the conservation of mature sagebrush habitat and reduce disturbance to wildlife from fire in PHMA. Consequently, there would be less early stage sagebrush communities for some species. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C. (See Appendix 1 at the end of this document for specific acres of land use restriction by alternative.)

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM-administered land adjacent to the Forest units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. Cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits loss, fragmentation, and disturbance in PHMA which is <1 percent to 39 percent of the sagebrush habitat across the Forest Service units. There would be benefits to individuals in PHMA. Generally, activities in GHMA and the remaining sagebrush habitat will

occur as they currently do or could expand as existing direction allows. These activities affect most sagebrush habitat on the Forest Service units. Overall impacts will be reduced compared to Alternative A.

Currently, some of the potential habitat changes occurred particularly on the Grassland. Habitat which is generally intact in most areas. Full use of conservation measures in Alternative B in PHMA would reduce some impacts on sagebrush associated species. However, proposed management allowances would have impacts on individuals of the sagebrush associated species. Determinations are consistent for the TBNG, the BT, and the MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Ferruginous hawk, Northern harrier, Loggerhead shrike, Sage sparrow, Brewer's sparrow, Fringed myotis, Townsend's big-eared bat, Spotted bat, and Hoary bat on TBNG.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Ferruginous hawk, Northern harrier, Short-eared owl, Loggerhead shrike, Sage sparrow, Brewer's sparrow, Columbian sharp-tailed grouse, Rocky Mountain bighorn sheep, White-tailed prairie dog, Wyoming pocket gopher, Fringed myotis, Townsend's big-eared bat, Spotted bat, and Hoary bat on the MB.

Therefore, this alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Northern goshawk and Boreal toad on the BT.

Alternative C

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to maintaining sagebrush habitat than other alternatives. They would generally be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 600,000 acres of habitat more than most other alternatives. New road construction is prohibited within four miles of active GRSG leks, and it is avoided in PHMA and GHMA. Existing road management would be designed to maintain or improve both PHMA and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among Alternatives. Habitat loss, fragmentation, and disturbance would be reduced on much of the sagebrush habitat. There would be significant reduction in disruption of nesting and birthing activities, abandonment of young, or temporary displacement of sagebrush associated species.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for sagebrush associated species. GRSG priority and general sagebrush habitat would be managed as an exclusion area for new ROW projects (Appendix 1). This is >80 percent of sagebrush habitat across the management units. Alternative C would encourage consolidation and acquisition of GRSG sagebrush habitat, limiting the possibilities for loss or degradation of habitat. This alternative would promote the greatest distribution and highest density of sagebrush associated species. (See Appendix 1 at the end of this document for specific acres of land use restriction by Alternative.)

Range Direct and Indirect Effects

There are 235,076 acres of PHMA across the Forest Service units in this alternative. The prohibition of livestock grazing in PHMA would retain the most herbaceous cover for animal or nest concealment, seed production, insect production, and prey production among Alternatives in this habitat. These results would provide the greatest opportunity among alternatives for reduced predation and parasitism and individual fitness in PHMA.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to sagebrush associated species and their habitat than other alternatives. Many conservation measures would be applied to GRSG GHMA in addition to PHMA. Therefore, conservation measures would benefit more than 600,000 acres of habitat than most other alternatives. For example, fluid mineral leasing would be closed on 348,750 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&C will be considered within priority (235,076 acres) and GHGHMA. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHGHMA. Geophysical exploration would only be allowed in priority and GHGHMA to obtain exploratory information for areas outside of and adjacent to these habitats. It would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing and winter habitats during their use season by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss, fragmentation, and disturbance would be reduced. There could be significant reduction in disruption of nesting and birthing activities, abandonment of young, or temporary displacement for sagebrush associated species. (See Appendix 1 at the end of this document for specific acres of other land use restriction by Alternative.)

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in priority and GHMA promoting the conservation of mature sagebrush habitat. Sagebrush canopy cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GH would be avoided in <12 inch precipitation zone. This alternative conserves more sagebrush habitat with higher canopy

cover than all other alternatives. Consequently, there would be less early stage sagebrush communities for some species.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Sagebrush habitat also occurs on private, state, and BLM-administered land adjacent to the Forest Service units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. Cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat on these other ownerships. However, this alternative substantially limits anthropogenic disturbances in priority and GHMA on federal lands benefitting sagebrush associated species. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in Alternative C in priority and GHMA would noticeably reduce impacts on sagebrush associated species. Proposed management would have impacts on individuals of the sagebrush associated species. Determinations are consistent for the TBNG, B-T, and MB.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Ferruginous hawk, Northern harrier, Loggerhead shrike, Sage sparrow, Brewer’s sparrow, Fringed myotis, Townsend’s big-eared bat, Spotted bat, and Hoary bat on TBNG.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Ferruginous Hawk, Northern harrier, Short-eared owl, Loggerhead shrike, Sage sparrow, Brewer’s sparrow, Columbian sharp-tailed grouse, Rocky Mountain bighorn sheep, White-tailed prairie dog, Wyoming pocket gopher, Fringed myotis, Townsend’s big-eared bat, Spotted bat, and Hoary bat on the MB.

Therefore, this alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Northern goshawk and Boreal toad on the BT.

Alternative D

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to sagebrush associated species than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA will be allowed > 0.25 miles from the four known leks on the BT, numerous leks on TBNG, and any new leks. This is closer than the disturbance allowed under the other alternatives except Alternative A. In particular, this disturbance would affect 39 percent of the TBNG. Impacts on the Forests would be much smaller. (See Appendix 1 at the end of this document for specific acres of land use restriction by alternative.)

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. There would be 106,092 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. A few slight differences include Alternative D recommendations considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Priority core habitat accounts for <2 percent of the land cover in the Forests and 39 percent of the Grassland so improvements would be variable and localized. There could be areas of improved habitat for productive breeding, foraging, and cover for sagebrush associated species.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that do not exist in Alternative A. Fluid mineral leasing would be closed on 6740 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Recent work from developed natural gas fields in Wyoming (Gilbert and Chalfoun 2011) documents 10-20 percent declines in the abundance of certain sagebrush obligates. The lack of conservation measures in sagebrush

outside of PHMA could lead to increased disturbance, loss of habitat, or degradation of habitat. (See Appendix 1 at the end of this document for specific acres of other land use restriction by alternative.)

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow Wyoming Game and Fish Department Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a "disturbance" contributing toward the 9 percent threshold. Treatment is permitted in GRSG breeding, nesting, and winter range which reduces dense sagebrush cover for other species. Treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of cover. These limited conservation measures in PHMA and the lack of measures in the remainder of sagebrush habitat would have detrimental impacts on sagebrush associated species.

Cumulative Effects for Five Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. Sagebrush habitat also occurs on private, state, and BLM-administered land adjacent to the Forest Service units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROWs, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. The combined impact is a trend toward more loss and fragmentation of sagebrush habitat; more early succession grass-dominated habitat; more disturbances in sagebrush habitat; and higher occurrence of invasive and nonnative plants. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in PHMA; there is no similar limit in Alternative A. The allowance of 9 percent disturbance in PHMA, which only conserves a small portion of sagebrush habitat across all the units, and the limited conservation measures in other sagebrush habitat will have detrimental impacts on sagebrush associated species compared to Alternatives B, C, and E. Allowable activities could cause substantial changes in sagebrush habitat quantity, quality, and fragmentation.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Proposed management allowances would have impacts

on individuals of the sagebrush associated species. Determinations are consistent for the TBNG, the BT, and the MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Ferruginous hawk, Northern harrier, Loggerhead shrike, Sage sparrow, Brewer's sparrow, Fringed myotis, Townsend's big-eared bat, Spotted bat, and Hoary bat on TBNG.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Ferruginous hawk, Northern harrier, Short-eared owl, Loggerhead shrike, Sage sparrow, Brewer's sparrow, Columbian sharp-tailed grouse, Rocky Mountain bighorn sheep, White-tailed prairie dog, Wyoming pocket gopher, Fringed myotis, Townsend's big-eared bat, Spotted bat, and Hoary bat on the MB.

Therefore, this alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for Northern goshawk and Boreal toad on the BT.

Proposed Plan Amendment (Preferred Alternative)

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs (>380,000 acres). Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D but less restrictive than Alternatives B and C. There would be less habitat loss or degradation, and less disruption of nesting or hatching, abandonment of young, or temporary displacement in sagebrush habitat compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of sagebrush habitat could be lost, degraded or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. The Proposed Plan Amendment includes >380,000 acres as PHMA and SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, allow power lines >0.6 miles from occupied leks in PHMA and SFAs, and allow some

special uses. However, there would be 5362 acres of ROW exclusion areas in GRSG habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on sagebrush habitat and sagebrush associated species would be reduced compared to Alternatives A and D and would be greater than impacts to sagebrush habitat in Alternative C. This alternative would retain >358,400 acres of sagebrush habitat with the 5 percent disturbance limit compared to 227,582 acres of PHMA retained in Alternative B with a 3 percent disturbance limit. (See Appendix 1 at the end of this document for specific acres of other land use restriction by alternative.)

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. There are >380,000 acres of PHMA and SFAs across the Forest Service units in this alternative. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush habitat quality for sagebrush associated species. There could be areas of improved habitat for productive breeding, foraging, and cover for sagebrush associated species.

There would be some exceptions to meeting conservation measures for areas with <200 acres of GRSG habitat in isolated parcels of Forest Service lands, in Management Areas 8.4 and 3.63 (Minerals Management and Black-footed Ferret Reintroduction Habitat) on TBNG, and where >90 percent of an allotment on TBNG occurs within nesting or brood rearing habitat.

Potential adverse effects on sagebrush associated species from these exceptions in specific areas could include habitat fragmentation due to infrastructure development and habitat conversion of sagebrush stands to grasslands for improved livestock forage. There could also be site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts could include higher predation and a reduction of herbaceous material causing a lack of hiding cover or forage.

The conservation measures for this alternative improve sagebrush habitat in PHMA and SFAs (>380,000 acres) and GHMA (>470,000 acres) more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA (234,621 acres), none in SFAs, and not as much within GHMA (614,673 acres delete). Alternative C would apply to 849,294 acres of combined PHMA and most often GHMA.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals' operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs. For example, fluid mineral leasing would be closed on 3343 acres of GRSG habitat on federal surface and federal mineral leases

(Appendix 1). Where there are existing leases, conditions can be added for the protection of GRSG or its habitats. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA during breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA and SFAs and often, GHMA, would provide habitat benefits to sagebrush associated species. The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternative B is often more restrictive but covers fewer acres of sagebrush. Alternative C is generally more restrictive or prohibitive to energy development than this alternative. (See Appendix 1 at the end of this document for specific acres of other land use restriction by Alternative.)

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs and, most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs. In addition, vegetation treatment in PHMA and SFAs in nesting and wintering habitat in northeast Wyoming that would reduce sagebrush canopy to <15 percent would be restricted.

Conservation measures would be more beneficial to sagebrush associated species than Alternatives A and D considering, for example, a no disturbance limit and a 9 percent disturbance limit for these Alternatives respectively. Impacts on mature sagebrush habitat and sagebrush associated species would be reduced compared to these Alternatives. The Proposed Plan Amendment is generally similar to Alternatives B and C, but is less restrictive in a few conservation measures. In the Proposed Plan Amendment, sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and standards and guidelines for fire management in order to maintain sagebrush in priority and GHMA and SFAs. Consequently, there would be less early stage sagebrush communities for some species.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Sagebrush habitat also occurs on private, state, and BLM-administered land adjacent to the Forest units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. Cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. However, anthropogenic disturbances >5 percent on all ownerships in PHMA

and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance in PHMA and SFAs will cause some loss of sagebrush habitat for sagebrush associated species. This alternative also limits disturbing activities in PHMA and SFAs and often, GHMA. In total, there are >850,000 acres of combined PHMA, SFAs, and GHMA on the BT across these National Forest System lands addressed by conservation measures. There would be less loss or fragmentation of mature sagebrush habitat. Generally, activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. Overall, effects of the Proposed Plan Amendment would be less impacting to sagebrush associated species than Alternatives A and D. Impacts would be more pronounced than Alternative C. Alternative B includes greater habitat protection in many cases but addresses a smaller area.

Currently, some of the potential habitat changes occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in the Proposed Plan Amendment would reduce impacts on sagebrush associated species. Proposed management would have impacts on individuals of the sagebrush associated species. Determinations are consistent for the TBNG, BT, and MB.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Ferruginous hawk, Northern harrier, Loggerhead shrike, Sage sparrow, Brewer’s sparrow, fringed myotis, Townsend’s big-eared bat, Spotted bat, and Hoary bat on TBNG.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Ferruginous hawk, Northern harrier, Short-eared owl, Loggerhead shrike, Sage sparrow, Brewer’s sparrow, Columbian sharp-tailed grouse, Rocky Mountain bighorn sheep, White-tailed prairie dog, Wyoming pocket gopher, Fringed myotis, Townsend’s big-eared bat, Spotted bat, and Hoary bat on the MB.

Therefore, this alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for Northern goshawk and Boreal toad on the BT.

C. Grassland Associated Species

The Black-tailed prairie dog, Swift fox, Long-billed curlew, Burrowing owl, Chestnut-collared longspur, McCown’s longspur, Mountain plover, and Grasshopper Sparrow were grouped for this analysis due to the similar nature of the habitats occupied by these animals. Though species specific effects may differ slightly, the programmatic nature and landscape scale effects will be generally and collectively analyzed for this group of species. As the nature of the project is to

amend the Forest and Grassland Plans to include regulatory mechanisms and conservation measures to protect sagebrush habitats for GRSG, the effects would generally be similar to effects on GRSG and are covered in the above analysis.

Mixed Grass Prairie

Western wheatgrass can form an unbroken sod cover in some cases. Sandberg's bluegrass is abundant and prairie junegrass and green needlegrass are also present. Blue grama can be found, but in low abundance. A diverse component of forbs can be found as compared to the association described above. Western yarrow is the dominant forb found in this plant association. The species associated with this habitat type tend to rely on taller structural habitat conditions. Those sensitive species associated with the mixed grass prairie are Grasshopper Sparrow (breeding and summer) and chestnut-collared longspur (breeding and summer).

Short-Grass Prairie

Depending on the ecological site, early seral stages in upland plant communities are attributed to a high canopy cover of perennial plant species such as blue grama and red three awn or annual plant species such as six weeks fescue. Some upland sites also have high canopy covers of Plains prickly pear cactus and/or high densities of nonnative invasive species such as cheatgrass and Japanese Brome. The species associated with this habitat type rely on relatively low vegetation conditions

Those sensitive species associated with a short-grass system are black-tailed prairie dog (yearlong), swift fox (yearlong), long-billed curlew (breeding and summer), burrowing owl (breeding and summer), McCown's longspur (breeding and summer), and mountain plover (breeding and summer).

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

Currently there is not a Forest Service R2 Conservation Assessment for the black-tailed prairie dog.

Distribution

Black-tailed prairie dogs historically ranged throughout the Great Plains in short-grass and mixed-grass prairies. This R2 sensitive species is a common resident in the short- and mid-grass habitats of eastern Wyoming (Cerovski et al. 2004). The TBNG harbors one of the seven major colony complexes remaining in North America.

Habitat Associations and Threats

This species is also a common resident in the short- and mid-grass habitats of eastern Wyoming (Cerovski et al. 2004). The TBNG harbors one of the seven major colony complexes remaining in North America. Black-tailed prairie dogs are highly social, diurnal burrowing rodents that typically feed on grasses and forbs. Prairie dogs form colonies that are the main unit of a prairie dog population. Black-tailed prairie dog abundance and occupied acreage have been dramatically reduced throughout its historic range and continue to exhibit a slow decline (NatureServe 2004).

Major factors contributing to the reduction include disease (sylvatic plague), urbanization, habitat conversion, and control efforts. Additional information (including population trend) on the black-tailed prairie dog will be provided as a part of the Management Indicator Species section of this report.

Swift Fox (*Vulpes velox*)

The following is a habitat description of the swift fox. This information represents selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Stephens, R.M. and S.H. Anderson. 2005).

Distribution

The swift fox is native to the grassland prairies of the Great Plains region of North America (Kahn et al. 1997). Current known swift fox distribution is about 25 percent of its historic range from the literature or approximately 40 percent of the suggested historic range based on vegetation classification mapping of the short-grass and mid-grass prairie grassland types in the central United States (Figure 1). Distributions and associated densities appear highly variable among the occupied states (Kahn et al. 1997). The present known range is constricted and somewhat disjunct, with an identified population core present in the states of southeastern Wyoming (Figure 2), eastern Colorado, and western Kansas (Figure 4) (Kahn et al. 1997).

Habitat Associations and Threats

Swift foxes occur in the Great Plains in a variety of habitats including short-grass and mid-grass prairies, plowed fields and fencerows, and sagebrush (Egoscue 1979, Jones et al. 1985, Uresk and Sharps 1986, Sovada et al. 1998, Olson and Lindzey 2002). They select habitat with low-growing vegetation and relatively flat terrain, friable soils and high den availability, and areas near roads. Swift foxes are the most burrow-dependent canid in North America (Jackson and Choate 2000). Several studies have also reported that swift foxes select habitat adjacent to roads (Hillman and Sharps 1978, Hines and Case 1991, Pruss 1999, Olsen 2000).Swift foxes typically use relatively open short-grass prairie habitats with high visibility (Kilgore 1969), which is likely related to predator avoidance. Swift foxes killed by predators were found in sagebrush vegetation more than expected; this suggests that the risk of death was greater in sagebrush than other vegetation types. This appears to be balanced out by higher recruitment in home ranges with a larger proportion of sagebrush as these foxes were observed with bigger litters. Olsen (2000) concluded that low-growing (<30 centimeters) and low-density (16 percent cover) sagebrush vegetation should be considered suitable swift fox habitat.

The key threats identified to swift fox within R2 include: competition with coyotes and red foxes; habitat loss or fragmentation; vehicle collisions inadvertent poisoning; hunting and trapping; and management to increase tall vegetation.

Long-billed Curlew (*Numenius americanus*)

The following is a habitat description of the Long-billed Curlew. This information represents selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Sedgwick, J.A. 2006).

Distribution

The distribution of long-billed curlew breeding populations is disjunct corresponding to the now fragmented distribution of the short-grass and mixed-grass prairies of the Great Plains, Great Basin, and intermontane valleys of the western U. S. and southwestern Canada. Long-billed curlews breed from: southern British Columbia, Alberta, and Saskatchewan; south to northeastern New Mexico; central Nevada; northern Utah; and east to southwestern North Dakota and central South Dakota and Nebraska. Long-billed curlews breed: east of the Cascades in Washington and Oregon; in northeastern California and southern Idaho; east of the Rockies in Montana; and in Wyoming and eastern Colorado. In winter curlews are distributed in the U. S. mostly in coastal and inland regions of California, Texas, and Louisiana.

Habitat Associations and Threats

Long-billed curlews are native prairie specialists, nesting primarily in short-grass or mixed-grass prairie habitat with flat to rolling topography (King 1978, Pampush 1980, Jenni et al. 1981, Pampush and Anthony 1993, Hooper and Pitt 1996). They prefer short vegetation, generally less than 30 centimeters tall (often less than 10 centimeters), and generally avoid habitats with trees, a high density of shrubs (e.g., sagebrush [*Artemisia spp.*]), and tall, dense grass (Pampush 1981, Campbell et al. 1990, Pampush and Anthony 1993). Curlews use taller, denser grass during brood rearing when shade and camouflage from predators are presumably more important for chicks (Jenni et al. 1981), but this may also reflect a decline in the availability of shorter habitats later in the season.

Key threats identified for the curlew are: loss of grazing or overgrazing; fire suppression; introduction of exotic species such as crested wheatgrass; human disturbance associated particularly with recreation and energy development; loss or fragmentation of habitat; and pesticide spraying which significantly reduces arthropod abundance particularly grasshoppers (McEwen et al. 1972) a major food in the curlew's diet.

Burrowing Owl (*Athene cunicularia*)

The following is a habitat description of the Burrowing Owl. This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (McDonald, D., N.M. Korfanta, and S.J. Lantz. 2004).

Distribution

Burrowing owls are distributed throughout western North America and south from central Alberta to Tierra del Fuego in South America. Several studies have mapped actual burrowing owl locations in the Rocky Mountain Region. VerCauteren et al. (2001) surveyed for burrowing

owls in eastern Colorado and found a majority of owls nesting on private lands (Figure 8). In Wyoming, records from the Wyoming Game and Fish Wildlife Observation (WOS) database show burrowing owl sightings throughout most of the state except for the northwest corner where prairie gives way to mountainous landscapes (Figure 9) (Korfanta et al. 2001). In recent years, burrowing owl surveys have been conducted within the TBNGs in northeastern Wyoming (Conway and Hughes 2001, Conway and Lantz 2002, Conway and Lantz 2003). Of the 73 prairie dog colonies surveyed, 40 percent of the colonies were occupied by burrowing owls in both 2002 and 2003.

Habitat Associations and Threats

Burrowing owl habitat typically consists of open, dry, treeless areas on plains, prairies, and deserts. These areas are also occupied by burrowing mammals and other animals that provide nest burrows (Grinnell and Miller 1944, Haug et al. 1993). Because burrowing owls spend most of their time on or in the ground and are extremely susceptible to predation, short vegetation structure is also a requirement (Butts 1973, Zarn 1974, Green 1983, Plumpton 1992). Given this requirement for short vegetation, burrowing owls are commonly found in association with cattle, prairie dogs, and other grazers that clip vegetation (Konrad and Gilmer 1984).

The primary threats identified for burrowing owls include: habitat loss and fragmentation (especially prairie dog colonies); vehicular collisions; pesticides; domestic animals; losses on the wintering grounds; and recreational shooting of prairie dogs.

Chestnut-Collared Longspur (*Calicarius ornatus*)

The following is a habitat description of the Chestnut-Collared Longspur. This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Sedgwick, J.A. 2004a).

Distribution

The distribution of Chestnut-Collared Longspur breeding populations is disjunct, corresponding to the now fragmented distribution of the short-grass and mixed-grass prairies of the Great Plains and the southern fringe of the Canadian Prairie Provinces. Chestnut-collared Longspurs breed from southern Alberta, Saskatchewan, and Manitoba; south to northeastern Colorado and (formerly) extreme western Kansas; and east through North Dakota, South Dakota, and western and north-central Nebraska to western Minnesota (Figure 2) (Hill and Gould 1997, American Ornithologists' Union 1998). The Forest Service R2 state with the highest average relative abundance of Chestnut-Collared Longspurs is South Dakota. In Nebraska, they breed in the northwest (Johnsgard 1979); and in Colorado, they are known to breed in Weld and Washington Counties in the northeast (Andrews and Righter 1992, Pantle 1998); in Wyoming, Chestnut-Collared longspurs breed most commonly in the northeast and southeast (Oakleaf et al. 1992).

Habitat Associations and Threats

Chestnut-Collared Longspurs are native prairie specialists preferring level to rolling native mixed-grass and short-grass uplands, and in drier habitats moist lowlands (DuBois 1935, Fairfield 1968, Owens and Myres 1973, Stewart 1975, Wiens and Dyer 1975, Kantrud and Kologiski 1982, Anstey et al. 1995). Breeding habitat is typically mixed-grass or short-grass prairie <20 to 30 centimeters tall that has been recently grazed or mowed (Fairfield 1968, Owens and Myres 1973). Pastures planted with exotic grasses such as crested wheatgrass (*Agropyron cirstatum*) are also used as are mowed areas such as airstrips (Stewart 1975), but native pastures are preferred. Grazed or mowed tallgrass prairie is also used during the breeding season (Wyckoff 1986).

Compared to McCown's longspur, the Chestnut-Collared Longspur prefers areas with taller grass species such as needlegrasses (*Stipa spp.*) and wheatgrass (*Agropyron spp*.) (Baldwin and Creighton 1972). Chestnut-Collared Longspurs avoid excessively shrubby areas (Arnold and Higgins 1986) and grasslands with dense litter accumulations (Renken 1983, Berkey et al. 1993, Anstey et al. 1995). Within drier short-grass habitats, Chestnut-Collared Longspurs prefer wetter, taller, and more densely vegetated areas than McCown's longspurs and horned larks (*Eremophila alpestris*) (DuBois 1937, Strong 1971, Creighton and Baldwin 1974, Kantrud and Kologiski 1982, Wershler et al. 1991). Low, moist areas and wet-meadow zones around wetlands provide suitable habitat in these drier, short-grass areas (DuBois 1937, Rand 1948, Stewart 1975).

The primary threats to this bird include most of the declines in Chestnut-Collared Longspur populations both past and present which have been attributed to land-use practices that destroy native prairie (Fairfield 1968, Oberholser 1974, Gollop 1978, McNicholl 1988, Hill and Gould 1997). Both overgrazing and the loss of grazing can have a negative impact on this bird. In winter changing grazing practices in conjunction with variable rainfall and changing cultivation practices can also threaten Chestnut Collared Longspur population stability. The loss of fire over the landscape also can negatively impact Chestnut-Collared Longspurs as can prairie restoration efforts that seeded degraded grasslands with taller, exotic grasses.

McCown's Longspur (*Calcarius mccownii*)

The following is a habitat description of the McCown's Longspur. This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Sedgwick, J.A. 2004b).

Distribution

The distribution of breeding populations is disjunct corresponding to the now fragmented distribution of the short-grass prairies of the Great Plains and the southern fringe of the Canadian Prairie Provinces. Furthermore, both breeding and winter distributions may shift annually as McCown's is nomadic to some extent, making "somewhat erratic appearances and disappearance" at certain times and in certain places (Bent 1968). McCown's Longspurs breed in

loose colonies from southeastern Alberta east to southern Saskatchewan; south through Montana; eastern and central Wyoming; to western North Dakota and South Dakota; and western Nebraska to northeastern Colorado (Godfrey 1986, With 1994, Dechant et al. 1999). They winter in the southern US from western Oklahoma south through eastern New Mexico and central and west Texas into northern Mexico.

Habitat Associations and Threats

McCown's Longspurs breed in shortgrass prairie especially where vegetation coverage is sparse due to low soil moisture or heavy grazing, or where it is interspersed with shrubs or taller grasses. McCown's Longspurs use grasslands with little (Felske 1971) and low vegetation cover (DuBois 1935, Creighton 1974) such as provided by true native short-grass prairie or heavily grazed mixed-grass prairie. McCown's Longspurs prefer to breed in heavily grazed areas (Bradley personal communication), and they respond positively to livestock grazing (Bock et al. 1993). In Colorado individuals often use sparsely vegetated hillsides with southern exposures for displaying and nesting (Giezentanner 1970a and 1970b, Felske 1971, Creighton 1974).

In southeastern Wyoming preferential placement of territories on areas with a high percent of bare ground was attributed to microclimate effects such as early warming and drying of nest sites (Greer 1988). Percent vegetation coverage within five centimeters of the ground was higher in occupied territories than in unoccupied territories in Wyoming.

The primary threats to the McCown's Longspur are overgrazing in some cases, energy development through loss or fragmentation of habitat (well pads, roads, pipelines, storage tanks, power lines, compressor and pumping stations), disturbance (drilling, vehicle traffic), or environmental contamination. Recreation is increasing in R2 (Forest Service 2002), and the negative effects of recreation on bird species composition and nest placement in both forests and grasslands have recently been documented (e.g., Miller et al. 1998). In addition to direct mortality, pesticide applications may also result in reduced food delivery rates, lowered avian densities, and depressed brain acetylcholinesterase activities (Martin et al. 2000).

Mountain Plover (*Charadrius montanus*)

The following is a habitat description of the Mountain Plover. This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Dinsmore 2003).

Distribution

Mountain plovers breed primarily in eastern Colorado, central Wyoming, and eastern Montana (Knopf 1996a) and more locally in northern Mexico (state of Nuevo León) (Knopf and Rupert 1999b, Desmond and Ramirez 2002), Texas (Davis Mountains), northeastern New Mexico (Hubbard 1978, Sager 1996), western Oklahoma (primarily the Panhandle; Shackford 1991), southwestern Kansas (primarily Morton County; Fellows and Gress 1999), southwestern Nebraska (Kimball County; Dinsmore 1997), northeastern Utah (Myton Bench area; Day 1994, Ellison-Manning and White 2001), Arizona (U.S. Department of the Interior 1999), and

southeastern Alberta (Wallis and Wershler 1981, Knopf 1996a) (Figure 3). They are common nowhere, but probably reach their greatest abundance in the central portions of the breeding range in eastern Colorado and Wyoming. Most Mountain Plovers are thought to winter in the Imperial Valley in southern California.

Habitat Associations and Threats

Mountain Plovers are a disturbed-prairie or semi-desert species rather than a grassland species (Knopf and Miller 1994), and they are often characterized as a breeding bird of high plains and desert tablelands (Graul 1975, Knopf 1996a, 1996b). They prefer disturbed habitats for nesting including areas formerly occupied by bison (Knopf 1996a) and prairie dogs (Knowles et al. 1982, Samson and Knopf 1994, Knopf 1996a) and agricultural fields (Knopf and Rupert 1999a, Shackford et al. 1999). Mountain Plover are associated with areas of disturbance for nesting. Disturbance like fire or grazing seems necessary to meet the specific habitat requirements of the plover and may provide secondary benefits such as increased food resources. Areas used for nesting include: native short- and mixed-grass prairie, semi-desert sites, and prairie dog colonies. Throughout their range, mountain plovers selectively nest on active prairie dog colonies, and agricultural lands.

Specific threats to the Mountain Plover within and outside of R2 include: loss of native habitats; loss of prairie dogs; alteration of current grazing regimes; agricultural lands as a reproductive sink; habitat fragmentation; energy development; and potentially pesticides. It is worth acknowledging that the Mountain Plover can come into contact with numerous pesticides used to control insects and some of these may have unknown negative consequences for the Mountain Plover.

Grasshopper Sparrow (*Ammodramus savannarum*)

The following is a habitat description of the Grasshopper Sparrow. This information is selected direct quotes from the Forest Service R2 Conservation Assessment for this species (Slater 2004).

Distribution

The Grasshopper Sparrow has a widespread distribution throughout most of the Americas, but it often breeds locally and is considered rare to uncommon in much of its range (Vickery 1996). In western North America, Grasshopper Sparrows breed in: southern British Columbia, eastern Washington and Oregon, central Idaho, northeastern Nevada, northern Utah, southwestern Wyoming, north-central Nevada, along the California coast, the western edge of the Sierra Nevada, and in northwestern Baja California (where they are resident) (Vickery 1996). Grasshopper Sparrows winter north across the southeastern U. S., west through Texas, southern Arizona, and southern California (Sauer et al. 1996, Vickery 1996). The species winters south to southern Baja California and Chiapas, Mexico, southern Guatemala, northern El Salvador, and southwestern Honduras, the Valle Central of Costa Rica, the Gulf coast, southern Florida, north Bahama Island, and Cuba.

Habitat Associations and Threats

The Grasshopper Sparrow is found in a broad array of open grassland types, but it is notably area-sensitive, preferring large grassland patches greater than eight hectares in size (Samson 1980, Herkert 1994, Vickery et al. 1994, Helzer 1996). Minimum area requirements vary over the species' range. In Nebraska, Grasshopper Sparrows were found in fragments larger than eight hectares (Helzer 1996). Within open grasslands of suitable patch size, Grasshopper Sparrows prefer grasslands habitats of intermediate height (~30 centimeters) with clumped vegetation interspersed with patchy bare ground and sparse shrub cover (Bent 1968, Vickery 1996, Dechant et al. 2001). In arid grasslands of the west and southwest, they occupy lusher areas with small amounts (<35 percent) of shrub or tall forbs. Besides native prairie, Grasshopper Sparrows breeding habitat also includes pasture, hayland, Conservation Reserve Program fields, airports, and reclaimed surface mines (Whitmore 1980, Vickery 1996, Dechant et al. 2001).

In R2, Grasshopper Sparrows are found in Wyoming in mixed- and northern short-grass prairies and open sagebrush grasslands (Cerovski et al. 2001). Grasshopper sparrows avoid habitats where vegetation is less than 10 centimeters (Wiens 1973) and appear to prefer grass heights of ~30 centimeters and mean grass cover values of >50 percent. Grasshopper sparrows require some areas of bare ground for foraging, but it is unclear how much is desirable; most empirical studies suggest a range of 2 to 34 percent. Grasshopper sparrows require some taller vegetation such as tall grasses, forbs, or scattered shrubs to use as singing perches during territory establishment and for defense. However, they avoid habitats where shrub cover exceeds 35 percent (Smith 1968, Bock and Webb 1984). Scattered trees provide acceptable habitat and are used as song perches (Johnsgard 1979).

Within the states of Forest Service R2, which represent the core of this species' breeding range, Grasshopper Sparrow populations have also exhibited long-term declines. Today the greatest threats to the grassland avifauna in R2 including the Grasshopper Sparrow, continue to be habitat loss, habitat fragmentation, and habitat degradation from grazing and fire regimes that often fail to replicate the natural dynamics under which these species and their habitats evolved (Samson and Knopf 1994, Vickery et al. 2000). In the arid, short-stature grassland communities of R2, frequent disturbances negatively affect sparrow habitat. Specific threats to Grasshopper Sparrow habitat and its populations are urban development and conversion of grasslands to cropland, overgrazing in mixed- and short-grass prairies are a serious threats to Grasshopper Sparrow habitats. They are also more likely to utilize patches with larger core areas and less edge (i.e., circular patches) (Helzer and Jelinski 1999).

Alternative A - No Action

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

There would be no changes to the current TBNG system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There is a current Travel Management Plan in place addressing all non-special use travel on TBNG. Restrictions on special uses may apply, but off-road permits are still issued. These activities would continue on 224,124 acres of PHMA and 329,740 acres of GHMA and there would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance. Motorized access to most of TBNG is present on authorized roads and usually means higher concentrations of human use adjacent to motorized routes and in habitat. In addition, with increased road use, comes increased noise which has been identified as a specific stressor on wildlife. In this alternative noise associated with traffic would not be moderated.

Lands and Realty

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. There would be 1802 acres of ROW exclusion areas in GRSG habitat (Appendix 1). Some habitats could be traded to other ownership which improves habitat for other R2 Sensitive Species. The parcels are isolated; lands that would reduce boundary conflicts with other ownerships; or are otherwise in the public interest. All Forest Service lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation. Other impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat.

Range

There is no change in the numbers, timing, or method of livestock grazing on the National Grassland. Livestock grazing is permitted across GRSG habitat on the TBNG. Range improvements are designed to not have a direct negative effect on wildlife. Potential adverse effects on grassland habitats could include habitat fragmentation due to infrastructure development, moderate to heavy livestock grazing, and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and young mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

Energy development consisting of coal, oil, and natural gas has been a predominant use of public lands on the TBNG. Fluid mineral leasing is closed on 0 acres of GRSG habitat as an example (Appendix 1). In this alternative there would be no cap on surface disturbing activities. The above mentioned energy development may still cause impacts as they relate to the: increased anthropogenic disturbance of habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and development or removal of mineral materials. Other restrictions are identified in Appendix 1.

Fire and Fuels Management

Species using this habitat type prefer tall, ungrazed to lightly grazed grasslands. There is no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Both prescribed and wild fire has provided benefits to this habitat type through the conversion of sagebrush to a grass dominant condition. This reduction has come about from a variety of activities including wildfire and prescribed. In several cases, these prescribed burns have been designed to specifically improve grassland habitats. Since these species prefer tall and ungrazed to lightly grazed grasslands, both prescribed and wildfire have provided benefits to habitat condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present and reasonably foreseeable future projects in addition to impacts described above. Grassland habitat also occurs on private, state, and BLM-administered land adjacent to the Grassland and Forest units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in the grassland habitat. These cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative A

Existing levels of habitat alteration or loss and disturbance would continue or could increase. Limitations would be provided only by the units LMRP guidance which generally allows substantial disturbance and habitat loss or modification in grassland habitat. These could allow substantial changes in habitat quantity, quality, and ownership on each Grassland or Forest unit.

Currently, some of the potential habitat (PHMA) changes have occurred including positive habitat improvements due to prescribed and wildfire particularly on the Grassland. Habitat is generally intact in most areas. Full use of Alternative A measures limit some impacts on grassland associated species. Proposed management would still have negative impacts on

individuals of the grassland associated species. Therefore, this alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area nor cause a trend toward federal listing" for the black-tailed prairie dog, swift fox, long-billed curlew, burrowing owl, chestnut-collared longspur, McCown's longspur, mountain plover, and Grasshopper Sparrow on the TBNG.

Alternative B

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

In PHMA new road construction would be limited to areas with less than 3 percent habitat disturbance and would be allowed only the minimum necessary road standard and no upgrading of current roads. Existing roads not designated in a Travel Management Plan would be reclaimed. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels which are lower in this alternative (20-24 decibels) than Alternative A. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These restrictions on travel and recreation activities result in less disruption of grassland habitat bringing about reduced impacts on breeding and a reduction of road associated mortality. These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C.

Lands and Realty

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects (Appendix 1). In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA. These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C.

Range

Alternative B would adjust grazing direction in GRSG PHMA. There are 224,124 acres of PHMA across the TBNG in this alternative. Many livestock improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. Fencing would be developed to reflect GRSG needs in all GRSG habitats. Outside of PHMA, the potential effects due to livestock grazing, vegetation disturbance, and range improvements would be the same as Alternative A. Potential adverse effects on grassland associated species could include habitat fragmentation due to infrastructure development and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Inside of PHMA, the focus on lighter grazing would also provide additional positive impact for grassland species in the form of higher residual grasses for hiding cover, nesting cover, and predator avoidance. Conservation

measures would be more protective than conservation measures in Alternatives A and D, but less protective than Alternatives C and E.

Energy and Minerals

PHMA would be closed to new coal, energy and non-energy leasable materials, and fluid mineral leases. Existing leases would have a four mile, no surface occupancy buffer around leks. COAs would be attached to existing leases during analysis and approval of exploration and development activities to minimize or avoid the impacts on GRSG through a project design. Exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs for GRSG would not be considered within GRSG PHMA. Outside of PHMA, mineral development would be the same as Alternative A. Impacts associated with energy-related anthropomorphic disturbances such as habitat fragmentation, noise, and habitat loss would be reduced for grassland associated species improving the quality of the available habitat. For example, fluid mineral leasing would be closed on 333,748 acres of GRSG habitat (Appendix 1). This alternative better conserves PHMA and some grassland species habitat than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management

Prescribed fire in sagebrush would be very limited in PHMA and fuel treatments would emphasize protecting existing sagebrush ecosystems. Suppression and habitat protection would be emphasized. In GRSG PHMA within precipitation zones of 12 inches or less, fire is not used to treat sagebrush unless as a last resort for fuel breaks and it must be within a 3 percent disturbance limit. Fire would not be restricted in grassland habitats without sagebrush as a component. Fire can provide improved habitat conditions for grassland associated species by increasing grassland habitat and reducing shrub species. The restriction of this tool within PHMA would limit the potential for habitat expansion for grassland habitats. This alternative conserves more sagebrush habitat than Alternatives A, D, and E, but conserves less than Alternative C.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Grassland habitat also occurs on private, state, and BLM-administered land adjacent to the Grassland or Forest units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in grassland habitat. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. These cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits loss, fragmentation, and disturbance in PHMA. There would be benefits to individuals and other habitat types such as grassland that occur in PHMA. Generally, activities in GHMA and associated habitats, such as grassland, will occur as they do currently or they could have minor expansion as existing direction allows. In general, most conservation measures would limit anthropomorphic disturbances that could have negative impacts on grassland habitats. The loss of fire in the sagebrush habitat would limit some habitat expansion for grassland.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in Alternative B in PHMA would reduce some impacts on grassland associated species. Proposed management would have impacts on individual grassland associated species. Therefore, this alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for the Black-Tailed Prairie Dog, Swift Fox, Long-Billed Curlew, Burrowing Owl, Chestnut-Collared Longspur, McCown's Longspur, Mountain Plover, and Grasshopper Sparrow on the TBNG.

Alternative C

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

In this alternative, conservation measures are generally applied to both PHMA and GHMA. GRSG PHMA and GHMA would be managed as exclusion areas for new SUA permits (see Appendix 1). New road construction would be prohibited within four miles of active GRSG leks and avoided in PHMA and GHMA. Existing road management would be designed to maintain or improve both PHMA and GHMA. Road associated noise would be limited to less than 10 decibels above ambient levels (20-24 decibels). Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These restrictions on travel and recreation activities result in the least disruption of grassland habitat, bringing about reduced impacts on breeding, and a reduction of road associated mortality.

Lands and Realty

No GRSG habitat in PHMA would be exchanged away. GRSG priority and GHMA would be managed as ROW exclusion areas for new ROW permits (see Appendix 1). The Forest Service will strive to acquire important private lands in areas identified as GRSG Special Areas. Alternative C would encourage consolidation and acquisition of GRSG habitat. This could cause the loss of some mixed grass prairie habitat in exchange for GRSG habitat.

Range

Livestock grazing would be prohibited within GRSG PHMA. There are 224,124 acres of PHMA across the TBNG. All new structural range developments and location of supplements would be

avoided in both PHMA and GHMA unless they can be shown to benefit GRSG. Grazing and trailing within lekking, nesting, brood-rearing, and winter habitats would be avoided during periods of the year when these habitats are utilized by GRSG. Post-fire for both prescribed and wildfire monitoring is required in all GRSG habitat to re-establish grazing. Within GRSG PHMA and GHMA, livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve GRSG habitat objectives. Since grassland associated species generally thrive in ungrazed to lightly grazed areas, these conservation measures would be a positive influence for them.

Energy and Minerals

Many conservation measures would be applied to GHMA in addition to PHMA. Therefore, conservation measures would benefit more than 300,000 more acres of habitat than other alternatives. For example, fluid mineral leasing would be closed on 1,089,200 acres of GRSG habitat (Appendix 1). No exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs will be considered within GRSG PHMA and GHMA. Both GRSG PHMA and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations/expressions of interest would be accepted for parcels within GRSG PHMA or GHMA. Oil and gas leasing would not be allowed in GRSG PHMA. Geophysical exploration would only be allowed in GHMA to obtain exploratory information for areas outside of and adjacent to PHMA and GHMA would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by GRSG. Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. No construction of evaporation or infiltration reservoirs to hold coalbed methane wastewater would be allowed. All PHMA would be closed to non-energy leasable mineral leasing. GRSG PHMA would be closed to mineral material exploration, sales, and free use permits. These measures would promote the least disturbance and habitat loss among Alternatives.

Fire and Fuels Management

Within all GRSG habitat on the TBNG, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all GRSG habitats, sagebrush reduction/treatments to increase livestock or big game forage would be avoided. Also, sagebrush canopy cover would generally not be reduced to less than 15 percent within any GRSG habitat and vegetation treatments in both habitats would be designed to create landscape patterns which benefit GRSG the most. For all GRSG habitat, fire would not be used to treat sagebrush in precipitation zones with less than 12 inches except as a last resort as a fuel break. Post-fuels management projects will be designed to ensure the long-term persistence of seeded or pre-treatment native plants including sagebrush. Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition, establish non-grazing enclosures, and include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Grazing should not return to the burn area until woody and herbaceous plants achieve

GRSG habitat objectives. No fuels treatments would be allowed in known GRSG winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and they will maintain winter range habitat quality. Fuels reduction project (roadsides or other areas) in all GRSG habitat would utilize mowing of grass. In PHMA, fire suppression to conserve the GRSG habitat would be prioritized immediately after firefighter and public safety. This alternative conserves more sagebrush habitat with higher shrub canopy cover than all other alternatives.

Fire would not be restricted in grassland habitats without sagebrush as a component; however, grassland also occurs within both PHMA and GHMA. Since fire can provide improved habitat conditions for grassland associated species by increasing grassland habitat and reducing shrub species, the restriction of this tool within all GRSG habitats would limit the potential for habitat expansion for grassland habitats.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Grassland habitat also occurs on private, state, and BLM-administered land adjacent to the Forest Service units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in grassland habitat. Overall, grassland habitat is expected to be maintained or improve slightly. The reduction in the availability of fire is expected to contribute to a slower expansion of the habitat, but other conservation measures would off-set this by precluding impacts on existing habitat. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment

Summary of Alternative C

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Grassland habitat is generally intact in most areas and expanding due to wildfire. Full use of conservation measures in Alternative C in PHMA and GHMA would noticeably reduce the anthropomorphic impacts compared to other alternatives to grassland associated species such as habitat loss, fragmentation, and disturbance in grassland habitats occurring within PHMA and GHMA. In general, most conservation measures would limit anthropomorphic disturbances that could have negative impacts on grassland habitats. The loss of fire in the sagebrush habitat would limit some habitat expansion for grassland associates.

Therefore, this alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for the Black-Tailed Prairie Dog, Swift Fox, Long-Billed Curlew, Burrowing Owl, Chestnut-Collared Longspur, McCown’s Longspur, Mountain Plover, and Grasshopper Sparrow on the TBNG.

Alternative D

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of grassland habitat. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in grassland habitat would be very similar but slightly less detrimental than Alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PHMA and connectivity habitat will be allowed > 0.25 miles from GRSG leks. This is closer than the disturbance allowed under the other alternatives except Alternative A. New ROWs and SUAs in priority core habitat would generally be excluded (see Appendix 1); those allowed would be subject to the 9 percent disturbance limit. For grassland associated species, this is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A.

Range

Conservation measures are generally similar to Alternative A. Grazing management strategies would be developed cooperatively with permittees, lesees and other landowners on an allotment-by-allotment basis to improve GRSG habitat. As grazing permits are renewed in PHMA, GRSG habitat objectives and management considerations could be incorporated. Up to 15 percent of PHMA could be retired from grazing where permittee or lessee voluntarily relinquishes their grazing preference in their grazing allotment. Vegetative management and grazing infrastructure is essentially the same as Alternative A. With an expected move toward lighter grazing to enhance GRSG habitat and up to 15 percent of the PHMA having grazing removed, this alternative would provide more, high quality habitat for grassland associated species than Alternative A, but not as much as in Alternatives B, C, and E.

Energy and Minerals

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. Fluid mineral leases would be closed on 6738 acres of GRSG habitat on federal surface and federal mineral leases, for example (Appendix 1). Energy development consisting of coal, oil, and natural gas, has been a predominant use of public lands on the TBNG.

Within the above mentioned disturbance cap, there may still be some impacts as they relate to the: increased anthropogenic disturbance of habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface

occupancy on mineral leased areas; noise; industrial campsites; and development or removal of mineral materials. The lack of conservation measures in sagebrush outside of priority core habitat could also lead to these same increased anthropogenic disturbances, only they could be greater since there would be no cap on the disturbance. Conservation measures would promote habitat more than Alternative A but less than Alternatives B, C, and E.

Fire and Fuels Management

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Treated areas would not be rested from grazing. Both prescribed and wild fire has provided benefits to this habitat type through the conversion of sagebrush to a grass dominant condition. This reduction has come about from a variety of activities including wildfire and prescribed. In several cases, these prescribed burns have been designed to specifically improve grassland habitats. Since these species prefer tall, ungrazed to lightly grazed grasslands both prescribed and wild fire have provided benefits to habitat condition. The only adverse effect would be the limitation of a 9 percent disturbance, which could prevent increased habitat growth in some areas.

Cumulative Effects for Five Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Grassland habitat also occurs on private, state, and BLM-administered land adjacent to the Forest Service units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. The 9 percent disturbance cap on Forest Service lands could cause a reduction in habitat improvement projects associated with sagebrush removal in some cases. This is expected to contribute to a slower expansion of the habitat, but overall grassland habitat is expected to remain stable or increase.

However, cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. In this alternative habitat for grassland associated species is still expected to be maintained or improve slightly. These cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat, which only conserves about 42 percent of sagebrush habitat on the TNBG, and the limited conservation measures in other sagebrush habitat will have detrimental impacts on grassland associated species compared to Alternatives

B, C, and E. Allowable activities could cause substantial changes in habitat quantity, quality, and fragmentation.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Proposed management would still have impacts on individuals of the mixed grass associated species. Therefore, this alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for the Black-Tailed Prairie Dog, Swift Fox, Long-Billed Curlew, Burrowing Owl, Chestnut-Collared Longspur, McCown's Longspur, Mountain Plover, and Grasshopper Sparrow on the TBNG.

Proposed Plan Amendment (Preferred Alternative)

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

New level four and five roads would avoid areas within 1.9 miles of the perimeter of occupied GRSG leks within GRSG PHMA and SFAs. No new road construction for any level of road would be allowed within 0.6 miles of the perimeter of occupied GRSG leks within PHMA. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 within a six tenths (0.6) mile radius of the perimeter of occupied GRSG leks inside core habitat and connectivity habitat areas. In addition, noise levels at the 0.6 mile perimeter of the lek should not exceed 10 decibels above ambient noise.

Recreation special uses would be allowed in priority and GHMA and SFAs only if they did not result in a loss of GRSG habitat or have a long-term (more than five years) negative impact on the GRSG or its habitat. In addition, T&C to protect and restore GRSG habitat will be included in all SUAs.

Conservation measures inside PHMA and SFAs would provide some benefits to grassland associated species habitat by limiting disturbances associated with roads, road construction, and recreational activities. In some cases it may also increase some disturbances in that portion of the PHMA made up of grassland to avoiding disturbances in sagebrush. Conservation measures for GRSG habitat outside these areas could lead to increased anthropogenic disturbance of grassland associated species habitat, increased traffic on Forest Service and mineral development roads, new road construction, and road traffic speed.

Potential adverse effects on mixed grass associated species from these exceptions in specific areas could include habitat fragmentation due to road development, direct mortality from vehicle collision, and the disruption of breeding and the rearing of young. Conservations measures focus primarily on PHMA and SFAs (>275,000 acres) on the TBNG. Measures would be slightly more restrictive than Alternatives A and D, but less restrictive than Alternatives B and C.

Lands and Realty

GRSG habitat requirements would be used to prioritize parcels for exchange or acquisition within PHMA, SFAs, and GHMA. New projects within PHMA and SFAs would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. GRSG PHMA and SFAs would be managed as ROW avoidance areas for new ROW or SUA permits (see Appendix 1).

Grassland associated species would benefit from conservation measures restricting anthropomorphic activities, but could see a loss of habitat if habitat were identified for disposal in favor of GRSG habitat. Measures in PHMA and SFAs would be more restrictive than Alternatives A and D, but less restrictive than Alternatives B and C.

Range

Conservation measures place more focus on incorporating measures to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush habitat quality for sagebrush associated species. There could be areas of improved GRSG habitat for productive breeding, foraging, and cover for grassland associated species.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands >200 acres. In addition, on TBNG, Management Areas 8.4 and 3.63 (Minerals Management and Black-footed Ferret Reintroduction Habitat) that overlap with GHMA management areas or other areas in GHMA designated for short-grass species, livestock grazing will be managed to meet those Management Area objectives.

Grassland associated species could benefit from habitat conversion of sagebrush stands to grasslands for improved livestock forage. There could also be site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Potential adverse effects on mixed grass associated species from these exceptions in specific areas could include habitat fragmentation due to infrastructure development focused on avoiding GRSG impacts.

The conservation measures for this alternative emphasize GRSG habitat and they could de-emphasize grassland associated species habitat by increased sagebrush retention. The inclusion of the exception areas would allow this effect to be minimized outside of PHMA. This alternative reduces mixed grass habitats in GHMA more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA but not as much within GHMA. Alternative C would apply to priority and GHMA, promoting sagebrush habitat quality for

sagebrush associated species more than other alternatives but at the expense of grassland associated species in some instances.

Energy and Minerals

In all GRSG habitats, but especially PHMA and SFAs, mineral operators will be encouraged to reduce disturbance to GRSG habitat. Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for priority and GHMA during breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Within PHMA management areas, a maximum of 5 percent disturbance in PHMA and SFAs (within >275,000 acres) would be allowed using the Density Disturbance Calculation Tool (DDTC). The density of oil and gas or mining activities would be considered and evaluated for measures that limit or reduce their activities to no more than an average of one location per 640 acres. Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least impact possible to GRSG habitat.

Conservation measures inside PHMA and SFAs and often GHMA, would provide habitat benefits to grassland associated species habitat. For example, fluid mineral leases would be closed in 26,554 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). In some cases, this limit may increase some disturbances in that portion of the PHMA made up of grassland by avoiding disturbances in sagebrush. The difference in conservation measures in sagebrush outside of PHMA could lead to: increased anthropogenic disturbance of grassland associated species habitat; off-road vehicle use,; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and the development or removal of mineral materials

The conservation measures for this alternative maintain or protect sagebrush habitat in both priority and GHMA more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternatives B and C are generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management

Within PHMA and SFAs and GHMA, prescribed fire activities will be designed to move vegetative conditions described for GRSG. It will be avoided in areas of Wyoming big sagebrush, other xeric sagebrush species, or where cheatgrass or other fire-invasive species occur

and/or within areas of less than 12 inches of annual precipitation unless needed to facilitate site preparation for habitat restoration. Fuels treatments will be designed to reduce the spread and intensity of wildfires. A maximum of 5 percent disturbance would be allowed within PHMA and SFAs using the DDTC. Prescribed fire in nesting and wintering habitats that would reduce sagebrush canopy to less than 15 percent would be avoided.

Fire can provide improved habitat conditions for grassland associated species by increasing grassland habitat and reducing shrub species. The reduction of fire and the 5 percent disturbance cap could slow the establishment of new or expanded grassland habitat.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Grassland habitat also occurs on private, state, and BLM-administered land adjacent to the Forest Service units. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. These cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Proposed Plan Amendment

The conservation measures for this alternative emphasize GRSG habitat and they could de-emphasize grassland associated species habitat by increased sagebrush retention. The inclusion of the exception areas would allow this effect to be minimized outside of PHMA. Some habitat fragmentation due to road development, direct mortality from vehicle collision, and the disruption of breeding and the rearing of young could occur. The 5 percent disturbance cap could slow the establishment of new or expanded grassland habitat within PHMAs. Grassland associated species would benefit from conservation measures restricting anthropomorphic activities, but could see a loss of habitat if their habitat were selected for development or identified for disposal in favor of protecting GRSG habitat.

This alternative reduces mixed grass habitats in GHMA more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, but not as much within GHMA. Alternative C would apply to all GRSG habitats without exceptions, promoting sagebrush habitat quality for sagebrush associated species more than other alternatives, but at the expense of grassland associated species in some instances.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in the Proposed Plan Amendment would reduce many impacts on mixed grass associated species. Proposed management would still have some impacts on individuals of the mixed grass associated species.

Therefore, this alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for the Black-Tailed Prairie Dog, Swift Fox, Long-Billed Curlew, Burrowing Owl, Chestnut-Collared Longspur, McCown's Longspur, Mountain Plover, and Grasshopper Sparrow on the TBNG.

D. Plants

The following eight R2 or R4 sensitive plant species are analyzed in greater detail for this BE: Barr's milkvetch (*Astragalus barii*), meadow milkvetch (*Astragalus diversifolius var. diversifolius*), Payson's milkvetch (*Astragalus paysonii*), Payson's bladderpod (*Lesquerella paysonii*), Soft aster (*Symphyotrichum molle*), Dropleaf (slender leaved), Buckwheat (*Eriogonum exifolium*), Colorado tansyaster (*Machaeranthera coloradensis var. coloradensis*), and Large flower triteleia (*Triteleia grandiflora*).

These species were grouped for this analysis due to their similarity of using sagebrush habitats. Though species specific effects may differ slightly, the programmatic nature and landscape scale effects will be analyzed generally and collectively for these species. As the nature of the project is to amend the Forest and Grassland Plans to include the regulatory mechanisms and conservation measures used to protect sagebrush habitats for GRSG, these measures would have similar effects on sagebrush associated plants. The adverse impacts on these plant species are expected to be minor to negligible.

Astragalus barrii (*Barr's milkvetch*)

Distribution

This plant is a R2 Sensitive Species occurring on the TBNG. Astragalus barrii is a rare species endemic to the badlands of southwestern South Dakota, far northwestern Nebraska, and the Powder River Basin of Wyoming and Montana.

Habitat Associations and Threats

Astragalus barrii grows on dry badlands and semi-barren slopes with low vegetation cover. It grows on soils derived from shale, sandstone, silts and limestone. It typically occurs on rocky prairie breaks, ridges, knolls, and slopes (Ladyman 2006). Vegetation in this environment tends to be adapted to high insolation, considerable run-off, and exposure to sediments and salinity from exposed and partially modified geological material.

There are insufficient data to accurately determine the long-term trends. Since Astragalus barrii was first recognized, several large populations that appeared to be stable have been located. In general, revisits to known occurrences seem to have found additional colonies rather than relocating the original colony.

Activities associated with natural resource development, particularly coal bed methane gas, are emerging as the primary potential threats to the habitat of Astragalus barrii in the Powder River Basin of Wyoming and Montana (Ladyman 2006). Range-wide some populations have been

impacted by resource extraction activities in the past, but the impacts appear to have been localized. Grazing and trampling by native and nonnative ungulates may have an impact on some of the smaller colonies, but do not appear to substantially threaten any of the larger known populations. Invasive weeds are likely a threat to long-term sustainability of some populations due to habitat degradation and competition.

Astragalus diversifolius var. diversifolius (Meadow milkvetch)

Distribution

This plant is a R4 Sensitive Species with a historical observation (1834) that was believed to occur on the BT. The historic location was thought to overlap current GRSG habitat on the BT. However, Heidel (2009) indicates that this milkvetch does not occur on national forests in the Intermountain Region. It occurs in east-central Idaho, the southwestern edge of the Salt Lake Desert in Utah, southern Nevada, and south-central Wyoming. In Wyoming it is known from the Great Divide Basin (Sweetwater County) and the one historical collection is thought to be from the Green River Basin (Sweetwater or Sublette Counties).

Habitat Associations and Threats

This plant occurs in moist, often alkaline, meadows and swales in sagebrush valleys or closed drainage basins (4,400-6,620 feet). In Wyoming it grows in alkaline meadows at fringes of playa landscapes at 6,500-6,620 feet (Heidel 2009). These alkaline meadows do not occur on the BT.

There are estimated to be approximately 8,000 plants of Astragalus diversifolius in Wyoming covering an area about 75 ha. The density and continuity of the species varies greatly within and between occurrences. All three of the Wyoming occurrences have higher numbers than the largest known Idaho occurrence (Heidel 2009).

Potential threats to currently known populations are considered to be habitat loss from agriculture in adjacent states, mineral and energy developments, and noxious weed invasion.

Astragalus paysonii (Payson's milkvetch)

Distribution

This plant is a R4 Sensitive Species that overlaps some GRSG habitat on the BT. The species is a regional endemic of the Clearwater Mountains of north-central Idaho; historically from the Palisades Reservoir area of east-central Idaho; and the Wyoming Salt River, Snake and Gros Ventre ranges of western Wyoming (Lincoln, Teton, and Sublette Counties) (Heidel 2008). The species is known from 37 occurrences in Wyoming, 30 of which have been discovered or observed since 1992.

Habitat Associations and Threats

Payson's milkvetch occurs primarily in disturbed areas such as recovering burns, clear cuts, road cuts, and blow downs on sandy soils with low cover of forbs and grasses at elevation ranging

from 5,850-9,600 feet (Heidel 2008). Average occurrences are extremely small and restricted in area often with fewer than 20 plants in 1/2 acre of habitat. Only five Wyoming occurrences are notably large containing over 100 plants. In an historical perspective, this species is probably in decline due to fire suppression in western national forests. Most populations are very small and probably are unable to persist over long periods of time without some form of disturbance.

Payson's milkvetch is threatened primarily by succession which makes habitats unsuitable for long-term persistence. This species requires periodic disturbances to create new habitat or keep competing late-seral species or weeds at bay.

Lesquerella paysonii (Payson's bladderpod)

Distribution

This plant is a R4 Sensitive Species that overlaps GRSG habitat on the BT. Payson's bladderpod is a regional endemic of west central Wyoming, eastern Idaho, and southwestern Montana. In Wyoming this species is found in the Gros Ventre, Salt River, Snake River, Teton, Wind River, Wyoming ranges, northern Green River Basin, and Jackson Hole in Lincoln, Sublette, and Teton Counties (Heidel 2008a).

Habitat Associations and Threats

Payson's bladderpod occurs primarily on windswept, gravelly, calcareous ridge crests, semi-open slopes, and rocky floodplains. Occurrence is often associated with *Artemisia tridentata var. vaseyana* grassland communities with total vegetative cover between 25-50 percent. Populations also occur on talus slopes, disturbed roadsides, dried stream channels, rocky clearings within conifer forests, and travertine outcrops at 5,500-10,600 feet (Heidel 2008a). Census populations range in size from 10-1,500 individuals in areas between 1-30 acres. Total population is conservatively estimated at 20,000 individuals (Fertig 1997). Impacts from recreation (hiking and off-road vehicles), ski development, grazing, and mining are potential threats in lower elevation populations. However, overall threats are low to most occurrences (Heidel 2008a).

Symphyotrichum molle (Soft aster)

Distribution

This plant is a R4 Sensitive Species that overlaps GRSG habitat on the BT. It is a Wyoming endemic restricted to the Bighorn Range (Big Horn, Johnson, Natrona, Sheridan, and Washakie Counties) and Cliff Creek/Hoback Canyon area of Sublette County (Fertig 2000).

Habitat Associations and Threats

Soft aster is found in sagebrush grasslands and mountain meadows in calcareous soils at 6,400 to 8,500 feet elevation. The identification of a Hoback Canyon occurrence has been questioned, but unresolved. As such, presence is currently acknowledged for the project area on the BT.

The species is known from 34 extant and two historical locations in Wyoming, 32 of which have been discovered or relocated since 1990. Many populations are abundant locally containing several thousand individual plants (Fertig 2000). Grazing and trampling have been identified as potential threats, although low levels of herbivory or disturbance do not appear to have a negative impact.

Eriogonum exifolium (Dropleaf {slender leaved} buckwheat)

Distribution

This plant is a R2 Sensitive Species that overlaps GRSG habitat on the MB. It is a regional endemic whose global distribution is limited to 26 occurrences in Carbon and Albany Counties, Wyoming and Jackson, Grand, and Larimer Counties, Colorado (Anderson 2006). Two of these occurrences are known from the MB.

Habitat Associations and Threats

Dropleaf buckwheat is a perennial herb that grows in sparsely vegetated habitats such as barren hills or sagebrush flats on mountain parks. The plant has been found at elevations ranging from 7,500–9,000 feet in Colorado. It is restricted to scattered small areas of specific habitats. Individual occurrences range from groups of 30 plants to more than one million (Anderson 2006). According to Anderson (2006), there is evidence to suggest that *Eriogonum exilifolium* numbers are trending downward as the result of human activities and habitat loss; however, it may be abundant where areas of suitable habitat are extensive since it is under-inventoried and it is possible that occurrences remain to be discovered.

Threats include “residential and commercial development, range improvements, off-road vehicle use, other recreational uses, grazing, energy development, reservoir creation, ROW management, coal mining, exotic species invasion, effects of small population size, disease, declining pollinators, fire, global climate change, and pollution” (Anderson 2006).

Machaeranthera coloradoensis (Colorado tansy aster)

Distribution

This plant is a R2 Sensitive Species that overlaps some GRSG habitat on the MB. Colorado tansy aster is a regional endemic species with populations located in central, west-central, and southwestern Colorado and south-central Wyoming. Of the 33 occurrences of Machaeranthera coloradoensis, 21 occurrences are on lands managed by the Forest Service in Colorado and Wyoming. Two occurrences have been documented on the MB.

Habitat Associations and Threats

This species is found mainly from foothills to subalpine environments on sparsely-vegetated slopes, rocky outcrops, roadsides, or subalpine meadows (Beatty et al. 2004). Reported elevations range from 6,090 feet to 8,500 feet. It is found on sparsely-vegetated areas with other cushion-like plants in sagebrush communities.

No population trend is apparent. However, several forest botanists believe that extensive surveys would discover more populations and 15 new locations have been discovered since 1997 (Beatty et al. 2004).

Machaeranthera coloradoensis is vulnerable because of its restricted geographic range and small number of documented occurrences. Direct or indirect negative impacts on populations or habitats by human-related activities could occur from motorized and non-motorized recreation, trail or road construction and maintenance, reservoir expansion, housing development, changes to natural disturbance regimes, domestic livestock activities, invasive species introduction, or small-scale mining. Lower elevation populations and those populations closest to roads and trails are likely at the most risk.

Triteleia grandiflora (Largeflower Triteleia)

Distribution

This plant is a R2 Sensitive Species with habitat that might overlap GRSG habitat on the MB. Distribution of this species centers around the Pacific Northwest with populations in Colorado (San Juan National Forest) and Wyoming (MB National Forest) representing the southern- and eastern-most extents (Ladyman 2007).

Habitat Associations and Threats

In Colorado the species is found in openings among *Pinus ponderosa* (ponderosa pine) and *Quercus gambelii* (Gambel oak) at approximately 7,800 feet. Judging from the number of historic occurrences, *Triteleia grandiflora* appears to have been a relatively common species within its range sometimes abundant locally, but in other areas it may have always existed in low numbers. However, several populations have been extirpated and extant populations appear to be declining (Ladyman 2007). Threats to long-term persistence include: habitat loss, fragmentation, and degradation caused by human recreation, livestock grazing, resource development (timber and mineral), and invasive nonnative plant species throughout its range (Ladyman 2007).

Alternative A - No Action

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current roads system, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. In general, more acres and lineal miles of routes and use equate to a greater likelihood of loss or disturbance of habitat. These activities would continue on 235,076 acres of PHMA and 676,618 acres of GHMA. There would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. Impacts include physical damage to individuals or habitat. Growth, development, root storage, or seed set may be reduced or individual mortality might

occur. There could be increased erosion, sedimentation, soil compaction, or spread of invasive weeds. Lesquerella paysonii and Astragalus paysonii could benefit from the ground disturbance, but not the other impacts such as habitat loss, compaction, or weed increases.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 4186 acres of ROW exclusion areas in GRSG habitat (Appendix 1). Some plant habitat could be traded to other ownership where there is greater potential for development for economic benefits in these areas; however, impacts on sensitive plants from such exchanges would be considered and mitigated per Forest Service policy. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss. Other impacts may include new infestations of noxious or invasive weeds, physical damage or death to individuals, erosion, sedimentation, and soil compaction. Lesquerella paysonii and Astragalus paysonii could benefit from the ground disturbance, but not the other impacts such as habitat loss, compaction, or weed increases. Though most projects would attempt to mitigate or minimize impacts, there could be loss of habitat. This alternative provides the least amount of habitat protection for sensitive plants (see Appendix 1).

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT and almost all GRSG habitat on the MB National Forest and TBNG. Potential effects on plant habitat could include site specific overgrazing; reduction in structure and diversity of residual vegetation from consumption; and degradation of rangeland habitat due to trampling. Growth, development, root storage, or seed set may be reduced or individual mortality might occur. Other impacts may include new infestations of noxious or invasive weeds, physical damage or erosion, sedimentation, and soil compaction. Lesquerella paysonii and Astragalus paysonii could benefit from the disturbance, but not the other impacts such as habitat loss, spread of invasive weeds, or soil compaction. Forest and Grassland Plan standards and guidelines for grazing management usually provide sufficient cover and diversity for healthy plant habitat across the Forests and Grassland. Still, this alternative provides the lowest amount of habitat protection.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing including expansion of new leases. This alternative could allow a large amount of habitat loss and degradation of sagebrush habitat. Fluid mineral leasing is closed in 3345 acres of GRSG habitat on federal surface and federal mineral leases, as an example (Appendix 1). There could be physical damage or death to individuals. Other impacts may include new infestations of noxious or invasive weeds, physical damage, or erosion, sedimentation, and soil compaction. Lesquerella paysonii and Astragalus

paysonii could benefit from the disturbance but not the other impacts such as habitat loss, spread of invasive weeds, or soil compaction. This alternative provides the least amount of habitat protection for sensitive plants (see Appendix 1).

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Also, treatment is permitted in GRSG breeding, nesting, and winter range. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. This alternative could allow a large amount of habitat loss and degradation of sagebrush habitat. There could be physical damage or death to individuals. Other impacts may include new infestations of noxious or invasive weeds, physical damage, erosion, or sedimentation. Lesquerella paysonii and Astragalus paysonii could benefit from the disturbance but not from other impacts such as weed increases. This alternative provides the least amount of habitat protection for sensitive plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. These plants occur on private, state, and BLM-administered land adjacent to the Forests and Grassland. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. However, cumulatively there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, ROWs granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. The combined impact is a trend toward: more loss and degradation of sagebrush habitat; more early succession grass-dominated habitat; more disturbances in sagebrush habitat; and higher occurrence of invasive and nonnative plants. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative A

Existing levels of habitat alteration or loss and disturbance would continue or could increase. Limitations would be provided only by Forest Plans' guidance which generally allows substantial disturbance and habitat loss in sagebrush habitat. Grassland Plan guidance is more restrictive in GRSG habitat. The limited conservation in the five resource areas (Appendix 1) could allow substantial changes in habitat quantity, quality, and ownership in sagebrush habitat.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of Alternative A measures limits a few impacts on plant species. Proposed management would have impacts on individuals of these plant species. Determinations are consistent for the TBNG, BT, and MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Astragalus barii* on the TBNG.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Eriogonum exifolium, Machaeranthera coloradensis var. coloradensis,* and *Triteleia grandiflora* on the MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" *Astragalus diversifolius var. diversifolius*, *Astragalus paysonii, Lesquerella paysonii*, and *Symphyotrichum molle* on the BT.

Alternative B

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 5 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 235,076 acres of PHMA. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat degradation or loss than Alternative A (see Appendix 1), retaining more sagebrush habitat and more undisturbed sagebrush habitat. Of course these benefits would occur only on PHMA, not all habitat for these plants. *Lesquerella paysonii* and *Astragalus paysonii* could benefit from the ground disturbance, but not the other impacts such as habitat loss, compaction, or weed increases.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some sagebrush habitat. There would be 106,023 acres of ROW exclusion areas in GRSG habitat (Appendix 1). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits these plant species.

Range Direct and Indirect Effects

There are 235,076 acres of PHMA across the Forest Service units in this alternative. Alternative B would adjust grazing direction in GRSG priority in favor of GRSG and this sagebrush habitat. Many livestock improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. The measures would benefit these

sensitive plant species. The potential effects due to livestock grazing and range improvements would be similar to Alternative A except that Alternative B provides more restrictions that would priority protect habitat. GRSG PHMA accounts for <2 percent of the land cover in the Forests and 39 percent of the Grassland, so changes would be variable and localized. There could be areas of improved habitat for plant health, growth, development, root storage, or seed set. Lesquerella paysonii and Astragalus paysonii could benefit from ground disturbance, but not the other impacts such as habitat loss, compaction, or weed increases.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. For example, fluid mineral leases would be closed on 348,750 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). This alternative would conserve this habitat now and into the future for GRSG and, consequently, for plant species. Energy and mineral development could still occur in the remaining sagebrush habitat (see Appendix 1). This alternative better conserves PHMA and, therefore, habitat for sagebrush associated plant species than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration and recovery would be emphasized. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would promote the conservation of mature sagebrush habitat and reduce disturbance to plant habitat from fire in PHMA. Consequently, there would be less early stage sagebrush communities for some species. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C. Astragalus paysonii might benefit less from the limitation on prescribed burning but would be benefitted by the reduction in habitat loss.

Cumulative Effects for Alternative B

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. In addition to the National Forest System lands administered lands, these plants occur on private, state, and BLM-administered land adjacent to the BT, MB National Forest and TBNG. Activities occurring in the above resource areas may also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. Cumulatively, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, ROWs granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. When combined with the expected impacts, this action's impacts are not expected to lead toward a federal listing nor to cause

concerns over population loss or species viability issues from the Forest Service units under review. Additional discussion of cumulative effects is contained in the FEIS chapter 4 and in Manier et al. (2013).

Summary of Alternative B

This alternative limits loss, fragmentation, and disturbance in PHMA, which is <2 percent to 39 percent of the sagebrush habitat across the Forest Service units. There would be benefits to individuals in PHMA. 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 on sensitive plants growing in sagebrush. Generally, activities in GHMA and the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. These activities affect most sagebrush habitat on the Forest units. Overall impacts will be reduced compared to Alternative A.

Currently, some of the potential habitat changes have occurred, particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in Alternative B in PHMA would reduce some impacts on sagebrush associated plant species. Proposed management allowances would have impacts on individuals of the sagebrush associated plant species. Determinations are consistent for the TBNG, BT, and MB National Forest.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Astragalus barii* on the TBNG.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Eriogonum exifolium*, *Machaeranthera coloradensis var. coloradensis*, and *Triteleia grandiflora* on the MB National Forest.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” *Astragalus diversifolius var. diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, and *Symphyotrichum molle* on the BT National Forest.

Alternative C

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to maintaining sagebrush habitat than other alternatives. Measures would generally be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 600,000 acres of habitat than most other alternatives. New road construction is prohibited within four miles of active GRSG leks and avoided in PHMA and GHMA. Existing road management would be designed to maintain or improve both

PHMA and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among alternatives. Habitat loss, fragmentation, and disturbance would be reduced on much of the sagebrush habitat. Lesquerella paysonii and Astragalus paysonii could benefit from ground disturbance, but not from other impacts such as habitat loss or weed increases.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for sagebrush habitat. GRSG priority and GHMA would be managed as an exclusion area for new ROW projects (see Appendix 1). Alternative C would encourage consolidation and acquisition of all designated habitat, limiting the possibilities for future loss of habitat from development. This alternative would promote the greatest distribution of intact sagebrush habitat for associated plant species.

Range Direct and Indirect Effects

There are 235,076 acres of PHMA across the Forest Service units in this alternative. The prohibition of livestock grazing in PHMA would promote the most cover and production of herbaceous plants within sagebrush among Alternatives. Improved plant health, growth, development, root storage, and seed set responses would also occur for sensitive plants. Still, PHMA includes a very small portion of the Forests, <2 percent, so conservation measures would benefit a limited number of plants here. Since the Grassland is 39 percent PHMA, there would be much less disturbance to sensitive plants across this unit. Some benefits would be reduced for Lesquerella paysonii and Astragalus paysonii since these plants benefit from ground disturbance that can be caused by livestock grazing.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to sagebrush associated plants than other alternatives. Many measures would be applied to GHMA in addition to PHMA. Therefore, conservation measures would benefit more than 600,000 additional acres of sagebrush habitat on the Forests and Grassland than most other alternatives. For example, fluid mineral leases would be closed on 1,439,673 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within priority (234,621 acres) and GHMA. Priority and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA.

Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss and disturbance would be reduced. There would be reduced physical

damage or death to individuals, reduced infestations of noxious or invasive weeds, or erosion, sedimentation, and soil compaction. Lesquerella paysonii and Astragalus paysonii could benefit from disturbance, but not the other impacts such as habitat loss, spread of invasive weeds, or soil compaction.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Sagebrush canopy cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GHMA would be avoided in <12 inch precipitation zone. Prescribed fire in sagebrush would be very limited in priority and GHMA, promoting the conservation of mature sagebrush habitat for most sensitive plant species, >800,000 acres across the units. There would be less physical damage or death to individuals. On the other hand, there would be a reduced opportunity to create new disturbed habitat for Lesquerella paysonii and Astragalus paysonii.

Cumulative Effects for Five5 Resource Areas

There could be additional effects from past, present and reasonably foreseeable future projects in addition to impacts described above for Alternative C. In addition to the Forest Service lands, these plants occur on private, state, and BLM-administered land adjacent to the BT National Forest and MB National Forest and TB National Grassland. Activities occurring in the above resource areas may also occur on these ownerships. There are some existing conservation measures on these other lands especially BLM. Cumulatively, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, ROWs granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. However, this alternative substantially limits anthropogenic disturbances in priority and GHMA on federal lands, benefitting sagebrush associated species. When combined with the expected impacts, this action's impacts are not expected to lead toward a federal listing nor to cause concerns over population loss or species viability issues from the Forest Service units under review. Additional discussion of cumulative effects is contained in the FEIS chapter 4 and in Manier et al. (2013).

Summary of Alternative C

This alternative limits habitat loss, fragmentation, and degradation in priority and general habitat, more than 850,000 acres of sagebrush habitat across the units. There could be substantial conservation for individual sensitive plants and clusters of plants. However, 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 on sensitive plants growing in sagebrush. Generally, activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. Overall impacts on sensitive plants will be reduced compared to all other alternatives.

Currently, some of the potential habitat changes have occurred particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in Alternative C

would reduce some impacts on sagebrush associated plant species. Proposed management allowances would still have impacts on individuals of the sagebrush associated plant species. Determinations are consistent for the TBNG, BT National Forest, and MB National Forest.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Astragalus barii* on the TBNG.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Eriogonum exifolium, Machaeranthera coloradensis var. coloradensis,* and *Triteleia grandiflora* on the MB National Forest.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" *Astragalus diversifolius var. diversifolius*, *Astragalus paysonii, Lesquerella paysonii,* and *Symphyotrichum molle* on the BT National Forest.

Alternative D

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more habitat loss, fragmentation, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would have the same impact on sagebrush associated plants as alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA will be allowed > 0.25 miles from the three known leks on the BT, numerous leks on TBNG, and any new leks. This is closer than the disturbance allowed under the other alternatives except Alternative A. In particular, this disturbance would affect 39 percent of the TBNG. Impacts on the Forests would be much smaller.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. There would be 106,092 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). This is more disturbance, habitat loss, and habitat degradation for sagebrush associated species than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA. Lesquerella

paysonii and Astragalus paysonii could benefit from the ground disturbance, but not from other impacts such as habitat loss, compaction, or weed increases.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures for Alternative D apply to priority core habitat. A few slight differences include this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is <2 percent of sagebrush habitat on the Forests, these conservation measures would have a very small benefit to sensitive plants. Priority core habitat is 39 percent of the Grassland, so conservation measures would have some benefit to some individuals and clusters of sensitive plants on the Grassland.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. Fluid mineral leases would be closed on 6,740 acres of GRSG habitat on federal surface and federal mineral leases, as an example (Appendix 1). However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. The lack of conservation measures in sagebrush outside of PHMA would allow increased disturbance, loss of habitat, or degradation of habitat. Priority core habitat is 39 percent of the Grassland so conservation measures would have some benefit to some individuals and clusters of sensitive plants on the Grassland.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow Wyoming Game and Fish Department Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a “disturbance” contributing toward the 9 percent threshold. Treatment is permitted in GRSG breeding, nesting, and winter range. Treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds to compete against native sensitive plant species. These limited conservation measures in PHMA and the lack of measures in the remainder of sagebrush habitat would have detrimental impacts on sagebrush associated plant species including habitat loss or degradation, physical damage, death, reduced root storage, or seed production. Lesquerella paysonii and Astragalus paysonii could benefit from the ground disturbance but not from other impacts such as habitat loss or weed increases.

Cumulative Effects for Alternative D

This alternative mirrors much of the management direction in Alternative A. Most of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above for Alternative D. In addition to the National Forest System

lands, these plants occur on private, state, and BLM-administered land adjacent to the BT and MB and TBNG. Activities occurring in the above resource areas may also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, soil compaction, or invasive weeds spread from recreation and travel, ROWs granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. However, when combined with the expected impacts, this action's impacts are not expected to cumulatively push any of the sensitive plant species over a threshold toward a federal listing nor to cause concerns over population loss or species viability issues from the Forest Service units under review. Additional discussion of cumulative effects is contained in the FEIS chapter 4 and in Manier et al. (2013).

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional habitat loss and degradation. Limited conservation in the remaining sagebrush habitat could allow substantial changes in habitat quantity, quality, and ownership in sagebrush habitat on the units. 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 on sensitive plants growing in sagebrush. Still, this alternative prevents some detrimental impacts compared to Alternative A.

Currently, some of the potential habitat changes have occurred, particularly on the Grassland. Habitat is generally intact in most areas. Full use of conservation measures in Alternative D would reduce some impacts on sagebrush associated plant species. Proposed management allowances would still have impacts on individuals of the sagebrush associated plant species in most sagebrush habitat. Determinations are consistent for the TBNG, the BT, and MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Astragalus barii* on the TBNG.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Eriogonum exifolium, Machaeranthera coloradensis var. coloradensis,* and *Triteleia grandiflora* on the MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" *Astragalus diversifolius var. diversifolius, Astragalus paysonii, Lesquerella paysonii,* and *Symphyotrichum molle* on the BT.

Proposed Plan Amendment (Preferred Alternative)

DIRECT AND INDIRECT IMPACTS

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs (>380,000 acres). Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks.

Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. The restriction on road construction or upgrades near leks in priority and GHMA would reduce direct disturbance and habitat loss. Disturbances to priority and general management areas would be fewer due to the standards and guidelines in place, which would lessen impacts on sensitive plant species in these areas. These measures would be slightly more restrictive, and therefore, provide more protection for sensitive plants in these areas than those described for Alternatives A and D, but less restrictive than Alternatives B and C. The reduced disturbance would not promote Lesquerella paysonii and Astragalus paysonii, but these plants would benefit from reduced loss of habitat.

Lands and Realty Direct and Indirect Effects

Generally, the lands and realty standards and guidelines lessen the anthropogenic impacts on PHMA management areas and in some cases priority and GHMA by limiting new ROWs and special use permits for activities in these areas. These include activities such as high-voltage power lines, pipelines, temporary access roads, MET towers and land ownership adjustments. Some small amount of sagebrush habitat could be lost, degraded or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 5,362 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Lower anthropogenic disturbances will potentially result in fewer impacts on sensitive plants, though at this large-scale planning level it is uncertain to what extent. From a relative perspective, the Proposed Plan Amendment will have fewer impacts on sensitive plants than Alternatives A and D and greater impacts on these plant species than Alternative C. This alternative would retain >360,000 acres of sagebrush habitat with the 5 percent disturbance limit compared to 228,024 acres of PHMA retained in Alternative B with a 3 percent disturbance limit.

Range Direct and Indirect Effects

The objectives, desired conditions, standards and guidelines with respect to livestock grazing, GRSG habitat and timing, distance, density and disturbance incorporate measures to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and other GRSG seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that improves rangeland health and sagebrush habitats.

There would be some exceptions to meeting conservation measures for areas with <200 acres of GRSG habitat in isolated parcels of Forest Service lands, in Management Areas 8.4 and 3.63 (Minerals Management and Black-footed Ferret Reintroduction Habitat) on TBNG, and where >90 percent of an allotment on TBNG occurs within nesting or brood rearing habitat.

These combined actions would not adversely impact the sensitive plant species under review. Rather these species would generally benefit from these measures through improved rangeland health conditions. The conservation measures for this alternative improve sagebrush habitat in PHMA and SFAs (>380,000 acres), and GHMA (>500,000 acres) more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA (235,076 acres), none in SFAs, and not as much within GHMA (676,618 acres). Alternative C would apply to >850,000 acres of combined PHMA and most often GHMA.

Energy and Minerals Direct and Indirect Effects

With respect to the standards and guidelines in the minerals, energy development, infrastructure, timing, distance, density and disturbance sections, anthropogenic disturbance in all GRSG habitat management areas will be reduced from the existing condition, or no action alternative. For example, fluid mineral leases would be closed on 3,343 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats would be added to (COAs when approving exploration and development activities. There are timing and/or distance restrictions for priority and GHMA and SFAs during breeding and nesting season and in winter concentration areas. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. There is a 5 percent disturbance of habitat limit in PHMA and SFAs. The density of oil and gas or mining activities would be considered and evaluated for measures that limit or reduce their activities to no more than an average of one location per 640 acres. Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat.

These standards and guidelines inside GRSG habitat management areas are not expected to have any adverse impacts on the sensitive plant species under review. These actions are expected to benefit these species by limiting direct disturbance from energy development/extraction and subsequent weed infestations where ground has been mechanically disturbed. Standard GRSG-TDDD-ST-010, which allows for exceptions, modifications and waivers, may inadvertently

cause an impact on a sensitive plant at the site-specific level. However, the probability of an impact would be less likely than under existing management direction or the no action alternative (Alternative A). Additionally, it is expect that if exceptions are granted the site would be surveyed for sensitive plants and they would be avoided or mitigated. Further, it is expect that these standards and guidelines in the Proposed Plan Amendment will benefit sensitive plants more than Alternatives A and D, but not as much as Alternatives B and C. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for the Proposed Plan Amendment. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation on locations per section. Alternatives B and C are generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, also in GHMA. The standards and guidelines with respect to fire management are designed to minimize fire's negative impact on sagebrush, minimize the direct loss of sagebrush from fire, minimize firefighting (suppression) impacts on sagebrush cover and GRSG, and increase effectiveness of suppression and pre-suppression activities in GRSG habitat management areas. Additionally, standards and guidelines that direct fuels management, (e.g. GRSG-GRSGH-ST-001, GRSG-GRSGH-GL-003, and GRSG-GRSGH-GL-005) are designed to minimize disturbance in GRSG habitat management areas and also increase the effectiveness of pre-suppression activities. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs. In addition, vegetation treatment in PHMA and SFAs in nesting and wintering habitat in northeast Wyoming that would reduce sagebrush canopy to <15 percent would be restricted.

These standards and guidelines are not expected to adversely impact sensitive plant species. Indirect benefits to sensitive plants may come from controlling or avoiding post-fire weed invasions in sagebrush habitat as there are fewer acres burned in these areas, especially in low elevation, low precipitation Wyoming sagebrush habitats. Two species, Lesquerella paysonii and Astragalus paysonii, may respond differently as these species require natural ground disturbance, however, the extent of the limitations is expected to be negligible for these species.

Conservation measures would be more beneficial to sensitive plants in sagebrush habitat than Alternatives A and D considering, for example, a no disturbance limit and a 9 percent disturbance limit for these Alternatives, respectively. The Proposed Plan Amendment is generally similar to Alternatives B and C, but is less restrictive in a few conservation measures. In the Proposed Plan Amendment, sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and standards and guidelines for Fire Management in order to maintain sagebrush in PHMA, SFAs, and GHMA and SFAs.

Cumulative Effects for Sensitive plant species

The adverse impacts on the sensitive plant species under review from the GRSG LRMP Amendment desired conditions, objectives, standards and guidelines described above are negligible. In addition to the National Forest lands, these plants occur on private, state, and BLM-administered land adjacent to the BT, MB, and TB. Activities occurring in the above resource areas may also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, ROWs granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. However, when combined with the expected impacts of this action, the combination is not expected to cumulatively move any of the sensitive plant species over a threshold toward a federal listing nor create concerns over the populations or viability of the species. Additional cumulative effects discussion is contained in the FEIS chapter 4, as well as in Manier et al. (2013).

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. Disturbances up to the 5 percent level may cause some impacts on sensitive plant species; however, this is much lower than would likely occur with Alternatives A and D. This alternative also limits disturbing activities in PHMA and SFAs and often, GHMA. In total, there are >850,000 acres of combined PHMA, SFAs, and GHMA. For the total acres of PHMA management areas, SFAs, and GHMA management areas, there would be a lower likelihood of impact on sensitive plant species and less loss or degradation of habitat due to the protection measure in the standards and guidelines. However, none of the guidance is specific to sensitive plant species. The implementation of the direction would likely reduce but not eliminate direct and indirect effects on sensitive plants growing in these habitat management areas. Generally, other activities in remaining areas will continue as they currently do, or may expand as existing direction allows. Overall, effects from the Proposed Plan Amendment would be less impacting to sagebrush associated sensitive plant species than Alternatives A and D, but there may be more impacts than Alternatives B and C.

Proposed management would still have impacts on individuals of the sagebrush associated plant species in most sagebrush habitat. Determinations are consistent for the TBNG, BT, and MB.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Astragalus barii* on the TBNG.

This alternative “may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Eriogonum exifolium, Machaeranthera coloradensis var. coloradensis,* and *Triteleia grandiflora* on the MB.

This alternative "may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" *Astragalus diversifolius var. diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, and *Symphyotrichum molle* on the BT.

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MANAGEMENT INDICATOR SPECIES REPORT

for the

Greater Sage-Grouse Conservation Effort to Amend the Bridger-Teton and Medicine Bow National Forest Plans and the Thunder Basin National Grassland Management Plan

May 13, 2015

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I. MANAGEMENT INDICATOR SPECIES: INTRODUCTION

The FSM defines MIS as "…plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (Forest Service 1991).

The NFMA directs national forests to identify 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 BT National Forest Land and Resource Management Plan (Forest Service 1990), MB National Forest Land and Resource Management Plan (Forest Service 2003), and the TB National Grassland Land and Resource Management Plan (Forest Service 2001), MIS for these management units include 20 terrestrial, eight aquatic wildlife species, and three plants.

The purpose of this MIS evaluation is to identify the likely effects of management decisions associated with the GRSG Planning Decision, specifically for BT, and MB National Forest, and TB National Grassland on population trends for respective Management Indicator Species for each of these Planning Units.

MIS were reviewed to determine which are likely to be present or have habitat that overlaps with GRSG PHMA, SFAs, or GHMA. Table 2 identifies species likely to be affected by implementation of one or more of the amendment Alternatives.

The Analysis of the Management Situation for this GRSG amendment originally evaluated a number of species for consideration in the analysis process. Subsequent review of the Alternatives indicates that several of these species originally thought to be affected will experience no effects on their primary habitat or populations. No alternative is expected to impact any identified limiting factors for these species or their life requirements. Based on these factors, the following MIS will not be analyzed in greater detail:

- Peregrine falcon and
- Boreal chorus frog

For the project history, purpose and need, description of the alternatives and analysis area, please review the BE above or reference the FEIS chapter 2.

Table 2. Bridger-Teton and Medicine Bow National Forests and Thunder Basin National Grassland Management Indicator Species that may be influenced by an action alternative and will be further analyzed in this document.

Species (Forest Service Unit)	Management Issue	Known or Suspected to be Present in Analysis Area?	Habitat present in Analysis Area?	Summary of anticipated effects from implementation of an action alternative to MIS
BIRDS				
Bald eagle (BT) *Haliaeetus leucocephalus*	(Formerly) Threatened or endangered species recovery	Y	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.
Northern goshawk (MB) *Accipiter gentiles*	Late seral lodgepole and aspen	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.
American peregrine falcon (BT) *Falco peregrinus anatum*	(Formerly) Threatened or endangered species recovery	Incidental	Minor	Very little habitat within mapped PHMA or GHMA. However, implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.
Greater Sage-Grouse (TBNG) *Centrocercus urophasianus*	Sagebrush quality	Y	Y	GRSG is the species for which amendment is occurring. The species will be evaluated in more detail.
Plains sharp-tailed grouse (TBNG) *Tympanuchus phasianellus*	High structure grasslands	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which sharp-tailed grouse population could respond. The species will be evaluated in more detail.
Whooping crane (BT) *Grus americana*	Threatened or endangered species recovery	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.

Species (Forest Service Unit)	**Management Issue**	**Known or Suspected to be Present in Analysis Area?**	**Habitat present in Analysis Area?**	**Summary of anticipated effects from implementation of an action alternative to MIS**
Brewer's sparrow (BT) *Spizella breweri*	Sagebrush condition	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which Brewer's sparrow population could respond. The species will be evaluated in more detail.
Golden-crowned kinglet (MB) *Regulus satrapa*	Fragmentation within a forest stand	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail
Three-toed woodpecker (MB) *Picoides tridactylus*	Snags, old forest, recent forest burns	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail
Lincoln's sparrow (MB) *Melospiza lincolnii*	Riparian zone, herbivory in willow community	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail
Wilson's warbler (MB) *Wilsonia pusilla*	Riparian zone, herbivory in willow community	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will **not** be evaluated in more detail
MAMMALS				
Bighorn sheep (BT) *Ovis canadensis canadensis*	Harvested species, mountain meadow condition	N	N	This species prefers high elevation alpine habitats with steep escape terrain adjacent to open foraging areas during summer months; usually winter in mountain meadows at lower elevations within home ranges. No habitat association with GRSG (Moreno 2012). Implementation of the alternatives will cause no changes to population of this species or its habitat. Therefore, this species will not be evaluated in more detail.

Species (Forest Service Unit)	**Management Issue**	**Known or Suspected to be Present in Analysis Area?**	**Habitat present in Analysis Area?**	**Summary of anticipated effects from implementation of an action alternative to MIS**
Grizzly bear (BT) *Ursus arctos horribilus*	Threatened or endangered species recovery	Y	Addressed in BA	Also a threatened species. See analysis in BA.
Elk (BT) *Cervus elaphus nelsoni*	Harvested species	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which elk population could respond. The species will be evaluated in more detail.
Mule deer (BT) *Odocoileus hemionus*	Harvested species	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which mule deer population could respond. The species will be evaluated in more detail.
Moose (BT) *Alces alces shirasi*	Harvested species	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which moose population could respond. The species will be evaluated in more detail.
Pronghorn antelope (BT) *Antilocarpa americana*	Harvested species	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which pronghorn population could respond. The species will be evaluated in more detail.
Black-tailed prairie dog (TBNG) *Cynomys ludovicianus*	Low structure grasslands	Y	Y	There are records of the species within PHMA and GHMA. The alternatives propose some changes within species habitat to which prairie dog population could respond. The species will be evaluated in more detail.
American marten (BT/MB) *Martes americana origines*	Old growth forest/.	N	N	No habitat within mapped PH or GH habitat. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.

Species (Forest Service Unit)	**Management Issue**	**Known or Suspected to be Present in Analysis Area?**	**Habitat present in Analysis Area?**	**Summary of anticipated effects from implementation of an action alternative to MIS**
Snowshoe hare (MB) *Lepus americana*	Conifer habitats with dense understory	N	N	No habitat within mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.
AMPHIBIANS				
Boreal toad (BT) *Bufo boreas boreas*	Wetland condition	Y	Y	The species is likely to occur within PHMA or GHMA on the BT. The alternatives propose some changes within species habitat to which Boreal toad population could respond. The species will be evaluated in more detail.
Boreal chorus frog (BT) *Pseudacris triseriata*	Wetland condition	Y	Minor	Minor habitat overlap with PHMA or GHMA on the BT. Alternatives will not affect habitat for this MIS, there will be no change to population of Chorus frog. Therefore, this species will **not** be evaluated in more detail.
FISH				
Bonneville cutthroat trout (BT) *Oncorhynchus clarki Utah*	Riparian condition	Y	N	No habitat overlap with mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will not be evaluated in more detail.
Colorado River cutthroat (BT) *Oncorhynchus clarki pleuriticus*	Riparian condition	Y	N	No habitat overlap with mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will **not** be evaluated in more detail.
Rainbow trout (BT/MB) *Oncorhynchus mykiss*	Riparian condition/water quality	Y	N	No habitat overlap with mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will not be evaluated in more detail.

Species (Forest Service Unit)	**Management Issue**	**Known or Suspected to be Present in Analysis Area?**	**Habitat present in Analysis Area?**	**Summary of anticipated effects from implementation of an action alternative to MIS**
Yellowstone/Snake River fine-spotted cutthroat (R4) *Oncorhynchus clarki* spp.	Riparian condition	Y	N	No habitat overlap with mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will not be evaluated in more detail.
Common trout (MB) *Salmo trutta* (brown) *Salvelinus fontinalis* (brook)	Water quality	Y	N	No habitat overlap with mapped PHMA or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will not be evaluated in more detail.
PLANTS				
Shultz's milkvetch (BT) *Astragalus shultziorum*	Sensitive plant representative	N	N	No habitat within mapped PH or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will not be evaluated in more detail.
Boreal draba (BT) *Draba borealis*	Sensitive plant representative	N	N	No habitat within mapped PH or GHMA. Implementation of the alternatives will cause no changes to populations of this species or its habitat. Therefore, this species will not be evaluated in more detail.
Aspen (BT) *Populus tremuloides*	Ecological indicator of Aspen Condition	Y	Y	Aspen occurs within PHMA and GHMA. The alternatives propose some changes within or adjacent to aspen which could impact the distribution and abundance of aspen. Aspen will be evaluated in more detail.

II. MANAGEMENT INDICATOR SPECIES – EFFECTS ANALYSIS

Greater Sage-Grouse (*Centrocercus urophasianus*)

A MIS is defined as a "plant or animal species or habitat components selected in a planning process used to monitor the effects of planned management activities on populations of wildlife and fish, including those that are socially or economically important" (TB National Grassland Land and Resource Management Plan, USDA 2001). The GRSG is selected as a management indicator species for sagebrush habitats that have tall, dense, and diverse herbaceous understories. These areas typically have a history of lighter livestock grazing intensities. Some of the species that also use this habitat include sage thrasher, Brewer's sparrow, pronghorn, and sage.

Distribution

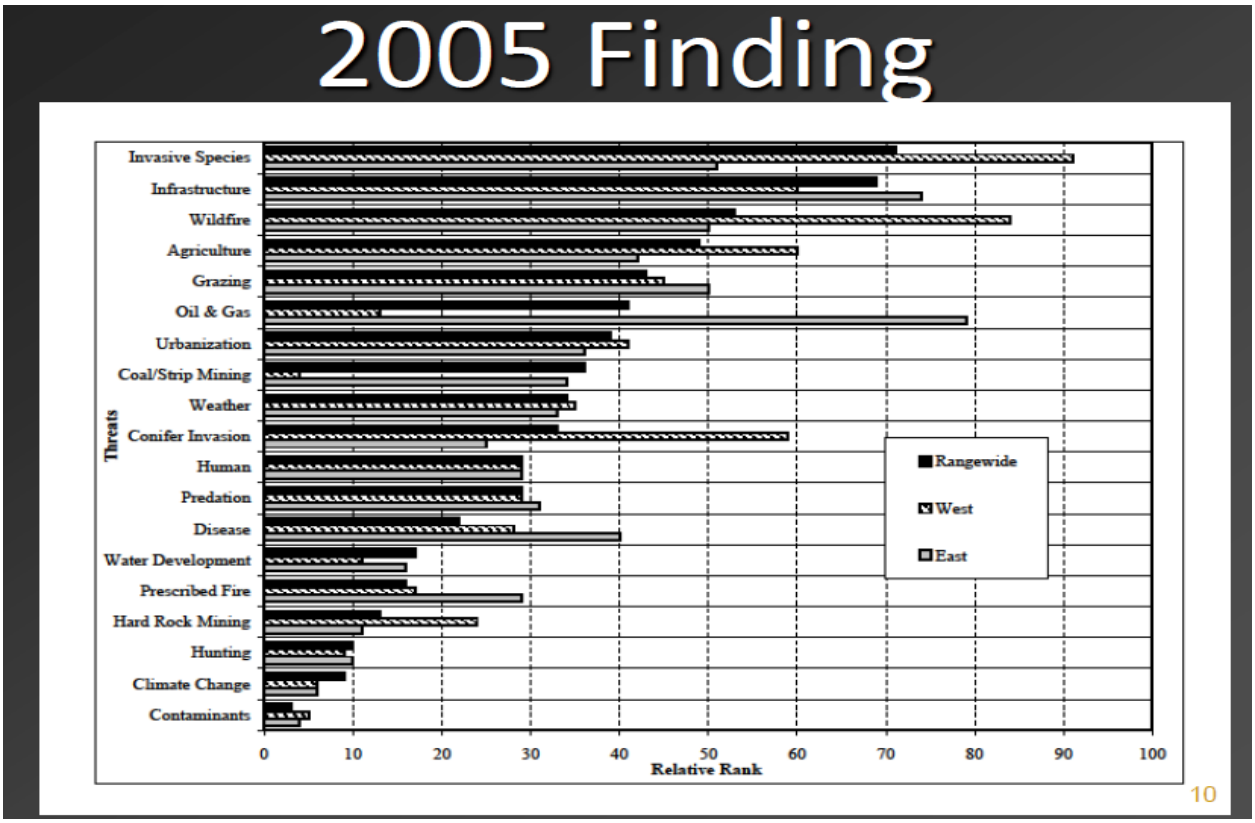
The GRSG is an MIS species on the TB National Grasslands. GRSG historically inhabited 13 western states and three Canadian provinces, but they have declined across their range and now occupy approximately 56 percent of their historic range. They are currently found in only 11 states and two Canadian provinces (USFWS 2013).They are found in association with shrub steppe and grassland habitats specifically having sagebrush as a component. Within Wyoming, GRSG habitats within Forest Service System lands support the GRSG population which include MB, BT National Forest, and TBNG. The WGFD has divided the State of Wyoming into six local sage-grouse working group areas for management and monitoring purposes. The TBNG falls within the Northeast Wyoming Sage-Grouse Local Working Group Area which encompasses 23,024 square miles (14,732,639 acres) in the northeast corner of Wyoming. While the TBNG comprises only 4 percent of the Northeast Wyoming Local Working Group Area, it provides over 25 percent of the GRSG habitat on federal public lands within this area. On TB where it is an MIS, there are approximately 553,864 acres of GRSG habitat.

Habitat Associations and Threats

The large GRSG requires a variety of sagebrush structural stages to meet seasonal habitat requirements. Sagebrush is essential for GRSG during all seasons of the year. This relationship is perhaps tightest in the late fall, winter, and early spring when GRSG are dependent on sagebrush for both food and cover. During the spring and summer, succulent forbs and insects become important additional food sources. GRSG require an extensive mosaic dominated by sagebrush of varying densities and heights along with an associated diverse native plant community dominated by high levels of native grasses and forbs (Wyoming Game and Fish Department 2003).

Current threats to GRSG in Wyoming include conversion and fragmentation of sagebrush habitats through infrastructure development which include energy development, wildfire, invasive species encroachment, noise, and the emergence of West Nile Virus in the Powder

River Basin. Below is the complete list identified by the USFWS in 2005 as threats to GRSG range-wide. For the purposes of the following table, Wyoming is considered a part of the eastern population.



The Northeast Wyoming Local Working Group felt oil, gas, and coal bed natural gas (CBNG) development, weather, vegetation management, invasive plants, parasites and diseases were the most important influences on the northeast Wyoming GRSG population.

Population Status and Trend

The WGFD monitors GRSG populations throughout the State including TBNG. They currently use the males/lek statistic to track population changes. This will indicate population fluctuations which is generally accepted as reflective of GRSG population's dynamics, but it will not give a population estimate. The State and regional patterns are of importance in relation to the TBNG for two reasons. First, the Grasslands are a part of this data set. Second, the "males per lek" trend for TBNG follows a similar pattern to that of the Northeast Wyoming Local Working Group Area. Figure 1 shows the average number of males/lek for lek counts and all lek monitoring combined from 1967 to 2013 for the Northeast Wyoming Local Working Group Area. Using this information, the regional trend suggests about a 10 year cycle of periodic highs and lows. However, a concern is that generally each subsequent peak in the population is usually lower than the previous peak. Additionally, each periodic low in the population is generally lower than

the previous population low. The long-term trend suggests a steadily declining GRSG population.

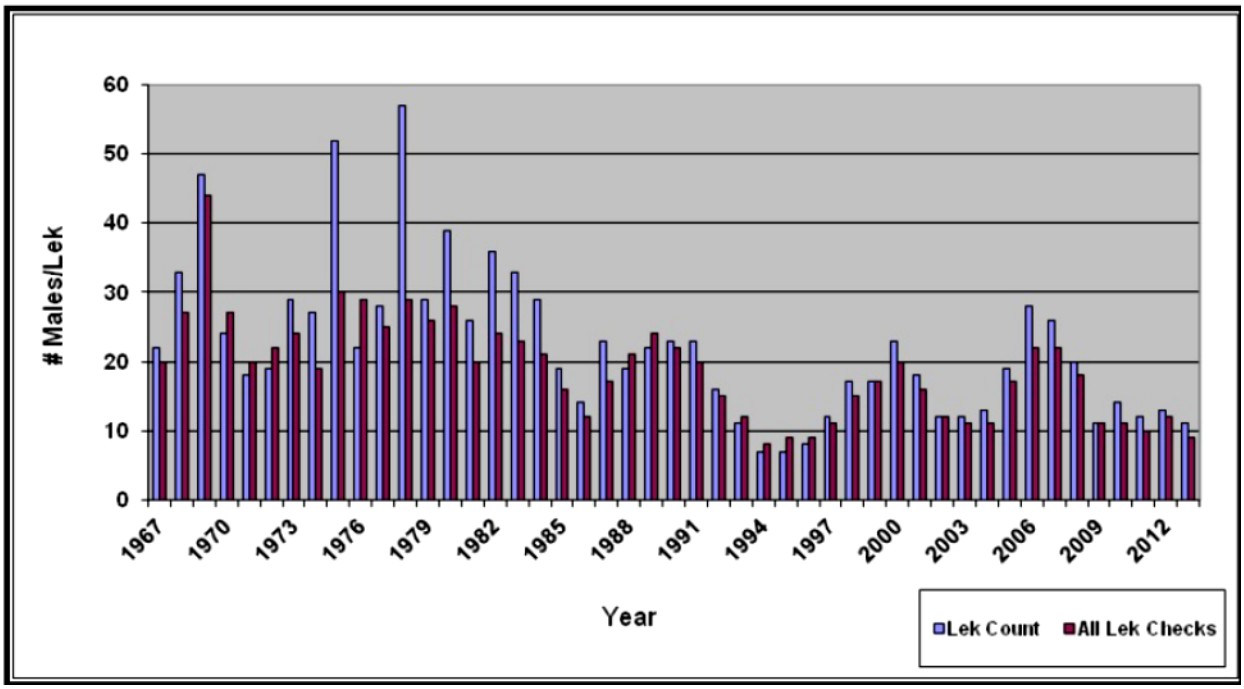


Figure 1. Northeast Wyoming Local Working Group Area Average Number of Males/lek for Lek Counts and All Leks (1967-2013)

Source: Wyoming Game and Fish Department Greater Sage-Grouse Job Completion June 1, 2012- May 31, 2013

Figure 2 below illustrates the mean male attendance per lek at the State, Northeast Wyoming Local Working Group Area, and TBNG. Of the six working groups, Northeast Wyoming has the lowest average male lek attendance in the State, averaging nine males per active lek in 2013 compared to the Statewide average of 17 males per active lek (Figure 2). Male lek attendance for the other working group areas ranged from 9.5 to 35 males per active lek. In 2013, the average males per lek on TBNG were 3.4.

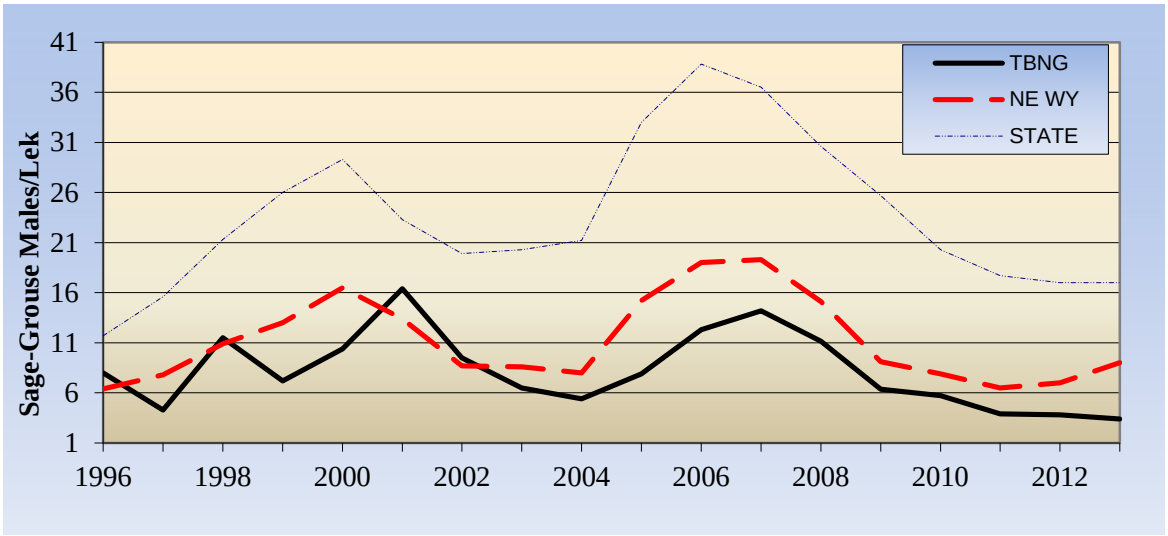


Figure 2. Mean Males/Lek for Wyoming, Northeast Wyoming, and TBNG (1996-2013)

The most recent peak minimum estimated population of GRSG on the TBNG was in 2007 at 2,762 birds. The population has steadily declined since that time. The current 2013 population estimate is 368 birds which is a loss of 2,394 birds or an 87 percent reduction over the last six years. The current population estimate is the lowest it has been in 16 years (Figure 3).

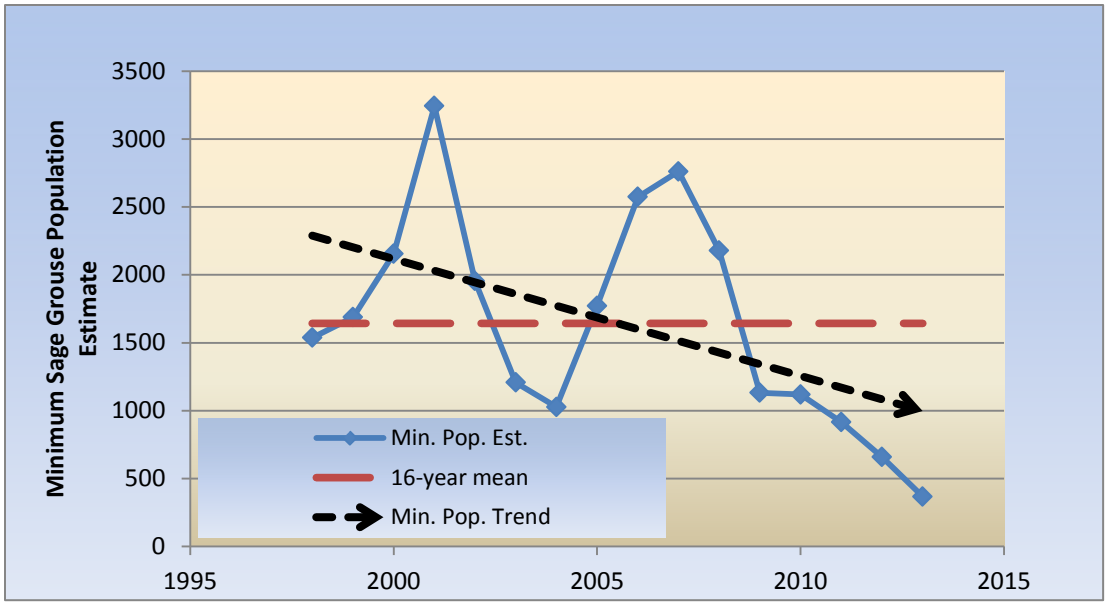


Figure 3. Minimum Greater Sage-Grouse Population Estimates for TBNG and the 15-Year Average

TBNG is divided into six subunits called Geographic Areas for management purposes, and each Geographic Area has GRSG as a MIS. Currently on TBNG, GRSG lek attendance is stable or slightly declining in two geographic areas, steeply declining in three geographic areas, and no longer has active leks in one geographic area.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel

There would be no changes to the current TBNG system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There is a current Travel Management Plan in place that addresses all non-special use travel on TBNG. Restrictions on special uses may apply, but off-road permits are still issued. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance to GRSG. Motorized access to most of TBNG is present on authorized roads, and it usually means higher concentrations of human use adjacent to motorized routes and in habitat. In addition, with increased road use comes increased noise which has been identified as a specific stressor on GRSG (Holloran 2005). These disturbances can cause impacts on reproduction and survival (Blickley and Patricelli 2012). In this alternative noise associated with traffic would not be moderated in GRSG habitat.

Lands and Realty

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. As a R2 Sensitive Species, GRSG habitat acquisition may be emphasized, however, some GRSG habitat could be traded to other ownership where the parcels are isolated, lands that would reduce boundary conflicts with other ownerships, or are otherwise in the public interest. All Forest Service lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation. Other impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat. (See Appendix 1 at the end of this document for specific acres of other land use restriction by Alternative.)

Range

There would be no change in the numbers, timing, or method of livestock grazing on TBNG. Range improvements are designed to not have a direct negative effect on GRSG. Potential adverse effects on GRSG habitat could include habitat fragmentation due to infrastructure development, habitat conversion of sagebrush stands to grasslands for improved livestock forage, and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

Energy development consisting of coal, oil, and natural gas has been a predominant use of public lands on the TBNG. Given that the TBNG may, in its entirety, be described as occupied GRSG habitat, energy development will continue to be an issue relevant to the conservation of GRSG. Energy development on TBNG is also of national importance. The TBNG produces significant quantities of coal. There are four coal mines on the TBNG either in production or some phase of planning or construction. The four mines have a collective footprint of over 120,000 acres within the planning area of which approximately 44,500 acres is on Forest Service lands. These lands produced 22.2 percent of the entire nation's coal in 1997 and they have continued to increase production. In addition, there are significant oil and gas exploration and development occurring and planned on TBNG. The majority of all GRSG habitats are open to leasing including expansion of existing leases with no cap on surface disturbing activities.

This energy development is a significant threat to GRSG as noted by the USFWS in the 2010 finding (75 FR 13910-14014): Energy development is a significant risk to the GRSG in the eastern portion of its range (Montana, Wyoming, Colorado, and northeastern Utah – MZs I, II, VII and the northeastern part of MZ III), with the primary concern being the direct effects of energy development on the long-term viability of GRSG by eliminating habitat, leks, and whole populations and fragmenting some of the last remaining large expanses of habitat necessary for the species' persistence. Energy development has also been identified as a major GRSG stressor in the Powder River Basin of Northeast Wyoming (Taylor et al. 2012).

The above mentioned energy development impacts as they relate to TBNG are a result of: increased anthropogenic disturbance of GRSG habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and development or removal of mineral materials. (See Appendix 1 at the end of this document for specific acres of other land use restriction by Alternative.)

Fire and Fuels Management

In the Powder River Basin sagebrush patch size has been reduced from an average of 820 acres to an average of less than 300 acres (from 1966 to 2006), a 63 percent reduction (WGFD 2014). This reduction has come about from a variety of activities including wildfire and prescribed burning.

There were 205 wildfires on the TBNG surface from 2001-2011 averaging19 fires per year. (This does not include all wildland fires occurring on private and State lands during this time.) The average size of a fire on TBNG during this time was 173.5 acres with a total of 35,562 acres burned. The largest single fire was 5,670 acres and five of the 11 years had more than 2,500 acres burned each year. The dominant fuel types on TBNG are GRSG habitat (sagebrush and mixed-grass prairie) with lightening being the primary cause of wildfire (61 percent), fires

caused by the railroad being the next most frequent cause (20 percent), remaining wildfires caused by a variety of other sources.

Impacts from wildfires include removal or loss of large tracts of sagebrush habitat resulting in a direst loss of nests as well as a loss of nesting habitat, hiding cover, and winter range. Wildfire can also increase nonnative or exotic grasses or weeds causing additional impacts. For example, as cheatgrass invades habitat types it can out-compete many native grasses. With the increase in cheatgrass, come potential increases in wildfire. Fire within a cheatgrass invaded vegetation type becomes cyclic because fire removes the vegetation, cheatgrass re-grows to denser conditions, and it then creates a fine fuel accumulation ready to burn again at a much reduced fire return interval (Davies et al. 2011).

In this alternative the use of prescribed fire generally is designed to maintain or improve habitat for desired plants and animals. However, prescribed burning is, by design, used to reduce the structure and seral condition when used in sagebrush, and this treatment tool is permitted in GRSG breeding, nesting, and winter range. These treatment impacts could result in removal or loss of up to 25 percent of the sagebrush within a stand and a burn area of up to 80 acres in size. This type of treatment could result in a localized loss or reduction in nesting, wintering, or hiding cover habitat while at the same time potentially increasing brood rearing habitat.

Most of the published literature concludes that fire has a negative effect on GRSG (Braun 2006; Knick and Connelly 2011; Beck et al 2012, USFWS 2013). A possible shortcoming of this research is the lack of studies involving the use of prescribed fire as a tool to thin Wyoming Big Sagebrush stands. Most literature evaluates intensive burning with a result near total removal of sagebrush within the burn area. The use of fire to reduce the density of Wyoming Big Sagebrush within a stand is still unclear. Prescribed fire can be a useful tool to remove conifer encroachment into GRSG habitat, but mechanical treatment was recommended in order to provide the most rapid recovery of the sagebrush community (Davies et al 2011).

Cumulative Effects

Effects on GRSG Habitat Trends TBNG-wide

In the Powder River Basin Sagebrush patch size has been reduced from an average of 820 acres to an average of less than 300 acres (from 1966 to 2006), a 63 percent reduction (WGFD 2014). This reduction has come about from a variety of activities. On TBNG wildfires alone burned over 35,500 acres in 11 years with over 2,500 acres being burned annually five of the 11 years. Energy development, wildfire, road development, and increased noise have also all worked together to fragment and reduce suitable, effective GRSG habitat on the TBNG. These impacts and downward trend have occurred over the last 11 years under the operations of the current LRMP signed in 2002. With all of this considered, the Grassland-wide habitat could be expected to continue to decrease in effectiveness and size in this alternative.

Effects on GRSG Population Trends TBNG-wide

GRSG populations have been steadily declining on the TBNG since 2007 with cyclic trends declining since 1998. Many of the GRSG leks also had less than 10 males in attendance per lek recorded for 2012. With the above discussion about habitat in mind, it could be expected that the Grassland-wide GRSG population would continue to decrease. This trend combined with the potential for West Nile in Northeast Wyoming (Taylor et al. 2011), is likely to lead to additional reductions in the distribution of GRSG within geographic areas and across the entire National Grassland.

GRSG have been selected to indicate the effects of management activities on other species relying on the sagebrush ecosystem for all or a part of their life cycle. Therefore, in this alternative it is expected that similar declines in other sagebrush species and their habitats will occur. As the No Action Alternative, this alternative provides the least GRSG and sagebrush associated species habitat conservation.

Alternative B

Direct and Indirect Impacts

Recreation and Travel

In priority GRSG habitats, new road construction would be limited to areas with less than 3 percent habitat disturbance, and allow only the minimum necessary road standard and no upgrading of current roads. Existing roads not designated in a Travel Management Plan would be reclaimed. All travel would remain on designated routes. Recreational use permits would only be permitted in PPH if there was a neutral or beneficial impact on GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels which are lower in this alternative (20-24 decibels) than Alternative A. All GRSG PPH and Important Bird Areas could be designated as SIAs. There would be less disruption of habitat, breeding, and a reduction of road associated mortality. These measures allow less habitat loss and disturbance than Alternative A retaining more suitable habitat.

Lands and Realty

PPH would be managed as an exclusion area and PGH (GHMA) would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PPH (Core). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PPH.

Range

Alternative B would adjust grazing direction in GRSG PPH (Core). Many livestock improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. Fencing would be developed to reflect GRSG

needs in all GRSG habitats. Outside of PPH (Core) the potential effects due to livestock grazing, vegetation disturbance, and range improvements would be the same as Alternative A. Potential adverse effects on GRSG habitat could include habitat fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

PPH (Core) would be closed to new coal, energy and non-energy leasable materials, and fluid mineral leases. Existing leases would have a four mile no surface occupancy buffer around leks. COAs would be attached to existing leases during analysis and approval of exploration and development activities to minimize or avoid the impacts on GRSG through a project design. Exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs for GRSG would not be considered within GRSG PHMA. Outside of PPH (Core), mineral development would be the same as Alternative A. This alternative better conserves PPH (Core) GRSG habitat than Alternatives A, D, and E and is equal to Alternative C.

Fire and Fuels Management

Prescribed fire in sagebrush would be very limited in PPH (Core) and fuels treatments would emphasize protecting existing sagebrush ecosystems. Suppression and habitat protection would be emphasized. In GRSG PPH (Core) areas within precipitation zones of 12 inches or less, fire is not used to treat sagebrush, unless as a last resort for fuel breaks and must be within a 3 percent disturbance limit. This would promote the conservation of habitat and reduce disturbance to habitat associated with fire in PPH. In addition, habitat restoration would be a priority. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C.

CUMULATIVE EFFECTS

Effects on GRSG Habitat Trends TBNG-wide

Within PPH (Core) the 3 percent disturbance limitation would limit anthropogenic impacts on GRSG structural habitat conditions. With the increased emphasis on fire suppression, reduced energy development, noise restrictions, and livestock grazing modifications within PPH (Core) overall GRSG habitat usability should remain stable with a potential for increasing in areas exceeding the 3 percent disturbance limitation. Additional protections and directions for PGH (GHMA) will further provide habitat protections in this alternative. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C.

Effects on GRSG Population Trends TBNG-wide

Based on the above habitat discussion and protections, the GRSG population would have a better chance of developing a stable or upward trend. Many of the documented stressors have been reduced in PGH (GHMA) and in the case of PPH (Core) they may have been removed. This alternative would encourage better habitat conditions which would be conducive to increased male attendance at more leks across most geographic areas. While the potential for West Nile has not been removed, the potential for a larger population distributed across the landscape would provide a higher potential for more birds to survive an outbreak. The expected increase in population trend would also provide the opportunity for GRSG to re-populate geographic areas where they are absent or decreasing in Alternative A.

It is expected that this alternative will conserve more habitat for GRSG and sagebrush associated species habitat than Alternatives A, D, and E, but conserves less than Alternative C.

Alternative C Direct and Indirect Impacts

Recreation and Travel

Conservation measure would be more beneficial to GRSG and their habitat than other alternatives. In this alternative conservation measures are generally applied to both PPH (Core Habitat) and PGH (GHMA). GRSG PHMA and GHMA would be managed as ROW exclusion areas for new ROW or SUA permits. New road construction would be prohibited within four miles of active GRSG leks, and it would be avoided in PPH (Core) and PGH (GHMA. Existing road management would be designed to maintain or improve both PPH (Core) and PGH (GHMA). Road associated noise would be limited to less than 10 decibels above ambient levels (20-24 decibels). Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. There would be less disruption of habitat, breeding, and a reduction of road associated mortality. These measures allow the least habitat loss and disturbance of all of the Alternatives retaining more suitable habitat.

Lands and Realty

Alternative C would have the most protective measures GRSG. No GRSG habitat in PPH (Core) would be exchanged away. The Forest Service will strive to acquire important private lands in areas identified as GRSG Special Areas. Alternative C would encourage consolidation and acquisition of GRSG habitat. This alternative would promote the greatest distribution and highest density of suitable GRSG habitat.

Range

Livestock grazing would be prohibited within GRSG PPH. All new structural range developments and location of supplements would be avoided in both PPH and PGH unless they can be shown to benefit GRSG. Grazing and trailing within lekking, nesting, brood-rearing, and winter habitats would be avoided during periods of the year when these habitats are utilized by GRSG. Post-fire (both prescribed and wildfire) monitoring is required in all GRSG habitat to re-

establish grazing. Within PPH and PGH, livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve GRSG habitat objectives.

Positive and negative effects can be caused by livestock grazing (Beck and Mitchell 2000). The prohibition of livestock grazing in PPH would retain the most herbaceous cover for nest concealment, and success; reduced predation; and increased chick survival (BER, Manier et al 2013). Structural development control would reduce mortalities associated with fence collisions; disease such as West Nile when it is associated with stock water development; and habitat fragmentation associated with water pipelines. Livestock grazing can also be beneficial in the establishment and maintenance of GRSG leks (Beck and Mitchell .2000) and it can stimulate forbs and increase their availability (BER, Manier et al 2013). By monitoring and rest from grazing, post-burned habitat is more likely to return to quality GRSG habitat.

Energy and Minerals

No exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs will be considered within PPH and PGH. Both GRSG PPH and PGH areas would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations/expressions of interest would be accepted for parcels within PPH or PGH. Oil and gas leasing would not be allowed in PPH. Geophysical exploration would only be allowed in GRSG PPH and PGH to obtain exploratory information for areas outside of and adjacent to PPH and PGH GRSG habitat and it would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing, and winter habitats during their season of use by GRSG. Where existing leases exist in all GRSG habitats, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. No construction of evaporation or infiltration reservoirs to hold coalbed methane wastewater would be allowed. All PPH would be closed to non-energy leasable mineral leasing. GRSG PPH areas would be closed to mineral material exploration, sales, and free use permits.

Conservation measure would be applied to more GRSG habitat, in many cases both PPH and PGH. Habitat effectiveness would be improved and fragmentation minimized. Since nearly all of TBNG is in either PPH or PGH, many of these restrictions would be applied grassland-wide. This alternative would be the most beneficial to GRSG and their habitat as it relates to energy development.

Fire and Fuels Management

Within all GRSG habitat, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all GRSG habitats, sagebrush reduction/treatments to increase livestock or big game forage would be avoided. Also, sagebrush canopy cover would generally not be reduced to less than 15 percent within any GRSG habitat and vegetation treatments in both habitats would be designed to create landscape patterns which most benefit GRSG. For all GRSG habitat, fire would not be used to treat sagebrush in precipitation zones with less than 12 inches except as a last resort as a fuel break. Post-fuels

management projects will be designed to ensure the long-term persistence of seeded or pre-treatment native plants including sagebrush. Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition, establish non-grazing enclosures, and include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Grazing then should not return to the burn area until woody and herbaceous plants achieve GRSG habitat objectives. No fuels treatments would be allowed in known GRSG winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. Fuels reduction project (roadsides or other areas) in all GRSG habitats would utilize mowing of grass. In PPH (Core) habitat areas, fire suppression to conserve the GRSG habitat would be prioritized immediately after firefighter and public safety.

Prescribed fire in sagebrush would be very limited in all GRSG habitat and suppression would be emphasized in PPH (Core). This would promote the conservation of habitat and reduce disturbance associated with fire. In addition, habitat restoration would be a priority. These measures would help improve overall GRSG habitat. This alternative conserves more sagebrush habitat with higher shrub canopy cover than all other alternatives. This could result in a localized increase in nesting, wintering, or hiding cover habitat while at the same time potentially allowing sagebrush encroachment into brood rearing habitat. The loss of fire as a tool could also restrict the removal of conifer encroachments into some sagebrush habitats.

CUMULATIVE EFFECTS

Effects on GRSG Habitat Trends TBNG-wide

This alternative provides habitat protections for both PPH and PGH GRSG habitats. This represents the entire GRSG habitat on TBNG and the majority of the National Grassland, excluding only the coal mine areas and ponderosa pine habitat type. This would result in very limited anthropogenic impacts on GRSG structural habitat conditions. With the increased emphasis on fire suppression, reduced energy development, noise restrictions, and livestock grazing limitations, overall GRSG habitat usability should remain stable with a high potential for an improving trend. However, there are negative impacts to this alternative with the complete exclusion of grazing and the loss of fire to enhance brood rearing habitat and conifer removal. These tools, if used properly, can assist in the maintenance and improvement of some key habitats. Overall, this alternative is the most conservative and it provides more suitable habitat than Alternatives A, B, D, and E.

Effects on GRSG Population Trends TBNG-wide

Based on the above habitat discussion and protections, the GRSG population would have a good chance of developing a stable or upward trend. Many of the documented stressors have been reduced or removed in much of the GRSG habitat across the National Grassland. This alternative would encourage better habitat conditions which would be conducive to increased male attendance at more leks across most geographic areas. While the potential for West Nile has not

been removed, the potential for a larger population distributed across the landscape would provide a higher potential for more birds to survive an outbreak. The expected increase in population trend would also provide the opportunity for GRSG to re-populate geographic areas where they are absent or decreasing in Alternative A.

This alternative is the most conservative, and provides more suitable habitat for GRSG and sagebrush associated species than Alternatives A, B, D, and E.

Alternative D

Direct and Indirect Impacts

Recreation and Travel

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of Sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance in PPH and it does require consideration of GRSG needs for recreation special uses in PPH (Core). The potential changes in Sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to GRSG than Alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PPH and connectivity habitat will be allowed > 0.25 miles from GRSG. This is closer than the disturbance allowed in the other alternatives except Alternative A.

New ROWs and SUAs in PPH would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in PGH.

Range

Conservation measures are generally similar to Alternative A. Grazing management strategies would be developed cooperatively with permittees, leases, and other landowners on an allotment-by-allotment basis to improve GRSG habitat. As grazing permits are renewed in PPH GRSG habitat, objectives and management considerations could be incorporated. Up to 15 percent of PPH (Core) could be retired from grazing where permittee or lessee voluntarily relinquishes their grazing preference in their grazing allotment. Vegetative management and grazing infrastructure is essentially the same as Alternative A. Potential adverse effects on GRSG habitat could include habitat fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other

vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap that does not exist in Alternative A. The lack of conservation measures in sagebrush outside of PPH could lead to: increased anthropogenic disturbance of GRSG habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and the development or removal of mineral materials.

Fire and Fuels Management

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in PPH. This treatment would follow WFGD "Protocols for Treating Sagebrush to Benefit Greater Sage-grouse" (WGFD 2011) to determining whether proposed treatment constitutes a "disturbance" that will contribute toward the 9 percent threshold. Treated areas would not be rested from grazing. This allowance alone will promote the expansion of noxious weeds and a lack of cover. Also, treatment is permitted in GRSG breeding, nesting, and winter range. These limited conservation measures on PPH and the lack of measures in the remainder of GRSG habitat would have detrimental impacts on GRSG. This type of management could result in a localized loss or reduction in nesting, wintering, or hiding cover habitat while at the same time potentially increasing brood rearing habitat.

Cumulative Effects

Effects on GRSG Habitat Trends TBNG-wide

This alternative mirrors much of the management direction in Alternative A. As displayed in Alternative A, there is a downward trend in habitat suitability and availability. The few conservation measures included in this alternative are limited to PPH (Core) habitat, and with this only representing 39 percent of the GRSG habitat within TBNG, they are not expected to be sufficient to create a noticeable change in GRSG habitat across the planning unit (TBNG). With implementation of this alternative, energy development, wildfire, road development, and increased noise would likely work together to continue to fragment and reduce suitable, effective GRSG habitat on the TBNG.

With all of this considered, the Grassland-wide habitat could be expected to continue to decrease in effectiveness and size in this alternative.

Effects on GRSG Population Trends TBNG-wide

Since this alternative uses the Alternative A management direction, it is reasonable that the population trend associated with the Alternative A management would continue. GRSG populations have been steadily declining on the TBNG since 2007 with cyclic trends declining

since 1998. Many of the GRSG leks also had less than 10 males in attendance per lek recorded for 2012. With the above discussion about habitat in mind, it could be expected that the grassland-wide GRSG population would continue to decrease. This trend, combine with the potential for West Nile in Northeast Wyoming (Taylor et al. 2011), is likely to lead to additional reductions in the distribution of GRSG within geographic areas, and across the entire National Grassland.

It is expected that this alternative will conserve more habitat for GRSG and Sagebrush associated species habitat than Alternative A, but conserves less than Alternatives B, C, and E.

Proposed Plan Amendment

Direct and Indirect Impacts

Recreation and Travel

New primary and secondary roads would avoid areas within 1.9 miles of the perimeter of occupied GRSG leks within GRSG PHMA. Other new roads would avoid areas within 0.6 miles of the perimeter of occupied GRSG leks within PHMA. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6:00 p.m. to 8:00 a.m. from March 1 – May 15 on or within a 0.6 mile radius of the perimeter of occupied GRSG leks inside core habitat and connectivity habitat areas. In addition, noise levels at the 0.6 mile perimeter of the lek, should not exceed 10 decibels above ambient noise. Some recreation special uses would be allowed in PHMA.

Conservations measures primarily apply to PHMA only. Measures in PHMA would be slightly more restrictive than Alternatives A and D but less restrictive than Alternatives B and C .The restriction on road construction or upgrades in PHMA would limit disturbance and habitat loss within PHMA, but it would allow existing conditions to continue in the remaining GRSG habitat.

Lands and Realty

GRSG habitat requirements would be used to prioritize parcels for exchange or acquisition within PHMA habitats. New projects within GRSG PHMA would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. GRSG PHMA would be managed as ROW avoidance areas for new ROW or SUA permits.

Most conservation actions are taken in both PHMA and PGH habitats. Some short-term (less than five years) impacts could occur. In addition, some small exceptions may be granted that could impact habitat, but could be demonstrated to not cause declines in GRSG populations. This could allow some habitat to be lost, degraded, or disturbed. Conservation measures would allow ROW and SUA permits as well as some limited power lines, some lease changes, and activities within 0.6 miles of a lek in PGH. Habitat changes could also occur because PHMA can be exchanged to other ownership. Overall, impacts on Sagebrush habitat and Sagebrush associated

species would be reduced compared to Alternatives A and D but would be greater than impacts on Sagebrush habitat and associated species in Alternatives B and C.

Range

Within GRSG core habitat, as appropriate, site specific GRSG habitat objectives and management considerations would be incorporated into all grazing permit renewals. Livestock grazing and associated range improvement projects would be planned and authorized in a way that contributes to rangeland health and maintains and/or improves GRSG and its habitat.

Conservation measures place more focus on incorporating measures to provide adequate habitat quality for GRSG within 5.3 miles of an occupied lek in most areas. Exceptions would include areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of 200 acres of Forest Service lands. In addition, on TBNG, Management Areas 8.4 and 3.63 (Minerals Management and Black-footed Ferret Reintroduction Habitat) that occur with PGH habitat and other areas in GHMA designated for short-grass species, they would also be excluded. These conservation measures improve habitat in both PHMA and GHMA habitat more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, but not as much within the GHMA habitat. Alternative C would apply to all GRSG habitat without exceptions which may not allow enough flexibility to maintain all of the needed habitat components.

Potential adverse effects on GRSG habitat (primarily in GHMA habitat) could include habitat fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

A maximum of 5 percent disturbance would be allowed within PHMA using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within GRSG PHMA. The density of oil and gas or mining activities would be considered and evaluated for measures that limit or reduce their activities to no more than an average of one location per 640 acres. Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. All non-energy leasable and salable mineral activities would be considered in PHMA. The lack of conservation measures in sagebrush outside of PHMA could lead to increased anthropogenic disturbance of GRSG habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development;, surface occupancy on mineral leased areas; noise; industrial campsites; and the development or removal

of mineral materials. Conservation measures would have impacts similar to but more restrictive than Alternatives A and D.

Fire and Fuels Management

A maximum of 5 percent disturbance would be allowed within PHMA using the DDTC. Within GRSG PHMA habitat in northeast Wyoming, vegetation treatments in nesting and wintering habitats that would reduce sagebrush canopy to less than 15 percent would not be conducted unless it could be shown to be beneficial to GRSG. Habitat restoration would be prioritized to rehabilitate PHMA first. Fuels treatments in PHMA would be designed with an emphasis on protecting existing sagebrush ecosystems and enhancing as well as protecting future sagebrush ecosystems. Multiple tools would be considered for fuels reduction and analyzed in NEPA compliance documentation before electing to implement prescribed fire in PHMA. Also, within PHMA the use of prescribed fire in areas of Wyoming Big Sagebrush, other xeric sagebrush species, or where Cheatgrass or other fire-invasive species occur and/or within areas of less than 12 inches of annual precipitation would be avoided. During wildfire suppression prioritization, PHMA would be placed immediately after firefighter and public safety to conserve the habitat.

Fire and fuel management again focuses primarily on PHMA for additional conservation management, leaving the remaining GRSG habitat to management similar to Alternative A. These conservation measures would make this alternative more beneficial than Alternatives A or D.

Cumulative Effects

Effects on GRSG Habitat Trends TBNG-wide

In Alternative E many of the conservation measures are extended to the GHMA increasing their effectiveness and reducing the loss or fragmentation of mature sagebrush habitat in these areas. Also, key to this alternative is the residual cover direction that is applied to grazing within 5.3 miles of a lek in both priority and general (with some exceptions) habitats. This direction will provide quality GRSG habitat to most of the occupied GRSG habitat.

In this alternative, the Forest Service added additional acreages to PHMA for the TB National Grassland to help ensure sufficient legal (NFMA) and CFR direction to meet viability requirements on each unit. These areas are associated with important GRSG populations that are well distributed within the suitable habitat across each unit. This is habitat that had been previously classified as GHMA and is now designated as Priority Core areas. These areas, in addition to the previously classified PHMAs, increases the area managed as priority GRSG habitats. On the TBNG, this is an increase of 51,067 acres which represents a change in PHMAs from about 40 percent to about 50 percent on the TBNG.

Table 1 depicts Forest Service acreage on the TB National Grassland and designated GRSG PHMA habitat acres. Of the over one-half million acres of Forest Service lands that comprise the TBNG, 275,191 acres (about 50 percent) have been designated as PHMA management areas.

Table 1: TBNG Acreage and Designated GRSG Core Habitat Acres.

Unit	PHMA Acres	General Habitat Acres	Total Acres of Greater Sage-Grouse Habitat
Thunder Basin National Grassland	275,191	278,673	553,864

Most of the aforementioned conservation measures apply to priority and GHMA. Of importance for all resource areas are the 5 percent disturbance cap and one facility per 640 acres density limit in PHMA and Sagebrush focal areas. These measures provide additional protection from further habitat loss due to anthropogenic development. However, these disturbance allowances will still result in minor losses of GRSG habitat.

Considering the above, the Grassland wide habitat could be expected to maintain or improve in effectiveness and size, in this alternative.

Effects on GRSG Population Trends TBNG-wide

With the addition of the additional PHMAs and expanded management direction for PGH habitat, the majority of the GRSG population will fall under enhanced management emphasizing GRSG habitat conservation and improvement. Based on current research, this direction should provide conditions that would allow the downward population trend to be reduced and potentially be turned around. There are many variables and unknowns that may be influencing the GRSG population trend on TB National Grassland, however, this alternative tries to address as many as could be identified. The results of the implementation of the conservation measures in this alternative may take several years to bear fruit. However, if fully implemented, and in the absence of a major disease outbreak such as West Nile, it is expected that the population trend on TB National Grassland will show a positive response.

Overall, the effects of management in Alternative E are less impacting than Alternatives A and D, but are also greater than those impacts associated with Alternative C or Alternative B. Based on the above habitat discussion and protections, the GRSG populations have a high probability of stabilizing or improving under the management direction of Alternative E. Many of the documented stressors have been reduced or removed in GRSG habitat across the National Forests and Grassland. This alternative would encourage better habitat conditions that would be reflected by increased male attendance at leks. While the potential for West Nile virus is not removed, the potential for a larger population distributed across the landscape could increase the potential for more birds to survive an outbreak. The expected increase in population trend would also provide the opportunity for GRSG to re-populate areas where they are absent or decreasing under current management.

Plains Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Distribution

Sharp-tailed grouse historically were found in Canadian and 21 U.S. states. They ranged from Alaska to California and New Mexico and as far east as Quebec, Canada. It is now extirpated from California, Kansas, Illinois, Iowa, Nevada, and New Mexico (Wikipedia on line at http://en.wikipedia.org/wiki/Sharp-tailed_Grouse#Distribution). On TBNG, Sharp-tailed grouse are MIS in only two geographic areas, the Spring Creek Geographic Area and the Upton/Osage Geographic Area. These two areas are also the only areas where Sharp-tailed grouse are known to reliably occur on TBNG. Other sightings have been reported, but no Sharp-tailed grouse populations have been found within the remaining four geographic areas.

Habitat Associations and Threats

The plains Sharp-tailed grouse was selected as a management indicator species on TBNG for the biological community most often found in grasslands with a diversity of structural stages, including an abundance of high structure grasslands. Quality nesting cover on mixed grasslands occurs where mid and/or tall grass species are dominant and ungrazed or lightly grazed cover has accumulated over a few years. On less productive mixed-grass prairies that receive an average of 14 to 16 inches of precipitation, quality nesting cover is typically found less on upland sites and more in the taller and denser cover patches in run-in sites (clumps of tall vegetation surrounded by shorter species types or vegetation) and along drainages become more important for nesting. Where long-term grazing has reduced the composition of mid and/or tall grass species, quality nesting cover is sometimes unavailable regardless of the grazing intensity. Interspersed shrubs and shrub communities also contribute to habitat suitability for this species and many other wildlife species. Sagebrush and other shrubs provide winter shelter and can provide additional foraging areas. Individual patch sizes of quality nesting cover across pastures or range sites should be at least 160 acres in size.

On TBNG Sharp-tailed grouse habitat overlaps GRSG habitat. This specie is found most prominently in the northern portions of the unit that are periodically rested from annual livestock grazing or grazed at light intensities.

Population Status and Trend

Sharp-tailed grouse do not receive consistent annual monitoring by other agencies, and they are primarily monitored by the Forest Service on TBNG. The TBNG population has shown an overall increasing population trend over the last 10 years (Figure 5). It should be noted that due to concerns about the noticeable decline in lek attendance after the 2007 survey season, additional monitoring was implemented. From 2007 to 2012 the population trend was predominantly increasing. In 2013 the population dropped noticeably. It is unclear whether this is a change in the population trend or a one year event similar to those that occurred in 2007 and 2011.

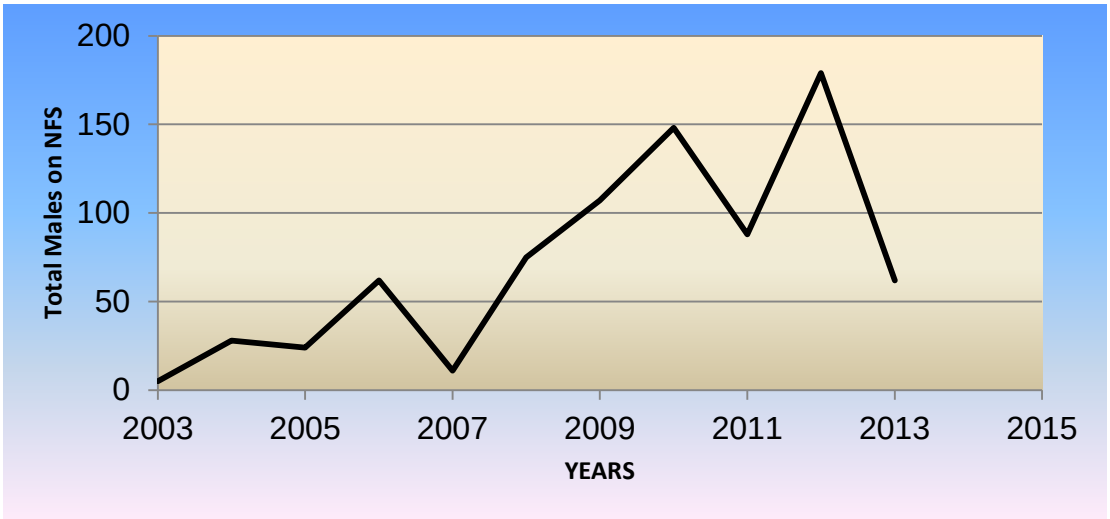


Figure 5. Total Male Sharp-tailed Grouse Observed on TBNG Surface from 2003 through 2013.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel

There would be no changes to the current TBNG system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There is a current Travel Management Plan in place addressing all non-special use travel on TBNG. Restrictions on special uses may apply, but off-road permits are still issued. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance to Sharp-tailed grouse. Motorized access to most of TBNG is present on authorized roads and it usually means higher concentrations of human use adjacent to motorized routes and in habitat. In addition, with increased road use comes increased noise which has been identified as a specific stressor on Sharp-tailed grouse. In this alternative noise associated with traffic would not be moderated in Sharp-tailed grouse habitat.

Lands and Realty

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. Some Sharp-tailed grouse habitat could be traded to other ownership where it improves habitat for a R2 Sensitive Species; parcels are isolated; lands that would reduce boundary conflicts with other ownerships; or are otherwise in the public interest. All Forest Service lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation. Other impacts may include new infestations of noxious or invasive weeds and an

increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat.

Range

There would be no change in the numbers, timing, or method of livestock grazing on TBNG. Range improvements are designed to not have a direct negative effect on Sharp-tailed grouse. Potential adverse effects on Sharp-tailed grouse habitat could include habitat fragmentation due to infrastructure development, moderate to heavy livestock grazing, and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

Energy development consisting of coal, oil, and natural gas has been a predominant use of public lands on the TBNG. Since Sharp-tailed grouse are only found in two Geographic Areas (GA) and only the Spring Creek GA has seen any recent mineral development, the influence of energy is relatively low on its habitat. However, the majority of all Sharp-tailed grouse habitats are open to leasing including expansion of existing leases with no cap on surface disturbing activities.

Oil and gas development within the Spring Creek GA has had little identifiable impact on Sharp-tailed grouse. Habitat conditions and population trends appear to be more closely related to grazing intensity and precipitation. However, the above mentioned energy development may still cause some impacts as they relate to the: increased anthropogenic disturbance of habitat;, off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and the development or removal of mineral materials.

Fire and Fuels Management

In the Powder River Basin Sagebrush patch size has been reduced from an average of 820 acres to an average of less than 300 acres (from 1966 to 2006), a 63 percent reduction (WGFD 2014). This reduction has come about from a variety of activities including wildfire and prescribed burning. In several cases, these prescribed burns have been designed to specifically improve Sharp-tailed grouse habitat. Since Sharp-tailed grouse prefer tall, ungrazed to lightly grazed grasslands, both prescribed and wild fire have provided benefits to this bird’s habitat condition.

Cumulative Effects

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

Sharp-tailed grouse habitat can be influenced by the amount of precipitation and based on recent drought conditions it was expected that the overall habitat conditions on TBNG would decline. Sharp-tailed grouse habitats can fluctuate annually. With all of this considered, in this alternative

the Grassland-wide habitat could be expected to vary in effectiveness and size until moisture levels stabilize.

Effects on Sharp-tailed Grouse Population Trends TBNG-wide

Sharp-tailed grouse populations have been steadily increasing since 2007 with a slight decrease in 2011. This trend has developed under the current management direction and is expected to continue. Viability is defined in the NFMA as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG LRMP have demonstrated that they are sufficient to maintain viability across the planning unit.

Alternative B

Direct and Indirect Impacts

Recreation and Travel

In Priority GRSG habitats (PPH also known as Core Areas) new road construction would be limited to areas with less than 3 percent habitat disturbance and allowing only the minimum necessary road standard and no upgrading of current roads. Existing roads not designated in a Travel Management Plan would be reclaimed. All travel would remain on designated routes. Recreational use permits would only be permitted in PPH if there was a neutral or beneficial impact on GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels (which are lower in this alternative [20-24 decibels] than Alternative A). All GRSG PPH and Important Bird Areas could be designated as SIAs. There would be less disruption of Sharp-tailed grouse habitat, breeding, and a reduction of road associated mortality. These measures allow less habitat loss and disturbance than Alternative A retaining more suitable habitat.

Lands and Realty

PPH (Core) would be managed as an exclusion area and PGH would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PPH (Core). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. These conservation measures would also provide habitat protection for Sharp-tailed grouse.

Range

Alternative B would adjust grazing direction in GRSG PPH (Core). Many livestock improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. Fencing would be developed to reflect GRSG needs in all GRSG habitats. Outside of PPH (Core) the potential effects due to livestock grazing, vegetation disturbance, and range improvements would be the same as Alternative A. Potential adverse effects to Sharp-tailed grouse habitat could include habitat fragmentation due to infrastructure development and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative

objectives. Inside of PPH (Core) the focus on lighter grazing would also provide additional positive impacts for Sharp-tailed grouse in the form of higher residual grasses.

Energy and Minerals

PPH (Core) would be closed to new coal, energy and non-energy leasable materials, and fluid mineral leases. Existing leases would have a four mile no surface occupancy buffer around leks. COAs would be attached to existing leases during analysis and approval of exploration and development activities to minimize or avoid the impacts on GRSG through a project design. Exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs for GRSG would not be considered within GRSG PHMA. Outside of PPH (Core), mineral development would be the same as Alternative A. Impacts associated with anthropomorphic disturbances would be reduced for Sharp-tailed grouse improving the quality of the available habitat.

Fire and Fuels Management

Prescribed fire in sagebrush would be very limited in PPH (Core) and fuels treatments would emphasize protecting existing sagebrush ecosystems. Suppression and habitat protection would be emphasized. In GRSG PPH (Core) areas within precipitation zones of 12 inches or less, fire is not used to treat sagebrush unless as a last resort for fuel breaks and it must be within a 3 percent disturbance limit. Fire can provide improved habitat conditions for Sharp-tailed grouse by increasing grassland habitat and reducing shrub species. In several cases, prescribed burns have been designed to specifically improve Sharp-tailed grouse habitat. The reduction of fire could slow the establishment of new or expanded Sharp-tailed grouse habitat.

CUMULATIVE EFFECTS

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

In this alternative Sharp-tailed grouse habitat is expected to be maintained or improve slightly. The reduction in the availability of fire is expected to contribute to a slower expansion of the habitat, but other conservation measures would off-set this by precluding impacts on existing habitat.

Effects on Population Trends TBNG-wide

Sharp-tailed grouse populations have been steadily increasing since 2007 with a slight decrease in 2011. This trend has developed under the current management direction, and since this alternative would provide increased habitat protections, it is expected to continue. Viability is defined in the NFMA as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG LRMP have demonstrated that they are sufficient to maintain viability across the planning unit.

Alternative C

Direct and Indirect Impacts

Recreation and Travel

In this alternative conservation measures are generally applied to both PPH (Core Habitat) and PGH (GHMA). GRSG priority and GHMA would be managed as ROW exclusion areas for new ROW or SUA permits. New road construction would be prohibited within four miles of active GRSG leks, and avoided in PPH (Core) and PGH (GHMA). Existing road management would be designed to maintain or improve both PPH (Core) and PGH (GHMA). Road associated noise would be limited to less than 10 decibels above ambient levels (20-24 decibels). Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. There would be less disruption of Sharp-tailed grouse habitat, breeding, and a reduction of road associated mortality.

Lands and Realty

No GRSG habitat in PPH (Core) would be exchanged away. The Forest Service will strive to acquire important private lands in areas identified as GRSG Special Areas. Alternative C would encourage consolidation and acquisition of GRSG habitat. This could cause the loss of some Sharp-tailed grouse habitat in exchange for GRSG habitat.

Range

Livestock grazing would be prohibited within GRSG PPH (Core). All new structural range developments and location of supplements would be avoided in both PPH (Core) and PGH (GHMA) unless they can be shown to benefit GRSG. Grazing and trailing within lekking, nesting, brood-rearing, and winter habitats would be avoided during periods of the year when these habitats are utilized by GRSG. Post fire (both prescribed and wildfire) monitoring is required in all GRSG habitat to re-establish grazing. Within GRSG PPH (Core) and PGH (GHMA), livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve GRSG habitat objectives. Since Sharp-tailed grouse generally thrive in ungrazed of lightly grazed areas, these conservation measures would be a benefit to Sharp-tailed grouse.

Energy and Minerals

No exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs will be considered within GRSG PPH (Core) and PGH (GHMA). Both GRSG PPH (Core) and PGH (GHMA) areas would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations/expressions of interest would be accepted for parcels within GRSG PPH (Core) or PGH (GHMA). Oil and gas leasing would not be allowed in GRSG PPH (Core). Geophysical exploration would only be allowed in GRSG PPH (Core) and PGH (GHMA) to obtain exploratory information for areas outside of and adjacent to PPH (Core) and PGH (GHMA) GRSG habitat and it would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by

GRSG. Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. No construction of evaporation or infiltration reservoirs to hold coalbed methane wastewater would be allowed. All PPH (Core) would be closed to non-energy leasable mineral leasing. GRSG PPH (Core) areas would be closed to mineral material exploration, sales, and free use permits.

Restrictions to energy development generally reduce the impacts on Sharp-tailed grouse by reducing anthropogenic disruptions to the birds and their habitat. Noise, habitat fragmentation, and increased loss of habitat would be reduced in this alternative.

Fire and Fuels Management

Within all GRSG habitat, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all GRSG habitats, sagebrush reduction/treatments to increase livestock or big game forage would be avoided. Also, sagebrush canopy cover would generally not be reduced to less than 15 percent within any GRSG habitat and vegetation treatments in both habitats would be designed to create landscape patterns which most benefit GRSG. For all GRSG habitat, fire would not be used to treat sagebrush in precipitation zones with less than 12 inches except as a last resort as a fuel break. Post fuels management projects will be designed to ensure the long-term persistence of seeded or pre-treatment native plants including sagebrush. Any vegetation treatment plan must include: pretreatment data on wildlife and habitat condition; establish non-grazing enclosures: and include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Grazing then should not return to the burn area until woody and herbaceous plants achieve GRSG habitat objectives. No fuels treatments would be allowed in known GRSG winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. Fuels reduction project (roadsides or other areas) in all GRSG habitat would utilize mowing of grass. In PPH (Core) habitat areas, fire suppression to conserve the GRSG habitat would be prioritized immediately after firefighter and public safety.

Fire can provide improved habitat conditions for Sharp-tailed grouse by increasing grassland habitat and reducing shrub species. In several cases, prescribed burns have been designed to specifically improve Sharp-tailed grouse habitat. The reduction of fire could slow the establishment of new or expanded Sharp-tailed grouse habitat, however, the deferment of grazing in burned areas would promote Sharp-tailed grouse habitat.

CUMULATIVE EFFECTS

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

In this alternative Sharp-tailed grouse habitat is expected to be maintained or improve slightly. The reduction in the availability of fire is expected to contribute to a slower expansion of the

habitat, but other conservation measures would off-set this by precluding impacts on existing habitat.

Effects on Population Trends TBNG-wide

Sharp-tailed grouse populations have been steadily increasing since 2007 with a slight decrease in 2011. This trend has developed under the current management direction and since this alternative would provide increased habitat protections, it is expected to continue. Viability is defined in the NFMA as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG LRMP have demonstrated that they are sufficient to maintain viability across the planning unit.

Alternative D

Direct and Indirect Impacts

Recreation and Travel

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of Sharp-tailed grouse habitat. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance in PPH and does require consideration of GRSG needs for recreation special uses in PPH (Core). The potential changes in Sharp-tailed grouse habitat would be very similar to but slightly less detrimental than Alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PPH (Core) and connectivity habitat will be allowed > 0.25 miles from GRSG leks. New ROWs and SUAs in PPH (Core) would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. For Sharp-tailed grouse this is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A.

Range

Conservation measures are generally similar to Alternative A. Grazing management strategies would be developed cooperatively with permittees, leasees and other landowners on an allotment-by-allotment basis to improve GRSG habitat. As grazing permits are renewed in PPH, GRSG habitat objectives and management considerations could be incorporated. Up to 15 percent of PPH could be retired from grazing where permittee or lessee voluntarily relinquishes their grazing preference in their grazing allotment. Vegetative management and grazing infrastructure is essentially the same as Alternative A. With an expected move toward lighter grazing to enhance GRSG habitat and up to 15 percent of the PPH having grazing removed, this alternative would provide more, high quality habitat than Alternative A, but not as much as in Alternatives B, C, and E.

Energy and Minerals

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap that does not exist in Alternative A. Since Sharp-tailed grouse are only found in two GAs and only the Spring Creek GA has seen any recent mineral development, the influence of energy is relatively low on its habitat. However, the majority of all Sharp-tailed grouse habitats are open to leasing including expansion of existing leases, but much of the Spring Creek GA falls into a designated PPH (Core) and therefore would be subject to the 9 percent disturbance cap.

However, within the above mentioned disturbance cap there may still be some impacts as they relate to the: increased anthropogenic disturbance of habitat; off-road vehicle use; increased traffic on Forest Service and mineral development roads; new road construction; road traffic speed; utility corridor permits or easements; water development;, mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and the development or removal of mineral materials. The lack of conservation measures in sagebrush outside of PPH (Core) could also lead to these same increased anthropogenic disturbances, only they could be greater since there would be no cap on the disturbance.

Fire and Fuels Management

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in PPH (Core). Treated areas would not be rested from grazing. Also, treatment is permitted in GRSG breeding, nesting, and winter range. In several cases, these prescribed burns have been designed to specifically improve Sharp-tailed grouse habitat. Since these Sharp-tailed grouse prefer tall, ungrazed to lightly grazed grasslands, both prescribed and wild fire have provided benefits to this bird's habitat condition. The only adverse effect would be the limitation of a 9 percent disturbance which could prevent increased habitat growth in some areas.

Cumulative Effects

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

In this alternative Sharp-tailed grouse habitat is expected to be maintained or improve slightly. The 9 percent disturbance cap could cause a reduction in habitat improvement projects associated with sagebrush removal in some cases. This is expected to contribute to a slower expansion of the habitat, but overall Sharp-tailed grouse habitat is expected to remain stable or increase.

Effects on Population Trends TBNG-wide

Sharp-tailed grouse populations have been steadily increasing since 2007 with a slight decrease in 2011. This trend has developed under the current management direction and since this alternative would provide increased habitat protections, it is expected to continue. Viability is defined in the NFMA as maintaining abundance and distribution across the planning unit.

Current management standards in the TBNG LRMP have demonstrated that they are sufficient to maintain viability across the planning unit.

Proposed Plan Amendment

Direct and Indirect Impacts

Recreation and Travel

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA. Similarly, road construction of any category would be prohibited within 0.6 miles of occupied leks in PHMA and within 0.25 miles of a lek in GHMA. In addition, road upgrades would be prohibited in PHMA. Any necessary new roads in PHMA would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA.

Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D but less restrictive than Alternatives B and C. There would be less habitat loss or degradation and less disruption of nesting or hatching, abandonment of young, or temporary displacement in sagebrush habitat compared to Alternatives A and D. The restriction on road construction or upgrades would limit disturbance and habitat loss, but it would allow existing conditions to continue in the remaining Sharp-tailed grouse habitat.

Lands and Realty

Some small amount of sagebrush habitat could be lost, degraded, or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA, and some special uses. However, there would be 5,362 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on sagebrush habitat, predominantly PHMA, would be reduced compared to Alternatives A and D, but would be greater than impacts on sagebrush habitat in Alternatives B and C.

Sharp-tailed grouse would benefit from conservation measures restricting anthropomorphic activities, but could see a loss of habitat if habitat were identified for disposal in favor of GRSG habitat. Changes of up to 5 percent in sagebrush habitat could result in a positive habitat improvement for Sharp-tailed grouse.

Range

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. In particular,

grazing will be managed to meet a seven inch residual grass height within 5.3 miles of a lek during breeding and nesting and four inches post nesting. There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands <200 acres. The residual stubble height direction would also benefit Sharp-tailed grouse by maintaining nesting habitat for them as well.

Several other exceptions applied to this direction. First, if 90 percent or more of the allotment falls within nesting or brood rearing habitat, 25 percent of the allotment would be exempted from meeting residual stubble height requirements. In addition, this direction is not applied to areas where GHMA overlap with Management Area 8.4 (Mineral Production), Management Area 3.63 (Black-footed Ferret Reintroduction Habitat), or other designated areas for short-grass species (approximately 98,000 acres, or 18 percent of TB National Grassland). There are also areas of the TBNG that do not fall within 5.3 miles of a GRSG lek. This would add additional acreages that the residual stubble height would not apply to. These exceptions would not be expected to provide any positive habitat benefits for Sharp-tailed grouse. Most other conservation measures apply to all PHMA.

Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. There could also be areas of improved Sharp-tailed grouse habitat for productive breeding, nesting, and brood rearing in PHMA and in GHMA.

Potential adverse effects on Sharp-tailed grouse habitat (primarily in PGH habitat) could include habitat fragmentation due to infrastructure development, site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Related impacts include higher nest predation and chick mortality due to a reduction of residual herbaceous material causing a lack of hiding cover.

Energy and Minerals

A maximum of 5 percent disturbance would be allowed within PHMA using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within GRSG PHMA. The density of oil and gas or mining activities would be considered and evaluated for measures that limit or reduce their activities to no more than an average of one location per 640 acres. Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. All non-energy leasable and salable mineral activities would be considered in PHMA. There are timing and/or distance restrictions for PHMA and GHMA during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA and PGH could lead to: decreased anthropogenic disturbance of Sharp-tailed grouse habitat, decreased off-road vehicle use, decreased traffic on Forest Service and mineral development roads, and less road construction and utility corridor permits or easements. There would also be: a reduced number of water developments; less mineral leasing and development: less surface occupancy on mineral leased areas; less noise; fewer industrial campsites; and reduced development or removal of mineral materials.

Fire and Fuels Management

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs.

In areas of Wyoming, big sagebrush or other xeric sagebrush species where fire-invasive species occur (such as cheatgrass) and/or within areas of less than 12-inch precipitation zones within priority and GHMA or SFAs, prescribed fire would be restricted.

In addition, vegetation treatment in PHMA and SFAs in nesting and wintering habitat in northeast Wyoming that would reduce sagebrush canopy to <15 percent would also be restricted.

Fire can provide improved habitat conditions for Sharp-tailed grouse by increasing grassland habitat and reducing shrub species. In several cases, prescribed burns have been designed to specifically improve Sharp-tailed grouse habitat. The reduction of fire and the 5 percent disturbance cap could slow the establishment of new or expanded Sharp-tailed grouse habitat.

CUMULATIVE EFFECTS

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

In this alternative Sharp-tailed grouse habitat is expected to be maintained or improve slightly. The reduction in the availability of fire is expected to contribute to a slower expansion of the habitat, but other conservation measures would off-set this by precluding impacts on existing habitat.

Effects on Population Trends TBNG-wide

Sharp-tailed grouse populations have been steadily increasing since 2007 with a slight decrease in 2011 and 2013. This trend has developed under the current management direction, and since this alternative would provide increased habitat protections, it is expected to continue.

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

The Black-tailed Prairie Dog (Prairie dogs) is selected as a management indicator species for low structure grasslands and the biological community associated with prairie dog colonies. Some species that typically benefit from management for low structure grasslands and maintenance or expansion of prairie dog colonies include burrowing owl, ferruginous hawk, and mountain plover.

Distribution

Prairie dogs historically ranged throughout the Great Plains in short-grass and mixed-grass prairies. This R2 Sensitive Species is a common resident in the short- and mid-grass habitats of eastern Wyoming (Cerovski et al. 2004). The TBNG harbors one of the seven major colony complexes remaining in North America. Prairie dogs are found throughout TBNG. The population for 2013 occupies 22,879 acres.

Habitat Associations and Threats

This species is also a common resident in the short- and mid-grass habitats of eastern Wyoming (Cerovski et al. 2004). The TBNG harbors one of the seven major colony complexes remaining in North America. Prairie dogs occupy prairies (shortgrass and mixed grass) and shrublands dominated by sagebrush on the northern plains. Most soils on the Forest Service lands in the planning area are suitable for Prairie dog burrowing. Even soils with shallow bedrock are known to support Prairie dog colonies. Prairie dogs may prefer some soils, but few soils in the planning area preclude Prairie dog burrowing. Slopes with suitable soils and vegetation that are less than 10 percent slope are considered preferred habitat. Prairie dogs are highly social, diurnal burrowing rodents that typically feed on grasses and forbs. Prairie dogs form colonies that are the main unit of a Prairie dog population. Prairie dog abundance and occupied acreage have been dramatically reduced throughout its historic range, and continue to exhibit a slow decline nationwide (NatureServe 2004). Locally, the population on TBNG is increasing. Major factors contributing to the reduction include disease (sylvatic plague), urbanization, habitat conversion, and control efforts.

Population Status, Trend, and Relationship to Habitat Change

The Prairie dog is selected as a MIS on TBNG for low structure grasslands and the biological community associated with Prairie dog colonies (Forest Service 2002, Appendix H). MIS for TBNG are identified by GA. In accordance with the Grassland Plan (Forest Service 2002), the Prairie dog is designated as the MIS to be evaluated for two of the six GAs; however they occur in all six Gas at some level. Prairie dogs form colonies that are the main unit of a Prairie dog population. Population monitoring for Prairie dogs has been found to be difficult to track over time. It has become the accepted norm to use acres of occupied habitat as a surrogate to direct population monitoring. This species has the ability to rapidly expand its distribution and population if not limited by pest control practices or disease, and they will readily spread into recently disturbed areas. The area occupied by BTPDs has declined to approximately 2 percent of its former range. Conversions of habitat to other land uses and widespread Prairie dog eradication efforts combined with sylvatic plague spread by fleas (*Yersinia pestis*), have caused significant population reductions. Although, the species itself is not in imminent jeopardy of extinction, its unique ecosystem is jeopardized by continuing fragmentation and isolation (USFWS 2009).Of the 2 percent of their original range that Prairie dogs still occupy, 1.5 percent occur on tribal lands, 0.33 percent occur on federal lands, and only 0.08 percent occur on private lands (Miller et al. 2007).

Habitat

Estimated total active acres of Prairie dog colonies within the TBNG from 1996-1997 and from 2001-2013 are illustrated in Figure 4. Colony acreages experienced a significant reduction from 1997 through 2000 due to plague outbreak. In 2007 the number of estimated acres of active Prairie dogs fell to the lowest point (3,243 individuals) in 12 years due to continuing plague. All active Prairie dog colonies on TBNG are mapped annually. The population for 2013 occupies 22,879 acres. Within TBNG there are 53,873 acres designated by Management Areas Direction (MA 3.63 and MA 2.1) for the management of Prairie Dogs and Black-footed Ferret reintroduction with 36,606 acres (68 percent) of this management area occurring outside of any GRSG PHMA. The remaining 17,267 acres (32 percent) fall within the Thunder Basin GRSG Core Area (PHMA). No direction within this analysis requires the reduction of this habitat in favor of GRSG. Prairie dogs and GRSG share some of the same habitats. Historically on TBNG, GRSG have used Prairie dog colonies for lekking and foraging habitat.

As disturbances associated with fire, grazing, and energy development continue the habitat conditions for the Prairie dog continue to improve.

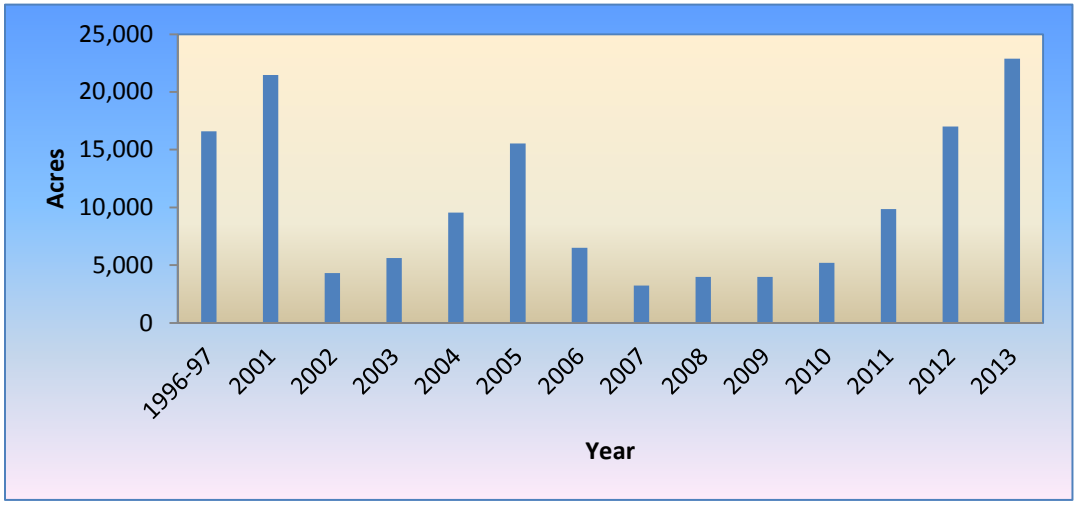


Figure 4: Prairie Dog Acres - TBNG

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel

There would be no changes to the current TBNG system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There is a current Travel Management Plan in place that addresses all non-special use travel on TBNG. Restrictions on special uses may apply, but off-road permits are still issued. Motorized access to most of TBNG is present on authorized

roads and it usually means higher concentrations of human use adjacent to motorized routes and in habitat. In general, more acres and lineal miles of routes and use equate to a greater likelihood of ground disturbance and the increased potential for prairie dog expansion.

Lands and Realty

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. As a R2 Sensitive Species prairie dog habitat acquisition may be emphasized, however, some habitat could be traded to other ownership where the parcels are isolated; lands that would reduce boundary conflicts with other ownerships; or are otherwise in the public interest. All Forest Service lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in ground disturbing activities that could encourage colony expansion.

Range

There would be no change in the numbers, timing, or method of livestock grazing on TBNG. Sagebrush fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives can provide or improve Prairie dog habitat conditions.

Energy and Minerals

Energy development consisting of coal, oil, and natural gas has been a predominant use of public lands on the TBNG. The majority of TBNG habitats are open to leasing including expansion of existing leases with no cap on surface disturbing activities. Disturbances, such as roads, pipelines, and staging areas or abandon drill pads, create improved habitat conditions and travel corridors through sagebrush and other tall vegetation. As these disturbances increase, the potential spread of Prairie dog colonies also increases.

Fire and Fuels Management

Fire is a habitat disturbance factor in the Powder River Basin. Across the basin sagebrush patch size has been reduced from an average of 820 acres to an average of less than 300 acres from 1966 to 2006which is a 63 percent reduction (WGFD 2014). This reduction has come about from a variety of activities including wildfire and prescribed burning.

In this alternative the use of prescribed fire generally is to be designed to maintain or improve habitat for desired plants and animals. Prescribed burning is, by design, used to reduce the structure and seral condition when used in sagebrush, and this treatment tool is permitted throughout TBNG. These treatment impacts could result in removal or loss of up to 25 percent of the sagebrush within a stand and a burn area of up to 80 acres in size. As fire (both prescribed and wildfire) reduces structural diversity in these sagebrush stands, it creates conditions that

allow easier colonization by Prairie dogs and generally is seen as positive for improving their habitat.

Cumulative Effects

Effects on Black-tailed Prairie Dog Habitat Trends TBNG-wide

In the Alternative A, Prairie dogs are managed following a formal management strategy that directs the Prairie dogs and their habitat. Currently Prairie dogs are found on 16,638 acres of TBNG, distributed in all GAs. The current LRMP has established the Management Area (MA) 3.63 where Prairie dogs management is actively and intensively managed. This MA makes up 44,420 acres of the National Grassland. Within this MA, 10,974 acres are currently occupied. The current trend in habitat is upward especially in light of a recent drought and its associated reduction in herbaceous structure.

With all of this considered, the Grassland-wide habitat could be expected to continue to increase in effectiveness and size in this alternative.

Effects on Black-tailed Prairie Dog Population Trends TBNG-wide

Plague has been found on TBNG since 2002. This disease has had devastating impacts on the TBNG Prairie dog populations since then reaching a low of 3,243 acres of occupied habitat in 2007. The population has steadily increased since then now populating over 16,600 acres. The current management encourages the continued growth of Prairie dogs across the TBNG.

Alternative B

Direct and Indirect Impacts

Recreation and Travel

In PHMA, new road construction would be limited to areas with less than 3 percent habitat disturbance and allowing only the minimum necessary road standard and no upgrading of current roads. Existing roads not designated in a Travel Management Plan would be reclaimed. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels (which are lower in this alternative [20-24 decibels] than Alternative A). All GRSG PHMA and Important Bird Areas could be designated as SIAs. These restrictions would reduce the amount of growth of Prairie dog habitat within the PHMA habitats. Outside of PHMA the management would continue similar to Alternative A which encourages Prairie dog growth.

Lands and Realty

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and

acquisition of GRSG PHMA. These conservation measures would be more of an impact than conservation measures in Alternatives A, D, and E, but less of an impact than Alternative C.

Range

Alternative B would adjust grazing direction in GRSG PHMA (Core). Many livestock improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. Fencing would be developed to reflect GRSG needs in all GRSG habitats. Outside of PHMA the potential effects due to livestock grazing, vegetation disturbance, and range improvements would be the same as Alternative A. Potential beneficial effects on Prairie dogs could include habitat enhancement due to infrastructure development and site specific overgrazing during drought years, with a potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives. Inside of PHMA, the focus on lighter grazing would also provide an adverse impact in the form of higher residual grasses for hiding cover, nesting cover, and predator habitat. Conservation measures would be less protective than conservation measures in Alternatives A, D, but more protective than Alternatives C and E. These restrictions would reduce the amount of growth of Prairie dog habitat within the PHMA habitats. Outside of PHMA the management would continue similar to Alternative A which encourages Prairie dog growth.

Energy and Minerals

PPH (Core) would be closed to new coal, energy and non-energy leasable materials, and fluid mineral leases. Existing leases would have a four mile, no surface occupancy buffer around leks. COAs would be attached to existing leases during analysis and approval of exploration and development activities to minimize or avoid the impacts on GRSG through a project design. Exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs for GRSG would not be considered within GRSG PHMA. Outside of PPH, mineral development would be the same as Alternative A. These restrictions would reduce the amount of growth of Prairie dog habitat within the PPH habitats. Outside of PPH the management would continue similar to Alternative A which encourages prairie dog growth

Fire and Fuels Management

Prescribed fire in sagebrush would be very limited in PPH and fuels treatments would emphasize protecting existing sagebrush ecosystems. Suppression and habitat protection would be emphasized. In PPH areas within precipitation zones of 12 inches or less, fire is not used to treat sagebrush unless as a last resort for fuel breaks and it must be within a 3 percent disturbance limit. With the reduction of fire within PPH, the expansion of Prairie dog habitat could be limited due to the lack of this type of vegetation disturbance. Outside of PPH (Core) the management would continue similar to Alternative A which encourages Prairie dog growth.

CUMULATIVE EFFECTS

Effects on Black-tailed Prairie Dog Habitat Trends TBNG-wide

Within PPH the 3 percent disturbance limitation would limit anthropogenic impacts and thus reduce the disturbance factor that promotes Prairie dog expiation. With the increased emphasis on fire suppression, reduced energy development, and livestock grazing modifications within PPH, overall prairie dog habitat usability should remain stable with a potential for decreasing. Additional protections and directions for PGH will further habitat expansion this alternative. This alternative would have more impacts on Prairie dog habitat than Alternatives A, D, and E, but promotes more than Alternative C. However, specific habitat management direction for Prairie dogs and MA 3.63 insure that sufficient habitat will remain to support desired Prairie dog levels.

Effects on Black-tailed Prairie Dog Population Trends TBNG-wide

With the Prairie dog management strategy in place, and in the absence of a plague outbreak, the current population trend is expected to continue to increase, although possibly at a slower rate due to the lack of anthropogenic influences.

With prairie dogs occurring in all GAs and with the current Prairie Dog Management strategy in place, this alternative is expected to maintain a viable population of Prairie dogs across the planning unit.

Alternative C

Direct and Indirect Impacts

Recreation and Travel

Conservation measure in this alternative would be more restrictive to Prairie dogs and their habitat than other alternatives. In this alternative conservation measures are generally applied to both PPH and PGH. GRSG priority and GHMA would be managed as ROW exclusion areas for new ROW or SUA permits. New road construction would be prohibited within four miles of active GRSG leks and it would be avoided in PPH and PGH. Existing road management would be designed to maintain or improve both PPH and PGH. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. There would be less disruptive activities. Conservation measure in this alternative would be more restrictive to Prairie dogs and their habitat development than other alternatives and would promote the least amount of expansion of Prairie dog colonies.

Lands and Realty

No GRSG habitat in PPH would be exchanged away. The Forest Service will strive to acquire important private lands in areas identified as GRSG Special Areas. Alternative C would encourage consolidation and acquisition of GRSG habitat. This alternative would promote the

greatest distribution and highest density of high structure habitat. With the emphasis on GRSG habitat, exchanges to promote Prairie dog habitat acquisition would most likely be reduced.

Range

Livestock grazing would be prohibited within GRSG PPH. All new structural range developments and location of supplements would be avoided in both PPH and PGH unless they can be shown to benefit GRSG. Grazing and trailing within lekking, nesting, brood-rearing, and winter habitats would be avoided during periods of the year when these habitats are utilized by GRSG.

The prohibition of livestock grazing in PPH would reduce ground disturbance and vegetation utilization. Both of these activities are effective in creating Prairie dog habitat. Structural development control would further reduce habitat modifications from construction associated with new fence building, waterline development, and stock water developments. The trailing of livestock can also be beneficial by breaking up sagebrush stands and creating areas of low vegetation and bare ground which is susceptible to Prairie dog colonization.

Energy and Minerals

Many conservation measures would be applied to GRSG GHMA in addition to PHMA. No exceptions, waivers, and modifications to lease stipulations, COAs, and T&Cs will be considered within GRSG PPH and PGH. Both PPH and PGH areas would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations/expressions of interest would be accepted for parcels within PPH or PGH. Oil and gas leasing would not be allowed in PPH. Geophysical exploration would only be allowed in GRSG PPH and PGH. To obtain exploratory information for areas outside of and adjacent to PPH and PGH, GRSG habitat would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing, and winter habitats during their season of use by GRSG. Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. No construction of evaporation or infiltration reservoirs to hold coalbed methane wastewater would be allowed. All PPH would be closed to non-energy leasable mineral leasing. PPH areas would be closed to mineral material exploration, sales, and free use permits.

The above GRSG conservation measures are designed to reduce or eliminate ground disturbing activities associated with mineral development. These conservation measures would be applied to more GRSG habitat, in many cases both PPH and PGH. Prairie dog habitat effectiveness would be reduced. Since nearly all of TBNG is in either PPH or PGH, many of these restrictions would be applied grassland-wide.

Fire and Fuels Management

Within all GRSG habitat on the TBNG, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all GRSG habitats,

sagebrush reduction/treatments to increase livestock or big game forage would be avoided. Also, sagebrush canopy cover would generally not be reduced to less than 15 percent within any GRSG habitat and vegetation treatments. Both habitats would be designed to create landscape patterns which would be of most benefit to GRSG. For all GRSG habitat, fire would not be used to treat sagebrush in precipitation zones with less than 12 inches except as a last resort as a fuel break. Post-fuels management projects will be designed to ensure the long-term persistence of seeded or pre-treatment native plants including sagebrush. Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition; establish non-grazing enclosures; and include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Grazing then should not return to the burn area until woody and herbaceous plants achieve GRSG habitat objectives. No fuels treatments would be allowed in known GRSG winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and they will maintain winter range habitat quality. Fuels reduction project (roadsides or other areas) in all GRSG habitat would utilize mowing of grass. In PHMA, fire suppression to conserve the GRSG habitat would be prioritized immediately after firefighter and public safety.

Prescribed fire in sagebrush can be a very useful tool in promoting Prairie dog habitat. The substantial loss or restriction of the use of fire would limit Prairie dog habitat expansion. This alternative conserves more sagebrush habitat with higher shrub canopy cover than all other alternatives. This could result in a more difficult time in achieving Prairie dog colony levels. While it does not remove Prairie dog habitat, it would slow its growth.

CUMULATIVE EFFECTS

Effects on Black-tailed Prairie Dog Habitat Trends TBNG-wide

Conservation measures in this alternative would be more restrictive to Prairie dogs and their habitat development than other alternatives and they would promote the least amount of expansion of prairie dog colonies. The substantial loss or restriction of ground and vegetation disturbing activities would limit Prairie dog habitat expansion. This alternative conserves more sagebrush habitat with higher shrub canopy cover than all other alternatives. This could result in a more difficult time in achieving Prairie dog colony levels. While it does not remove Prairie dog habitat, it would slow its growth.

With the increased emphasis on fire suppression, reduced energy development, and livestock grazing modifications, overall prairie dog habitat usability should remain stable with a potential for increasing, but at a much slower rate than under current management. Additional protections and directions for PGH will further the habitat expansion in this alternative. This alternative will likely have more effects on Prairie dog habitat expansion than Alternatives A, D, and E. However, specific habitat management direction for Prairie dogs and MA 3.63 insure that sufficient habitat will remain to support desired Prairie dog levels.

Effects on Black-tailed Prairie Dog Population Trends TBNG-wide

With the Prairie dog management strategy in place, and in the absence of a plague outbreak, the current population trend is still expected to continue to increase, although possibly at a slower rate due to the lack of anthropogenic influences.

With Prairie dogs occurring in all GAs and with the current Prairie Dog Management strategy in place, this alternative is expected to maintain a viable population of Prairie dogs across the planning unit.

Alternative D

Direct and Indirect Impacts

Recreation and Travel

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more ground disturbance and impacts on sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to, but slightly more detrimental to Prairie dogs than Alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PHMA and connectivity habitat will be allowed > 0.25 miles from GRSG leks. This is closer than the disturbance allowed under the other alternatives except Alternative A.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance and potential habitat improvement for prairie dogs than allowed in Alternatives B, C, and E, but less than Alternative A. These same uses would be allowed in PGH.

Range

Conservation measures are generally similar to Alternative A. Grazing management strategies would be developed cooperatively with permittees, leasees and other landowners on an allotment-by-allotment basis to improve GRSG habitat. As grazing permits are renewed in PPH, GRSG habitat objectives and management considerations could be incorporated. Up to 15 percent of PPH could be retired from grazing where the permittee or lessee voluntarily relinquishes their grazing preference in their grazing allotment. Vegetative management and grazing infrastructure is essentially the same as Alternative A. Potential adverse effects on Prairie dog habitat would be limited. The loss of up to 15 percent of grazing within PPH (Core) would restrict the expansion of suitable Prairie dog habitat. Habitat development due to infrastructure development: habitat conversion of sagebrush stands to grasslands for improved

livestock forage: and site specific overgrazing during drought years with a potential reduction in cover, structure, and diversity would still provide some opportunity for growth.

Energy and Minerals

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. The lack of conservation measures in sagebrush outside of PPH could lead to increased anthropogenic disturbance Prairie dog habitat. These could include off-road vehicle use; new road construction, utility corridor permits or easements; water development; mineral leasing and development; surface occupancy on mineral leased areas; noise; industrial campsites; and the development or removal of mineral materials. These disturbances have been documented to encourage the spread of Prairie dogs.

Fire and Fuels Management

Prescribed fire in sagebrush can be a very useful tool in promoting Prairie dog habitat. In this alternative there would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in PPH. Treated areas would not be rested from grazing. Also, treatment is permitted in GRSG breeding, nesting, and winter range. This allowance alone will promote the expansion of Prairie dogs where they occur in the nearby area. These limited conservation measures on PPH (Core) and the lack of measures in the remainder of GRSG habitat could have a positive influence on Prairie dogs.

Cumulative Effects

Effects on Black-tailed Prairie Dog Habitat Trends TBNG-wide

This alternative mirrors much of the management direction in Alternative A. In Alternative A, Prairie dogs are managed following a formal management strategy that directs the management of Prairie dogs and their habitat. Currently prairie dogs are found on 16,638 acres of TBNG, distributed in all GAs. The current LRMP has established the MA 3.63 where Prairie dogs management is actively and intensively managed. The primary difference between Alternative A and D is the use of a 9 percent habitat disturbance cap on PPH. Since PPH only makes up 39 percent of the TBNG, 61 percent would not be affected by this cap and would follow the current trend. This current trend in habitat availability is upward, especially in light of a recent drought and its associated reduction in herbaceous structure.

With all of this considered, the Grassland-wide habitat could be expected to continue to increase in effectiveness and size in this alternative.

Effects on Black-tailed Prairie Dog Population Trends TBNG-wide

This alternative mirrors much of the management direction in Alternative A. In the Alternative A, Prairie dogs are managed following a formal management strategy that directs the management of Prairie dogs and their habitat. The population has steadily increased over the last

six years and it is now occupying over 16,600 acres. The current management encourages the continued growth of Prairie dogs across the TBNG.

This alternative mirrors the current management (Alternative A) and the standards in the TBNG LRMP. These measures have demonstrated that they are sufficient to maintain viability of the black-tailed prairie dog population across the planning unit. Therefore, it is expected that Alternative D is sufficient to maintain the population across the TBNG.

Proposed Plan Amendment

Direct and Indirect Impacts

Recreation and Travel

New level 4 and 5 roads would avoid areas within 1.9 miles of the perimeter of occupied GRSG leks within GRSG PHMA. No new road construction for any level of road would be allowed within 0.6 miles of the perimeter of occupied GRSG leks within PHMA. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 within a 0.6 mile radius of the perimeter of occupied GRSG leks inside core habitat and connectivity habitat areas. In addition, noise levels at the 0.6 mile perimeter of the lek, should not exceed 10 decibels above ambient noise.

Recreation special uses would be allowed in priority and GH only if they did not result in a loss of GRSG habitat or have a long-term (more than five years) negative impact on the GRSG or its habitat. In addition, T&Cs to protect and restore GRSG habitat will be included in all SUAs.

Conservation measures inside PHMA and SFAs would provide some benefits to Prairie dog habitat by limiting disturbances associated with roads, road construction, and recreational activities. In some cases it may also increase some disturbances in that portion of the PHMA made up of grassland to avoid disturbances in sagebrush. Conservation measures for GRG habitat outside these areas could lead to increased anthropogenic disturbance of Prairie Dog habitat, increased traffic on Forest Service and mineral development roads, new road construction, and road traffic speed. However, this still would allow existing conditions to continue in the remaining Prairie dog habitat.

Lands and Realty

GRSG habitat requirements would be used to prioritize parcels for exchange or acquisition within PHMA and GHMA. New projects within PHMA would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. GRSG PHMA would be managed as ROW avoidance areas for new ROW or SUA permits.

With the emphasis on GRSG habitat, exchanges to promote Prairie dog habitat acquisition would most likely be reduced.

Range

Within GRSG core habitat, as appropriate, site specific GRSG habitat objectives and management considerations would be incorporated into all grazing permit renewals. Livestock grazing and associated range improvement projects would be planned and authorized in a way that contributes to rangeland health and maintains and/or improves GRSG and its habitat.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands >200 acres. In addition, on TB National Grassland, Management Areas 8.4 and 3.63 (Minerals Management and Black-footed Ferret Reintroduction Habitat) that overlap with GHMA or other areas in GHMA designated for short-grass species, livestock grazing will be managed to meet those Management Area objectives. These exceptions would allow the continued management of Prairie dogs within these areas.

Prairie dog habitat growth derived from livestock management under current conditions would most likely continue under this alternative. Sagebrush fragmentation due to infrastructure development; habitat conversion of sagebrush stands to grasslands for improved livestock forage; and site specific overgrazing during drought years would most probably continue particularly outside of PHMA. With the potential reduction in cover, structure, and diversity of residual vegetation to meet other vegetative objectives, improved Prairie dog habitat conditions are likely.

Energy and Minerals

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for priority and GHMA during breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

A maximum of 5 percent disturbance would be allowed within PHMA habitat using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within PHMA habitat areas. The density of oil and gas or mining activities would be considered and evaluated for measures that limit or reduce their activities to no more than an average of one location per 640 acres. Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least impact possible to GRSG habitat.

Where existing leases exist in all GRSG habitat, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. Reduction of mineral development associated ground and vegetation disturbances inside of PHMA would limit Prairie dog colony growth.

Fire and Fuels Management

Within PHMA and SFAs and GHMA, prescribed fire activities will be designed to move vegetative conditions described for GRSG. It will be avoided in areas of Wyoming Big sagebrush, other xeric sagebrush species, or where Cheatgrass or other fire-invasive species occur and/or within areas of less than 12 inches of annual precipitation unless needed to facilitate site preparation for habitat restoration. Fuels treatments will be designed to reduce the spread and intensity of wildfires. A maximum of 5 percent disturbance would be allowed within PHMA and SFAs using the DDTC. Prescribed fire in nesting and wintering habitats that would reduce sagebrush canopy to less than 15 percent would be avoided.

Prescribed fire in sagebrush can be a very useful tool in promoting Prairie dog habitat. The substantial loss or restriction of the use of fire would limit Prairie dog habitat expansion. This alternative would conserve more sagebrush habitat with higher shrub canopy cover than Alternatives A, and E. This could result in a more difficult time in achieving Prairie dog colony levels. While it does not remove Prairie dog habitat, it would slow its growth.

Cumulative Effects

Effects on Black-tailed Prairie Dog Habitat Trends TBNG-wide

Within PHMA (Core) the 5 percent disturbance limitation would limit anthropogenic impacts and thus reduce the disturbance factor that promotes Prairie dog expiation. With the increased emphasis on fire suppression, reduced energy development, and livestock grazing modifications within PHMA, overall prairie dog habitat usability should remain stable with a potential for decreasing within the PHMA. Due to the vegetative exceptions outside of PHMA, the potential for Prairie dog habitat expansion would be similar to the current conditions which encourage growth. Specific habitat management direction for Prairie dogs and MA 3.63 insure that sufficient habitat will remain to support desired Prairie dog levels.

Effects on Black-tailed Prairie Dog Population Trends TBNG-wide

With the Prairie dog management strategy in place and in the absence of a plague outbreak, the current population trend is expected to continue to increase, although possibly at a slower rate due to the lack of some anthropogenic influences within PHMA (Core).

With Prairie dogs occurring in all GAs and with the current Prairie Dog Management strategy in place, this alternative it is expected to maintain a viable population Prairie dogs across the planning unit.

Brewer's sparrow (*Spizella brewerii*)

Distribution

Brewer's sparrow is a MIS for the BT and also a R2 Sensitive Species that overlaps with GRSG habitat on the TBNG, BT, and MB. Brewer's sparrows inhabit prairie and foothills shrublands

where sagebrush is present. Brewer's sparrows summer in North America and winter in Central or South America.

Habitat Associations and Threats

Brewer's sparrow is a sagebrush obligate species which nests in live sagebrush or on the ground at the base of a live sagebrush shrub. Alteration has occurred as a result of extensive, ecologically transformative influences of livestock grazing followed by alteration of natural fire regimes and invasion by exotic plant species, especially Cheatgrass (Holmes and Johnson 2005). Across their breeding grounds, the largest threat is permanent loss of Big sagebrush due to land use changes such as cultivated agriculture and residential development. Fire and other disturbances temporarily reduce nesting habitat, but this turnover of the big sagebrush type is needed for its sustained health (Forest Service 2009a). Loss and fragmentation of habitat due to agricultural, urban, suburban, energy, and road development also threaten the species.

Population Status, Trend, and Relation to Habitat Trend

Brewer's sparrow is considered globally "secure" by the Natural Heritage Program because of its wide distribution across North America. Within Wyoming, trend estimates show non-significant decreases between 1966 and 1979 and between 1980 and 2002. Declines are more pronounced between 1966 and 1979 than between 1980 and 2002 (Holmes and Johnson 2005). Detection frequencies increased slightly in northwest Wyoming from 1966 to 2002. Reported Brewer's sparrow population declines on the breeding areas in North America are likely linked to extensive alteration of sagebrush (*Artemisia spp*.) shrub-steppe habitat (Holmes and Johnson 2005).

There are five North American Breeding Bird Survey routes on the BT. Four of the routes showed a positive trend from 1968 to 2003 (+3.3, +18.1, +8.8, and +29.1 percent increase in the number on each route). The other route showed a negative trend of -16.2 percent/year. The stable to slightly decreasing Forest-wide population trend (one of five routes) mimics the non-significant, long-term decline across the State.

The sagebrush biome previously covered 63 million hectares (156 million acres) of western North America. Although the current geographic distribution of the Sagebrush biome remains the same, very little remains undisturbed or unaltered from its condition before Euro-American settlement (Holmes and Johnson 2005). In addition to the thousands of acres where nonnative grasses are now mixed with sagebrush, approximately 10 percent of native sagebrush steppe has now been completely replaced by invasive annuals or by intentionally seeded nonnative grasses. Another 10 percent of the Sagebrush steppe has been converted to dry land or irrigated agriculture (Nicholoff 2003).

The Brewer's sparrow was selected as a MIS for the BT as an ecological indicator for the condition of sagebrush. Brewer's sparrows utilize sagebrush with canopy cover 15 percent - 25 percent or greater (Forest Service 2009a). Herbaceous cover should provide concealment cover:

sufficient herbaceous vegetation to provide forage (seeds): and habitat for prey insects (Holmes and Johnson 2005).

Livestock management and shrubland management on the BT broadly and permanent sagebrush removal directly can affect the herbaceous understory and sagebrush canopy cover in Brewer's sparrow habitat. Retaining insufficient herbaceous cover or insufficient shrub cover can negatively affect Brewer's sparrow population trend.

Forest-wide monitoring indicates that existing habitat conditions are well-suited to sustain the Brewer's sparrow population. Rangeland management practices have improved considerably in the last 50 years, little sagebrush shrubland has been permanently lost and natural or prescribed shrubland disturbance has been limited. In fact, Forest Service (2009a) suggests that "…the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions. Since Brewer's sparrow thrives in late succession sagebrush, there is a larger amount of their habitat in satisfactory condition than occurred historically."

Available population and habitat information suggests Brewer's sparrows on the BT have a population trend that is generally stable to slightly declining. This sparrow is distributed across the BT and is well-distributed throughout Wyoming as evidenced by BBS survey results.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA. There would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance to Brewer's sparrows. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in Sparrow habitat. These can cause disruption of nesting activities, abandonment of young, and temporary displacement.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 2,107 acres of ROW exclusion areas in GRSG habitat (Appendix 1). Some Sparrow habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area. All Forest Service-administered lands would continue to be managed

according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss, fragmentation, or degradation for Brewer's sparrows. Other impacts may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance of Brewer's sparrows.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT. Potential effects on Brewer's sparrow habitat could include site specific overgrazing, reduction in cover, structure, and diversity of residual vegetation from consumption and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include higher nest predation and parasitism. Brewer sparrow abundance is higher in climax communities with >25 percent cover than sites with less cover (Holmes and Johnson 2005) so reduced cover could result in lower Sparrow abundance. Forest Plan standards and guidelines for grazing management usually provide sufficient cover and forage for Brewer's sparrows across the BT. For example, the BT LRMP indicates that GRSG species' needs will be addressed in allotment management plans and range improvements, management activities, and trailing will be coordinated with and designed to help meet the needs of GRSG.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing including expansion of new leases (refer to Appendix 1). Fluid mineral leases would be closed on 3,263 acres of GRSG habitaton federal surface and federal mineral leases for example (Appendix 1). This alternative could cause a large amount of direct and indirect habitat loss, degradation, and fragmentation of sagebrush habitat. There would be greater negative effects from related noise; increased presence of roads/humans; and anthropogenic structures in an otherwise open landscape. Recent work from developed natural gas fields in Wyoming (Gilbert and Chalfoun 2011) documents 10-20 percent declines in the abundance of certain sagebrush obligates including Brewer‘s sparrows.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Also, treatment is permitted in breeding, nesting, and winter range. Much of Brewer's sparrow habitat could be treated. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Impacts could include removing or losing large tracts of habitat due to prescribed fire or wildfire, losing nests, and increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Additional information from forest-wide monitoring (Forest Service 2009) indicates that "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the

communities were in healthy, functioning conditions. Since Brewer's Sparrow thrives in late succession sagebrush, there is a larger amount of their habitat in satisfactory condition than occurred historically." The liberal prescribed fire opportunity in this alternative could decrease late succession habitat to a proportion that occurred historically.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. In addition to the National Forest System lands, Brewer's sparrows occur on adjacent private, state, and BLM-administered land. Activities occurring in the above resource areas may also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Brewer's sparrow Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels, then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development can be permitted (with stipulations) on much of GRSG priority, and general habitat (refer to Appendix 1). Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact.

Effects on Brewer's sparrow Population Trend

The Brewer's sparrow population trend on the BT is stable to slightly declining. This population trend mimics the current lack of substantial change to sagebrush habitat across the BT. As mentioned, however, current LRMP guidance allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat for Brewer's sparrow. Therefore, this alternative would allow sufficient habitat change to reduce the probability that the forest-wide population trend would remain stable.

Summary of Alternative A

Existing levels of habitat alteration or loss and disturbance could continue or could increase substantially. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance and habitat loss in sagebrush habitat. This could allow substantial

changes in Brewer's sparrow habitat quantity, quality, and ownership on sagebrush habitat on the BT.

Currently, these potential habitat changes have not occurred and the Brewer's sparrow population trend on the BT is stable to slightly declining. It appears that current sagebrush habitat conditions can sustain this population. This trend is noticeably better than the range-wide decline observed in other BBS routes. Full use of Alternative A development opportunities in sagebrush would lead to a decline in sagebrush habitat which could cause a decline in the BT Brewer's sparrow population trend.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG priority and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternatives A, D, and E, retaining more habitat for Brewer's sparrows across the BT. There would be less disruption of nesting, less abandonment of young, or temporary displacement.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some Brewer's sparrow habitat on the BT National Forest. For example, there would be 5,955 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits Brewer's sparrow.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG habitat quality; therefore, in favor of Brewer's sparrow sagebrush habitat quality. There are 5,933 acres of PHMA across the BT in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A except that Alternative B provides a few more restrictions that would protect Brewer's sparrow habitat. GRSG PHMA accounts for less

than 5 percent of the sagebrush habitat on the BT, so any changes would be localized. There could be small pockets of improved sagebrush habitat quality for productive breeding, nesting, and brood rearing for Brewer's sparrow.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Though there are only four known active leks and only 5,933 acres of PHMA on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for Brewer's sparrow. Energy and mineral development could still occur on the remainder of 430,870 acres of sagebrush habitat.

Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. For example, fluid mineral leasing would be closed on 8,722 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). This alternative better conserves the 5,933 acres of PHMA and, therefore, Brewer's sparrow habitat, than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration, and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would promote the conservation of Brewer's sparrow habitat and reduce disturbance to Sparrows associated with fire in PHMA. In addition, habitat restoration would be a priority. These measures would help support the current forest-wide population of Brewer's sparrows. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C.

Additional information from forest-wide monitoring (Forest Service 2009) indicates that "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions. Since Brewer's Sparrow thrives in late succession sagebrush, there is a larger amount of their habitat in satisfactory condition than occurred historically." The limited prescribed fire opportunity in this alternative will continue to maintain more late succession habitat than occurred historically in PHMA.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. However, anthropogenic

disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Brewer's sparrow Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <5 percent of the 430,870 acres of sagebrush habitat and Brewer's sparrow habitat on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality for Brewer's sparrow, the benefits would be small in relation to the amount of Brewer's sparrow habitat available across the BT.

Effects on Brewer's sparrow Population Trend

The Brewer's sparrow population trend on the BT is stable to declining slightly. The population trend is not expected to change substantially as a result of improvements across <5 percent of Brewer's sparrow sagebrush habitat across the BT.

Summary of Alternative B

This alternative limits loss, fragmentation, and disturbance in PHMA which is <10 percent of the forest-wide Brewer's sparrow habitat. There would be benefits to individual Sparrows, but these would likely be too small to noticeably affect the forest-wide population trend. Generally, activities in GHMA and the remaining sagebrush habitat on the BT will occur as they do currently or could expand as existing direction allows. These activities affect most (>90 percent) Brewer's sparrow habitat on the BT. Therefore, overall impacts on Brewer's sparrow forest-wide population would be generally similar to but reduced compared to Alternatives A and D.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to Brewer's sparrows and their habitat than other alternatives. Conservation measures would generally be applied to GHMA (324,243 acres) in addition to PHMA. Therefore, these measures would benefit more acres of Brewer's sparrow habitat than other alternatives. New road construction is prohibited within four miles of active GRSG leks, and it is avoided in priority and GHMA. Existing road management would be designed to maintain or improve both priority and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among alternatives. Habitat loss, fragmentation, and disturbance would be reduced on much of the forest-wide Brewer's sparrow habitat. There would be greatly reduced disruption of nesting activities, abandonment of young, or temporary displacement.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for Brewer's sparrows. Priority and GHMA would be managed as an exclusion area for new ROW projects (Appendix 1) protecting much of the forest-wide Brewer's sparrow habitat. Alternative C would encourage consolidation and acquisition of GRSG limiting the possibilities for loss or degradation of Brewer's sparrow habitat. This alternative would promote the greatest distribution and highest density of Brewer's sparrows forest-wide.

Range Direct and Indirect Effects

There are 5,933 acres of PHMA across the BT in this alternative. The prohibition of livestock grazing in PHMA would retain the most herbaceous cover for nest concealment, seed production, and insect production among Alternatives. These results would provide the greatest opportunity among Alternatives for reduced nest predation and parasitism and sparrow fitness in PHMA. Since PHMA is <5 percent of forest-wide Brewer's sparrow habitat, benefits would occur to individuals and not be noticed across the population.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to Brewer's sparrows and their habitat than other alternatives. Many conservation measures would be applied to GHMA (324,243 acres) in addition to PHMA. Therefore, conservation measures would benefit more acres of sparrow habitat than most other alternatives. For example, fluid mineral leasing would be closed on 315,583 acres of GRSG sagebrush habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within priority (5,933 acres) and GHMA. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and they would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing, and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss, fragmentation, and disturbance would be reduced on much of the forest-wide, Brewer's sparrow habitat. There could be greatly reduced disruption of nesting activities, abandonment of young, or temporary displacement. Measures such as the seasonal restriction on disturbance in nesting habitat would achieve these results.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA, promoting the conservation of mature sagebrush habitat. Sagebrush canopy cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GHMA would be avoided in <12 inch precipitation zone. This alternative conserves more sagebrush habitat with higher shrub

canopy cover than all other alternatives. These measures would promote the conservation of Brewer's sparrow habitat and reduce disturbance to sparrows associated with fire. As mentioned earlier, Brewer's sparrow abundance is higher in stands with >25 percent canopy cover (Holmes and Johnson 2005). This alternative would maintain more acres of sagebrush in a condition to support Brewer's sparrows by maintaining shrub canopy cover. These measures would help support the current forest-wide population of Brewer's sparrows.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Brewer's sparrow Habitat Trend

This alternative promotes greater conservation of GRSG priority and GHMA. These habitats comprise much of the 430,870 acres of sagebrush Brewer's sparrow habitat on the BT. This alternative will maintain and improve habitat quantity and quality across the BT for Brewer's sparrow more than other alternatives.

Effects on Brewer's sparrow Population Trend

The Brewer's sparrow population trend on the BT is stable to slightly declining. The population trend could remain stable or increase with conservation measures on >75 percent of Brewer's sparrow habitat if substantial habitat loss or degradation does not occur on the remaining <25 percent of forest-wide habitat that will not benefit from the proposed conservation measures.

Summary of Alternative C

This alternative limits loss, fragmentation, and disturbance in general and PHMA which is >75 percent of the forest-wide Brewer's sparrow habitat. There could be benefits to individual sparrows across much of the forest-wide habitat that could be observed in the forest-wide population trend compared to other alternatives. Generally, activities in the remaining sagebrush habitat on the BT will occur as they do currently or could expand as existing direction allows. Overall this alternative would promote the greatest abundance of Brewer's sparrows forest-wide.

Currently, potential habitat changes on the remaining 40 percent of habitat have not occurred and the Brewer's sparrow population trend on the BT is stable to slightly declining. It appears that current habitat conditions can sustain this population. This trend is noticeably better than the range-wide decline observed in other BBS routes. Full use of conservation measures in

Alternative C in PHMA and GHMA could slow any forest-wide decline of Brewer's sparrow population if the remaining 40 percent of sagebrush on the BT was managed to the limit of allowable disturbances.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to Brewer's sparrows than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA will be allowed > 0.25 miles from the four known leks and any new leks on the BT. This is closer than the disturbance allowed under the other alternatives except Alternative A. This disturbance would affect <1 percent of the forest-wide Brewer's sparrow habitat. A few more Brewer's sparrows could be disrupted, habitat lost, nests lost, or young abandoned.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in the GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures for Alternative D apply to priority core habitat. A few slight differences included in this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is <10 percent of forest-wide Brewer's sparrow habitat, these conservation measures would have a very small benefit to the forest-wide population.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. As an example, fluid mineral leasing would be closed on 2 acres of GRSG habitaton federal surface and federal mineral leases (Appendix 1). Recent work from developed

natural gas fields in Wyoming (Gilbert and Chalfoun 2011) documents 10-20 percent declines in the abundance of certain sagebrush obligates including Brewer‘s sparrows. The lack of conservation measures in sagebrush outside of priority core habitat could lead to increased disturbance, loss of habitat, degradation of habitat, loss of nests, or abandonment of young.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow WGFD Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a “disturbance” contributing toward the 9 percent threshold. Treatment is permitted in GRSG breeding, nesting, and winter range. Treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of cover, reducing Brewer’s sparrow habitat quality. Brewer sparrow abundance is higher in climax communities with >25 percent cover than sites with less cover (Holmes and Johnson 2005) so reduced cover could result in lower sparrow abundance. These limited conservation measures in PHMA and the lack of measures in the remainder of Brewer’s sparrow habitat would have detrimental impacts on Brewer’s sparrows compared to Alternatives B, C, and E.

Cumulative Effects for Five Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. In addition to impacts described above, Brewer’s sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in Brewer’s sparrow habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Brewer's sparrow Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels, then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG (and Brewer’s sparrow) habitat. Range conservation measures in Alternative D apply only to priority or priority core habitat which is 1 percent of Brewer’s sparrow habitat on the BT. Therefore, sagebrush habitat quality could be reduced on the majority of Brewer’s sparrow habitat. Likewise, oil, gas, and geothermal development can be permitted (with stipulations) on much of GRSG priorityand general habitat subject only to a 9 percent disturbance limit in priority core habitat. This

alternative will allow substantial loss or degradation of Brewer's sparrow habitat compared to Alternatives B, C, and E.

Effects on Brewer's sparrow Population Trend

The Brewer's sparrow population trend on the BT is stable to slightly declining. This population trend mimics the current lack of substantial change to sagebrush habitat across the BT. As mentioned, however, Alternative D allows a substantial change to sagebrush habitat. Therefore, this alternative would allow sufficient habitat change to reduce the probability that the forest-wide population trend would remain stable.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat, which conserves <1 percent of forest-wide Brewer's sparrow habitat, and the limited conservation measures in other sagebrush habitat will have detrimental impacts on Brewer's sparrows compared to Alternatives B, C, and E. Allowable activities could cause substantial changes in Brewer's sparrow habitat quantity, quality, and fragmentation.

Currently, these potential habitat changes have not occurred and the Brewer's sparrow population trend on the BT is stable to slightly declining. It appears that current habitat conditions can sustain this population. This trend is noticeably better than the range-wide decline observed in other BBS routes. Full use of development opportunities in sagebrush areas not conserved by Alternative D would lead to a decline in sagebrush habitat which would reduce the probability that the forest-wide population trend would remain stable.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs. These habitats are >97,000 acres. Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat

loss or degradation and less disruption of nesting or hatching, abandonment of young, or temporary displacement in sagebrush habitat compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of Brewer's sparrow sagebrush habitat could be lost, degraded, or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 3,283 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on sagebrush habitat, predominantly PHMA and SFAs, would be reduced compared to Alternatives A and D, but would be greater than impacts on sagebrush habitat in Alternatives B and C.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush habitat quality for Brewer's sparrow. There could be areas of improved habitat for productive breeding, nesting, and brood rearing for Brewer's sparrows in PHMA and SFAs and, sometimes, in GHMA.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands <200 acres. Potential adverse effects on sagebrush habitat from this exception could include habitat loss or degradation or fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, none in SFAs, and not as much within GHMA. Alternative C would apply to PHMA and, most often, to GHMA promoting sagebrush habitat quality for Brewer's sparrow more than other alternatives.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs. Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. Fluid mineral leasing would be closed on 3,262 acres of GRSG habitat on federal surface

and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA, SFAs, and often, GHMA, would provide habitat benefits to Brewer's sparrow, a sagebrush obligate. The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. For example, alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit, compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternatives B and C are generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs. In addition, vegetation treatment in PHMA and SFAs in nesting and wintering habitat in northeast Wyoming that would reduce sagebrush canopy to <15 percent would be restricted.

Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D considering a no disturbance limit and a 9 percent disturbance limit for these alternatives, respectively. Sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in priority and GHMA management areas. Therefore, impacts on mature sagebrush habitat and Brewer's sparrow would be reduced.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. However, anthropogenic disturbances >5 percent on all ownerships in PHMA and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Brewer's sparrow Habitat Trend

This alternative promotes greater conservation of GRSG PHMA, SFAs, and often, GHMA. These habitats comprise >60 percent of the 430,870 acres of sagebrush habitat, Brewer's sparrow habitat, on the BT. This alternative will maintain and improve habitat quantity and quality across the BT for Brewer's sparrow more than other alternatives except Alternative C and sometimes Alternative B.

Effects on Brewer's sparrow Population Trend

The Brewer's sparrow population trend on the BT is stable to slightly declining. The population trend could remain stable or increase with conservation measures on >60 percent of Brewer's sparrow habitat if substantial habitat loss or degradation does not occur on the remaining <40 percent of forest-wide habitat that will not benefit from the proposed conservation measures.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance will cause some small loss of sagebrush habitat quantity and quality for Brewer's sparrow. This alternative also limits disturbing activities in PHMA and SFAs, and often, GHMA. In total, there are >270,000 acres of PHMA, SFAs, and GHMA on the BT. There would be less loss or fragmentation of mature sagebrush habitat. Generally, activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. Overall, effects of the Proposed Plan Amendment would be less impacting to Brewer's sparrow than Alternatives A and D. Impacts would be more pronounced than Alternative C and be broadly comparable to Alternative B.

Currently, allowable habitat changes have not occurred and the Brewer's sparrow population trend on the BT is stable to slightly declining. It appears that current habitat conditions can sustain this population. This trend is noticeably better than the range-wide decline observed in other BBS routes. Full use of conservation measures in the Proposed Plan Amendment in PHMA, SFAs, and in some cases, GHMA could slow any forest-wide decline of Brewer's sparrow population if the remaining sagebrush on the BT outside of these management areas was managed to the limit of allowable disturbances.

Rocky Mountain Elk (*Cervus elaphus nelsoni*)

Distribution

Elk is a MIS for the BT that overlaps with GRSG habitat on the National Forest. Rocky Mountain elk are common throughout the Rocky Mountains and western states and have been introduced into several other states.

Habitat Associations and Threats

Virtually all of the BT, >3,000,000 acres, provides elk habitat (Forest Service 2009a). They use a wide variety of vegetation types to meet their life history needs including aspen, several conifer

types, big sagebrush, several mountain shrubland types, meadows, grasslands, herblands, and tall forbs.

Threats can include competition with livestock, predation, and aspen decline. For these elk herds, transmission of brucellosis among elk at State established feedgrounds is a concern (Forest Service 2009a).

Population Status, Trend, and Relation to Habitat Trend

Elk harvest across Wyoming has averaged >20,000 animals annually since 2002 and it has increased slightly the last three years (WGFD 2011). Elk are abundant in suitable habitat across the State.

The BT includes 11 elk herds. These elk herds are supported by annual feeding operations on winter feedgrounds. The population trend for these elk herd units has been trending slightly downward but the elk population was above the WGFD objectives by approximately 12 percent in 2005 for the herd units within the BT, and it remains above objectives in 2008 (Forest Service 2009a). The slight downward trend on the BT is due to harvest designed to reduce the population. The high elk numbers on the BT mimic the high Statewide population status.

Rocky Mountain elk was selected as a MIS for the BT as a harvest species reflecting socioeconomic status. Elk use many habitat types; those overlapping with GRSG habitat are generally elk winter ranges comprised of sagebrush and aspen.

Some habitat conditions appear to be declining slowly. Aspen regeneration has been reduced, particularly around elk feedgrounds. Aspen distribution and stand vigor has declined due to aging stands and related conifer encroachment. Mountain shrub stands are predominantly mature and often decadent. In contrast, riparian, willow, and grassland communities have improved due to improvements in grazing management compared to historic times.

Livestock management and vegetation management on the BT can affect forage quality and quantity for elk. Retaining insufficient shrub, aspen, or herbaceous production can negatively affect the elk population trend. Prohibiting shrub and aspen regeneration within appropriate time intervals can reduce the quality and quantity of forage production. Forest Service (2009) suggests that lack of disturbance is affecting the quality of this elk habitat.

Forest-wide monitoring indicates that existing habitat conditions are sustaining the elk population. Most elk in this population use winter feedgrounds. Rangeland management practices have improved considerably in the last 50 years and little sagebrush shrubland has been permanently lost. The lack of natural or prescribed disturbance has created a higher proportion of older age class shrub stands and a decline in aspen vigor than occurred historically (Forest Service 2009a).

Available population and habitat information suggests elk on the BT have a population trend that is generally stable to slightly declining. The slight decline appears to be directly related to harvest strategies designed to reduce the population to State population management objectives.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA and there would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss and disturbance to elk. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in elk habitat. These can cause animal displacement, disruption of parturition, or reduced fitness in sagebrush habitat.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 2,107 acres of ROW exclusion areas in GRSG sagebrush habitat. Some elk habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss or degradation for elk. Other impacts may include new infestations of noxious or invasive weeds. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance of elk.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing occurs on 2,098,560 acres of the 3,400,000 acres of the BT. Livestock grazing occurs on >230,000 acres (>70 percent) of GRSG habitat, which is also habitat for elk. Potential effects on elk habitat could include: site specific overgrazing; reduction in cover, structure, and diversity of residual vegetation from consumption; and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include reduced fitness for winter survival. Reduced range condition could also cause elk on this Forest to rely more on winter feedgrounds. Forest Plan standards and guidelines for grazing management usually provide sufficient herbaceous forage for elk across the BT.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing including expansion of new leases. This alternative could allow a large amount of direct and indirect habitat loss and degradation of sagebrush habitat. For example, fluid mineral leasing would be closed on 3,263 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). There would be greater negative effects from related noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Loss of habitat and greater disturbance could cause elk to rely more on winter feedgrounds.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. A lot of elk habitat could be treated. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Impacts could include creating more grass forage for elk benefitting survival of individuals. Results could make elk less reliant on winter feedgrounds. There could also be increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Elk habitat includes the entire BT where vegetation management in timber and aspen stands create more foraging habitat. Elk habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in elk habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Elk Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels, then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat which is also elk habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development can be permitted (with stipulations) on >300,000 acres of GRSG priority and general habitat. Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact as elk habitat.

Effects on Elk Population Trend

The elk population trend on the BT is slowly declining as a result of harvest strategies directed at reducing the population to meet State objectives. This population trend (declining only as a result of harvest management) mimics the current lack of substantial change to sagebrush habitat across the BT. However, as mentioned, current LRMP guidance allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat for elk. Therefore, this alternative would allow sufficient habitat change that population reduction would cause by more than harvest management.

Summary of Alternative A

Existing conservation measures for sagebrush habitat are limited, so there is a potential for habitat alteration or loss and disturbance in this elk habitat. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance in the 430,870 acres of sagebrush habitat. Conversion to grass forage with fuels treatments would benefit elk. However, limited conservation in the other four resource areas could allow substantial changes in elk habitat quantity, quality, and ownership in sagebrush habitat on the BT.

Currently, existing Forest Plan allowances have not caused substantial disturbances in GRSG habitat which overlaps generally with elk winter and transition range on the Forest. Substantial changes to sagebrush habitat have not occurred and the elk population trend on the BT is slightly declining due to harvest strategy. It appears that current sagebrush habitat conditions can sustain this population considering that 80 percent of the elk on the BT also rely on winter feedgrounds (Forest Service 2009a). This abundance of elk mimics the status of elk populations Statewide. Full use of Alternative A conservation measures in GRSG habitat would have a small benefit to the elk population trend since elk occur across all habitats on the BT, the conservation measures are limited in GRSG habitat, and elk are supported on winter feedgrounds.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A retaining more habitat for elk across the BT National Forest. There would be less displacement, disruption of parturition, or reduced elk fitness in sagebrush habitat. Of course,

these benefits would occur on <1 percent of Forest-wide elk habitat so they would not be reflected in the population trend.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some elk habitat on the BT. There would be 5,955 acres of ROW exclusion areas in sagebrush habitat. These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits elk habitat.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG; therefore, in favor of elk sagebrush habitat quality. There are 5,933 acres of PHMA across the BT in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A, except that Alternative B provides a few more restrictions that would protect elk habitat. GRSG PHMA accounts for less than 5 percent of the land cover of the BT so any changes would be localized. There could be small pockets of improved areas of productive foraging for elk.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile no surface occupancy buffer around leks. Though there are only four known active leks and only 5,933 acres of PHMA on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for elk. Energy and mineral development could still occur on the remainder of 425,000 acres of sagebrush habitat. This alternative better conserves PHMA, and therefore elk habitat, than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would limit the creation of grass foraging areas on PHMA. This habitat could not be improved for elk foraging. Still, this is <5 percent of the sagebrush habitat on the BT. There would likely be no noticeable impact on the elk population. This alternative conserves more habitat than Alternatives A, D, and E, but conserves less than Alternative C.

Additional information from forest-wide monitoring (Forest Service 2009a) indicates that "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions." This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Elk habitat includes the entire BT where vegetation management in timber and aspen stands create more foraging habitat. Elk habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in elk habitat off the BT. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Elk Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <5 percent of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality for elk, the benefits would be small in relation to the amount of habitat available to elk across the BT, >3,000,000 acres.

Effects on Elk Population Trend

The elk population trend on the BT is slowly declining as a result of harvest strategies directed at reducing the population to meet state objectives. The population trend is not expected to change substantially as a result of improvements across <1 percent of sagebrush winter and transition habitat across the BT.

Summary of Alternative B

This alternative limits disturbance in PHMA which is <1 percent of the forest-wide elk habitat. There could be benefits to individual elk, but these would likely be too small to affect the forest-wide population trend. On the other hand, limits on sagebrush treatment will prohibit improvements in herbaceous forage. Generally, activities in GHMA and the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>95 percent) sagebrush habitat on the BT National Forest. Therefore, proposed conservation measures effects on the elk forest-wide population would be minimal.

Substantial changes to sagebrush habitat have not occurred and the elk population trend on the BT National Forest is stable to slightly declining due to harvest strategy. It appears that existing

sagebrush habitat conditions with proposed conservation measures can sustain this population considering that 80 percent of the elk on the BT also rely on winter feedgrounds (Forest Service 2009a). This abundance of elk mimics the status of elk populations statewide. Full use of Alternative B conservation measures in GRSG habitat that would have no noticeable impact on the elk population trend since elk occur across all habitats on the BT, the conservation measures are generally limited to PHMA, and elk are supported on winter feedgrounds.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measure would be more beneficial to elk and their sagebrush habitat than other alternatives. Measures would generally be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 324,000 more acres of elk habitat than other alternatives. New road construction is prohibited within four miles of active GRSG leks, and avoided in priority and GHMA. Existing road management would be designed to maintain or improve both priority and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among Alternatives. Habitat loss and disturbance would be reduced on +8 percent of the forest-wide elk habitat. There would be less disruption of wintering and parturition. There could be less reliance on elk feedgrounds.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for elk sagebrush habitat. PHMA and GHMA would be managed as an exclusion area for new ROW projects. This is >75 percent of forest-wide sagebrush habitat. Alternative C would encourage consolidation and acquisition of all designated habitat, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

There are 5,933 acres of PHMA across the BT in this alternative. The prohibition of livestock grazing in PHMA would retain the most herbaceous forage to support elk on transition and winter ranges. This result would provide the greatest opportunity among Alternatives for elk fitness and reduced reliance on feedgrounds. Still, PHMA is <1 percent of forest-wide elk habitat benefits would occur to individuals and not be noticed in the population trend.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to elk and their habitat than other alternatives. Many conservation measures would be applied to GHMA in addition to PHMA. Therefore, conservation measures would benefit more than 300,000 more acres of Elk sagebrush habitat than other alternatives. For example, fluid mineral leasing would be closed on 315,582 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&C will be considered within priority

(5,933 acres) and GHMA (324,243 acres). Priority and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and it would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss and disturbance would be reduced on +10 percent of the forest-wide elk habitat. There could be noticeably reduced disruption on winter and transition ranges possibly leading to less reliance on feedgrounds compared to Alternative A.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA, promoting the conservation of mature sagebrush habitat. Sagebrush canopy cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GHMA would be avoided in <12 inch precipitation zone. This would limit the creation of grass foraging areas across >324,000 acres of sagebrush. This habitat could not be improved for Elk foraging. This is >75 percent of the sagebrush habitat on the BT National Forest.

Lack of sagebrush treatment does not entice Elk to leave feedgrounds for native range. Additional information from forest-wide monitoring (Forest Service 2009) indicates that “the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions.” This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Elk habitat includes the entire BT where vegetation management in timber and aspen stands creates more foraging habitat. Elk habitat also occurs on private, state, and BLM-administered land adjacent to the BT National Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in elk habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Elk Habitat Trend

This alternative promotes greater conservation of GRSG priority and GHMA. These habitats comprise >75 percent of the 430,870 acres of sagebrush habitat on the BT. This alternative will

maintain and improve Elk winter and transition habitat quantity and quality across the BT more than other alternatives, perhaps causing elk to be less reliant on winter feedgrounds. Still, the benefits would be small in relation to the >3,000,000 acres of elk habitat available across the BT.

Effects on Elk Population Trend

The elk population trend on the BT is slowly declining as a result of harvest strategies directed at reducing the population to meet state objectives. Improvements to >75 percent of winter and transition ranges might require additional harvest to continue decreasing the population toward the State management objective.

Summary of Alternative C

This alternative limits loss and disturbance in general and PHMA, which is >75 percent of the forest-wide sagebrush habitat. There could be benefits to elk across much of this forest-wide habitat that could be observed in the forest-wide population trend compared to other alternatives. However, the limit on sagebrush treatment limits opportunities to improve winter and transition range and encourage elk to rely less on feedgrounds. Generally, activities in the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows.

Substantial changes to sagebrush habitat have not occurred and the elk population trend on the BT National Forest is declining slightly due to harvest strategy. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population considering that 80 percent of the elk on the BT also rely on winter feedgrounds (Forest Service 2009a). This abundance of elk mimics the status of elk populations statewide. Full use of Alternative C conservation measures in GRSG habitat could have a noticeable impact on the Elk population trend since measures would affect >75 percent of the BT National Forest's sagebrush habitat.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to elk than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA will be allowed > 0.25 miles from the four known leks and any new leks on the BT. This is closer than the disturbance allowed under the

other alternatives except Alternative A. This disturbance would affect <1 percent of the forest-wide Elk habitat. A few more Elk could be disrupted or a little habitat lost.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures of Alternative D apply to priority core habitat. A few slight differences include this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is <1 percent of forest-wide sagebrush habitat, these conservation measures would have a very small benefit to the forest-wide elk population.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and three disturbances per 640 acre limit in priority core habitat that does not exist in Alternative A. The conservation measures would benefit 5,593 acres of Elk sagebrush habitat. Fluid mineral leases would be closed on 2 acres of GRSG habitat (Appendix 1). Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves priority core habitat and, therefore, some limited elk habitat than Alternative A.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow WGFD Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a “disturbance” contributing toward the 9 percent threshold. Treatment is permitted in GRSG breeding, nesting, and winter range. Results could include creating more grass forage for elk, benefitting survival of individuals. However, treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of cover, reducing habitat quality for elk. The abundance of opportunity to increase herbaceous production should make elk less reliant on winter feedgrounds; however, post-treatment management could reduce these benefits.

Cumulative Effects for 5 Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. Elk

habitat includes the entire BT where vegetation management in timber and aspen stands also creates more foraging habitat. Elk habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in elk habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Elk Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels, then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat, which is also usually elk winter and transition habitat. Range conservation measures in Alternative D apply only to priority or priority core habitat, which is <10 percent and <1 percent, respectively, of elk sagebrush habitat on the BT. Therefore, sagebrush habitat quality could be reduced on the majority of elk habitat not addressed by conservation measures. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of GRSG priority and general habitat subject only to a 9 percent disturbance limit in priority core habitat. While this alternative will maintain some habitat quantity and improve some habitat quality for elk, the benefits would be small in relation to the amount of habitat available to elk across the BT, >3,000,000 acres. This alternative will allow substantial loss or degradation of elk habitat compared to Alternatives B, C, and E.

Effects on Elk Population Trend

The elk population trend on the BT is slowly declining as a result of harvest strategies directed at reducing the population to meet State objectives. The population trend is not expected to change substantially as a result of improvements across <1 percent of sagebrush habitat across the BT.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional shrub treatments. Conversion to grass forage with fuels treatments would benefit elk. However, limited conservation in the other four resource areas could allow substantial changes in elk habitat quantity, quality, and ownership in sagebrush habitat on the BT. Still, this alternative prevents more disturbance in these four areas than Alternative A.

Substantial changes to sagebrush habitat have not occurred and the elk population trend on the BT is stable to slightly declining due to harvest strategy. It appears that existing sagebrush

habitat conditions with proposed conservation measures can sustain this population considering that 80 percent of the elk on the BT also rely on winter feedgrounds (Forest Service 2009). This abundance of elk mimics the status of elk populations Statewide. Full use of Alternative D conservation measures in GRSG habitat would have a small impact on the elk population trend since elk occur across all habitats on the BT, the conservation measures are generally limited to priority core habitat and elk are supported on winter feedgrounds.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs (>100,000 acres). Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D but less restrictive than Alternatives B and C. There would be less habitat loss or degradation, less displacement, and less disruption of wintering or parturition in sagebrush habitat compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of elk habitat in sagebrush could be lost, degraded, or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 3,283 acres of ROW exclusion areas in sagebrush habitat. Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on elk and sagebrush habitat, predominantly PHMA and SFAs, would be reduced compared to Alternatives A and D but would be greater than impacts under Alternatives B and C.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland

health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush habitat quality for elk. There could be areas of improved habitat for foraging.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands >200 acres. Potential adverse effects on sagebrush habitat from this exception could include habitat loss or degradation, or fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in both PHMA, SFAs, and GHMA more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, none in SFAs and not as much within GHMA management areas. Alternative C would apply to PHMA and, most often, to GHMA promoting sagebrush habitat quality more than other alternatives.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs. Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. Fluid mineral leases, as an example, would be closed on 3,262 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for priority and GHMA management areas during breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures inside PHMA, SFAs, and often GHMA, would provide benefits to elk on winter ranges by retaining habitat and reducing disturbance. The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA management areas more than Alternatives A and D. For example, alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternatives B and C are generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, also in GH. Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D considering a no

disturbance limit and a 9 percent disturbance limit for these Alternatives, respectively. There are more treatment opportunities than Alternatives B and C. Sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in PHMA, SFAs, and GHMA. There would be fewer opportunities to create more grass forage for wintering elk and less encouragement to make elk less reliant on winter feedgrounds.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Elk habitat includes the entire BT National Forest where vegetation management in timber and aspen stands create more foraging habitat. Elk habitat also occurs on private, State, and BLM-administered land adjacent to the BT National Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in elk habitat off the BT. Cumulative effects are discussed in greater detail Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Elk Habitat Trend

This alternative promotes greater conservation of GRSG PHMA, SFAs, and GHMA. These habitats comprise >75 percent of the 430,870 acres of sagebrush habitat on the BT. This alternative will maintain and improve a substantial amount of elk winter and transition habitat quantity and quality across the BT more than other alternatives except Alternative C perhaps causing elk to be less reliant on winter feedgrounds. Still, the benefits would be small in relation to the >3,000,000 acres of elk habitat available across the BT.

Effects on Elk Population Trend

The elk population trend on the BT is slowly declining as a result of harvest strategies directed at reducing the population to meet State objectives. Improvements to >60 percent of winter and transition ranges might require additional harvest to continue decreasing the population toward the State management objective.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent. This 5 percent disturbance allowance will allow some small loss of sagebrush habitat. This alternative also limits disturbing activities in PHMA, SFAs, and often, GHMA. In total, there are >270,000 acres of PHMA, SFAs, and GHMA on the BT. There would be less loss or fragmentation of mature sagebrush habitat. Generally, other activities in GHMA and all activities in the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities could affect about 80 percent of the elk habitat on the BT. Overall, effects of the Proposed Plan Amendment would be less impacting to the elk forest-

wide population than Alternatives A and D. Impacts would be more pronounced than Alternative C and they would be broadly comparable to Alternative B.

Substantial changes to sagebrush habitat have not occurred and the elk population trend on the Forest is stable to slightly declining due to harvest strategy. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population considering that 80 percent of the elk on the BT also rely on winter feedgrounds (Forest Service 2009). This abundance of elk mimics the status of elk populations Statewide. Full use of the Proposed Plan Amendment conservation measures in GRSG habitat would have a small impact on the elk population trend since elk occur across all habitats on the BT, the conservation measures are usually limited to priority and GHMA, and SFAs, and elk are supported on winter feedgrounds.

Mule Deer (*Odocoileus hemionus*)

Distribution

Mule deer is a MIS for the BT that overlaps with GRSG habitat on the BT. Mule deer are common throughout the western states.

Habitat Associations and Threats

Mule deer are habitat generalists that can thrive in habitats from sagebrush and grassland to alpine tundra. All of the BT is classified as some type of mule deer seasonal range.

Threats can include competition with livestock and elk, aspen decline, and habitat loss to housing and energy development on winter ranges (Forest Service 2009).

Population Status, Trend, and Relation to Habitat Trend

Mule deer annual harvest across Wyoming has averaged between 43,000 and 55,000 since 2002 (WGFD 2011). Mule deer are abundant across the State, but populations are generally lower than 30 years ago.

The BT includes five mule deer herds. The mule deer population trend for the five herd units as a whole has been approximately stable since 2001; however, the total population remains below the state population objective (Forest Service 2009a). The population on the BT mimics the Statewide situation that mule deer are abundant but less abundant than over a decade ago.

Mule deer was selected as a MIS for the BT as a harvest species reflecting socioeconomic status. Mule deer use many habitat types; those overlapping with GRSG habitat are generally winter ranges comprised of sagebrush and aspen.

Livestock management and vegetation management on the BT can affect forage quality and quantity for mule deer. Retaining insufficient shrub, aspen, or herbaceous production can negatively affect the mule deer population trend. Rangeland management practices have improved considerably in the last 50 years and little sagebrush shrubland on the BT has been permanently lost.

On the other hand, some habitat conditions appear to be declining. Aspen regeneration has been reduced, particularly around elk feedgrounds. Aspen distribution and stand vigor has declined due to aging stands and related conifer encroachment. There is an overrepresentation of late-seral shrublands on the BT (Forest Service 2009), which limits nutritional quality to mule deer. In addition to greatly increased fire-return intervals, heavy browsing by native ungulates has contributed to this situation. The amount of winter range off the BT is declining due to energy development and housing development.

Forest-wide monitoring indicates that existing habitat conditions are sustaining the mule deer population. Available population and habitat information suggests mule deer on the BT have a population trend that is generally stable, but reduced compared to previous decades. The lower, stable population parallels the abundance of older, less productive, and heavily browsed shrublands.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA. There would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss and disturbance to deer. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in deer habitat. These can cause animal displacement, disruption of parturition, or reduced fitness in sagebrush habitat.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 2,107 acres of ROW exclusion areas in GRSG habitat. Some deer habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss or degradation for deer. Other impacts may include new infestations of noxious or invasive weeds. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance of deer.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT. Potential effects on deer habitat could include site specific overgrazing, reduction in cover, structure, and diversity of residual vegetation from consumption, and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include reduced fitness for winter survival. Forest Plan standards and guidelines for grazing management usually provide sufficient herbaceous forage for deer across the BT. For example, the BT LRMP indicates that GRSG species' needs will be addressed in allotment management plans and range improvements, management activities, and trailing will be coordinated with and designed to help meet the needs of GRSG.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMAs would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing, including expansion of new leases. This alternative could allow a large amount of direct and indirect habitat loss and degradation of sagebrush habitat. For example, fluid mineral leasing would be closed on 3,263 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). There would be greater negative effects from related noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Loss of habitat and greater disturbance would cause deer to have a reduced ability to survive winters.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Much deer habitat in transition and winter range could be treated. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Impacts could include regenerating younger, more palatable shrub stands which benefit survival of individuals. Forest Service (2009a) indicates "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions". Results could benefit individual survival in the long-term. There could also be increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Deer habitat includes the entire BT where vegetation management in timber and aspen stands create more foraging habitat. Deer habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral

development, and range management in deer habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Mule Deer Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels, then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat which is also mule deer habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of GRSG priority andgeneral habitat. Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact as mule deer habitat.

Effects on Mule Deer Population Trend

The mule deer population trend on the BT is stable but reduced compared to several decades ago. This stable population trend mimics the current lack of substantial change to sagebrush habitat across the BT. However, as mentioned, current LRMP guidance allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat for mule deer. Therefore, this alternative would allow sufficient habitat change to reduce the probability that the forest-wide population trend would remain stable.

Summary of Alternative A

Existing conservation measures for sagebrush habitat are limited so there is a potential for habitat alteration or loss and disturbance in this deer habitat. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance in sagebrush habitat. Regenerating shrub stands with fuels treatments would benefit deer in the long-term. However, limited conservation in the other four resource areas could allow substantial changes in deer habitat quantity, quality, and ownership in sagebrush habitat on the Forest.

Currently, existing Forest Plan guidance has been adequate to manage disturbances in GRSG habitat which overlaps generally with deer winter and transition range on the Forest. Substantial changes to sagebrush habitat have not occurred and the deer population trend on the BT is stable. It appears that current sagebrush habitat conditions can sustain this population. This abundance of deer mimics the status of deer populations statewide. Full use of Alternative A conservation measures in GRSG habitat would have a small impact on the deer population trend since deer occur across all habitats on the BT and the conservation measures are limited in GRSG habitat.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A, retaining more habitat for deer across the BT. There would be less displacement, disruption of parturition, or reduced deer fitness in sagebrush habitat. Of course, these benefits would occur on <1 percent of Forest-wide deer habitat; so they would not be reflected in the population trend.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some deer habitat on the BT. There would be 5,955 acres of ROW exclusion areas in sagebrush habitat. These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits deer.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG; therefore, in favor of mule deer sagebrush habitat quality. There are 5,933 acres of PHMA across the BT in this alternative (Table A above). Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A, except that Alternative B provides a few more restrictions that would protect deer habitat. GRSG PHMA accounts for less than 5 percent of the land cover of the BT so any changes would be localized. There could be small pockets of improved sagebrush habitat quality and productive herbaceous foraging for deer.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Though there are only three known active leks and only 5,933 acres of on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for deer. Energy and mineral development could still occur

on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PHMA, and therefore, deer habitat than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would limit the regeneration of shrubs on PHMA. This habitat could not be improved for mule deer foraging over time. Still, this is <10 percent of the sagebrush habitat on the BT. Impacts on the mule deer population trend would be small to immeasurable.

Additional information from forest-wide monitoring (Forest Service 2009a) indicates that "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions." This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Deer habitat includes the entire BT where vegetation management in timber and aspen stands create more foraging habitat. Deer habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in deer habitat off the BT. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Mule Deer Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <5 percent of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality for mule deer, the benefits would be small in relation to the amount of habitat available to mule deer across the BT >3,000,000 acres.

Effects on Mule Deer Population Trend

The mule deer population trend on the BT is stable. The population trend is not expected to change substantially as a result of improvements across <10 percent of sagebrush winter and transition habitat across the BT.

Summary of Alternative B

This alternative limits disturbance in PHMA, which is <1 percent of the forest-wide deer habitat. There could be benefits to individual deer, but these would likely be too small to affect the forest-wide population trend. On the other hand, limits on sagebrush treatment will prohibit regeneration of shrub stands. Generally, activities in GHMA and the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>95 percent) sagebrush habitat on the Forest. Therefore, overall impacts on the deer forest-wide population would be generally similar to Alternative A.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the BT National Forest is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This relative abundance of deer mimics the status of deer populations Statewide. Full use of Alternative B conservation measures in GRSG habitat would have a small impact on the deer population trend since deer occur across all habitats on the BT and the conservation measures are generally limited to PHMA.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to deer and their sagebrush habitat than other alternatives. Conservation measures would generally be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 300,000 more acres of deer habitat than other alternatives. New road construction is prohibited within four miles of active GRSG leks, and it is avoided in priority and GHMA. Existing road management would be designed to maintain or improve both priority and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among alternatives. Habitat loss and disturbance would be reduced on +8 percent of the forest-wide deer habitat. There would be less disruption of wintering and parturition and improved chances of winter survival.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for deer sagebrush habitat. Priority and GHMA would be managed as an exclusion area for new ROW projects. This is >60 percent of forest-wide sagebrush habitat. Alternative C would encourage consolidation and acquisition of all designated habitat, limiting the possibilities for loss or degradation of mule deer transition and winter habitat.

Range Direct and Indirect Effects

There are 5933 acres of PHMA across the BT National Forest in this alternative. The prohibition of livestock grazing in PHMA would retain the most herbaceous forage among Alternatives to

support deer on transition and winter ranges. This result would provide the greatest opportunity among Alternatives for improved deer fitness. Still, PHMA is <1 percent of forest-wide deer habitat and benefits would occur to individuals and not be noticed across the population.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to deer and their habitat than other alternatives. Many conservation measures would be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 300,000 more acres of mule deer sagebrush habitat than other alternatives. Initial surface disturbance from oil, gas, and coal is 85,140 acres. No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within priority (5,933 acres) and GHMA (324,243 acres). Priority and would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and they would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing, and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Habitat loss and disturbance would be reduced on +8 percent of the forest-wide deer habitat. There could be noticeably reduced disruption on winter and transition ranges, possibly leading to improved winter survival.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA. This would limit the regeneration of shrubs across >320,000 acres of sagebrush. This is >70 percent of the sagebrush habitat on the BT. This habitat could not be improved for deer foraging over the long-term.

Lack of sagebrush treatment would be detrimental to mule deer over the long-term. Additional information from forest-wide monitoring indicates that “the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions” (Forest Service 2009). This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Deer habitat includes the entire BT where vegetation management in timber and aspen stands create more foraging habitat. Deer habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in deer habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Mule Deer Habitat Trend

This alternative promotes greater conservation of GRSG priority and GHMA. These habitats comprise >75 percent of the 430,870 acres of sagebrush habitat on the BT. This alternative will maintain and protect deer winter and transition habitat quantity and quality across the BT National Forest more than other alternatives. However, the limitation on prescribed burning could have negative impacts over time.

Effects on Mule Deer Population Trend

The mule deer population trend on the BT is stable. Maintenance and protection of >75 percent of the winter and transition range on the BT will increase the probability that the population trend will remain stable.

Summary of Alternative C

This alternative limits loss and disturbance in priority and GHMA which is >75 percent of the forest-wide sagebrush habitat. There could be benefits to deer across much of this forest-wide habitat that could be observed in the forest-wide population trend compared to other alternatives. However, the limit on sagebrush treatment limits opportunities to improve winter and transition range and improve chances for winter survival. Generally, activities in the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the BT National Forest is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This relative abundance of deer mimics the status of deer populations Statewide. Full use of Alternative C conservation measures in GRSG habitat could have a noticeable benefit to the deer population trend.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to deer than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA and connectivity habitat will be allowed > 0.25 miles from the three known leks and any new leks on the BT. This is closer than the

disturbance allowed under the other alternatives except Alternative A. This disturbance would affect <1 percent of the forest-wide deer habitat. A few more deer could be disrupted or a little habitat lost.

There would be 5,955 acres of ROW exclusion areas in sagebrush habitat. New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures of Alternative D apply to GRSG priority core habitat. A few slight differences include that this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is <1 percent of forest-wide sagebrush habitat, these conservation measures would have a very small benefit to the forest-wide mule deer population.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a 3 percent disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. As an example, fluid mineral leasing would be closed on 2 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Therefore, these measures would benefit 5,593 acres of deer sagebrush habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. The lack of conservation measures in sagebrush outside of priority core habitat could lead to increased disturbance, loss of habitat, degradation of habitat, and reduced winter survival.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow WGFD Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a “disturbance” contributing toward the 9 percent threshold. Also, treatment is permitted in GRSG breeding, nesting, and winter range. Results should include regenerating shrub stands for mule deer, benefitting survival of individuals. However, treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and reduce forage production.

Cumulative Effects for Five Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There

could be additional effects from past, present, and reasonably foreseeable future projects. Deer habitat includes the entire BT where vegetation management in timber and aspen stands creates more foraging habitat. Deer habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in deer habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Mule Deer Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels, then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG which is also mule deer winter and transition range. Range conservation measures in Alternative D apply only to priority or priority core habitat which is <1 percent of mule deer sagebrush habitat on the BT. Therefore, sagebrush habitat quality could be reduced on the majority of mule deer sagebrush habitat. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of GRSG priority and generalhabitat subject only to a 9 percent disturbance limit in priority core habitat. This alternative will allow substantial loss or degradation of mule deer habitat compared to Alternatives B, C, and E.

Effects on Mule Deer Population Trend

The mule deer trend on the BT is stable. This population trend mimics the current lack of substantial change to sagebrush habitat across the BT. As mentioned, however, Alternative D allows substantial change to sagebrush habitat. Therefore, this alternative would allow sufficient habitat change to reduce the probability that the forest-wide population trend would remain stable.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional shrub treatments. Conversion to early successional shrub stands with fuels treatments would benefit deer forage quality and diversity. However, limited conservation in the other four resource areas could allow substantial changes in deer habitat quantity, quality, and ownership in sagebrush habitat on the BT. Still, this alternative prevents more disturbance in these four areas than Alternative A.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the BT is stable. It appears that existing sagebrush habitat conditions with proposed conservation

measures can sustain this population. This relative abundance of deer mimics the status of deer populations Statewide. Full use of development opportunities in sagebrush areas not conserved by Alternative D would lead to a decline in sagebrush habitat which would reduce the probability that the forest-wide population trend would remain stable.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs (>100,000 acres). Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat loss or degradation, and less disruption of wintering or parturition in sagebrush habitat compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of mule deer sagebrush habitat could be lost, degraded, or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 3,283 acres of ROW exclusion areas in sagebrush habitat. Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on mule deer in sagebrush habitat, predominantly PHMA and SFAs, would be reduced compared to Alternatives A and D, but would be greater than impacts on sagebrush habitat in Alternatives B and C.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush habitat quality for mule deer. There could be areas of improved foraging for mule deer.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands <200 acres. Potential adverse effects on sagebrush habitat from this exception could include habitat fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, none in SFAs, and not as much within GHMA. Alternative C would apply to PHMA and, most often, to GHMA promoting sagebrush habitat quality for mule deer more than other alternatives.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs. Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. Fluid mineral leases would be closed on 3,263 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GH during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities such as dams and impoundments will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA, SFAs, and often GHMA, would provide benefits to mule deer by retaining shrub forage and reducing disturbance. The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit, compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternatives B and C are generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs.

Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D considering a no disturbance limit and a 9 percent disturbance limit for these alternatives, respectively. There are more treatment opportunities than Alternatives B and C. Sagebrush

treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in priority and GHMA. More mature sagebrush habitat would be maintained, but regeneration of older, decadent stands would be more limited in the long-term.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Deer habitat includes the entire BT where vegetation management in timber and aspen stands creates more foraging habitat. Deer habitat also occurs on private, State, and BLM-administered land adjacent to the Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in deer habitat off the BT. However, anthropogenic disturbances >5 percent on all ownerships in PHMA and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Mule Deer Habitat Trend

This alternative promotes greater conservation of GRSG PHMA, SFAs and often, GHMA. These habitats comprise >60 percent of the 430,870 acres of sagebrush habitat on the BT. This alternative will maintain and protect deer winter and transition habitat quantity and quality across the BT more than other alternatives except Alternative C. However, the limitation on prescribed burning in PHMA could have negative impacts over time. Still, overall benefits would be small in relation to the >3,000,000 acres of habitat available to mule deer across the BT.

Effects on Mule Deer Population Trend

The mule deer population trend on the BT is stable. Maintenance and protection of >60 percent of the winter and transition range on the BT will increase the probability that the population trend will remain stable as long as significant changes do not occur in the remaining 40 percent of sagebrush habitat on the BT.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance in PHMA and SFAs will cause some loss of sagebrush habitat for mule deer. This alternative also limits disturbing activities in PHMA and, often GHMA. In total, there are >330,000 acres of PHMA, SFAs, and GHMA on the BT National Forest. There would be less loss or fragmentation of mature sagebrush habitat for mule deer. Generally, other activities in GHMA and all activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. These activities could affect about 70 percent of the mule deer sagebrush habitat on the BT National Forest. Overall, effects of the Proposed Plan Amendment would be less impacting to the mule

deer forest-wide population than Alternatives A and D. Impacts would be more pronounced than Alternatives B and C.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the BT National Forest is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This relative abundance of deer mimics the status of deer populations Statewide. Full use of the Proposed Plan Amendment conservation measures in PHMA, SFAs, and in some cases GHMA, would have a small but noticeable impact on the deer population trend since deer occur across all habitats on the BT and the conservation measures are limited to the described habitats.

Moose (*Alces alces shiras*)

Distribution

Moose is a MIS for the BT that overlaps with some GRSG habitat on the National Forest. Moose are common throughout northern states that include boreal forest.

Habitat Associations and Threats

Nearly all of the BT is classified as some type of moose seasonal range. Vegetation types used by moose on the BT include aspen, many conifer types, several mountain shrubland types, big sagebrush, meadows, herblands, and tall forbs.

Some factors are documented by research show contributing to the decline in moose numbers include decline in habitat conditions, predation, human disturbance during winter, and disease (Forest Service 2009a). Typically habitat is the primary limiting factor of moose populations (Forest Service 2009a).

Population Status, Trend, and Relation to Habitat Trend

Annual moose harvest across Wyoming has declined consistently over the last 10 years. Harvest was 1,160 in 2002 but was as low as 460 in 2011 (WGDF 2011), indicating declining populations.

The BT includes five moose herds. The moose population for these herds has been trending downward since 1998, and the total population remains below State population objectives (Forest Service 2009a). The moose population trend on the Forest mimics statewide population declines.

Moose was selected as a MIS for the BT as a harvest species reflecting socioeconomic status. Moose use many habitat types; those overlapping with GRSG habitat are generally winter ranges comprised of sagebrush and aspen.

Some habitat conditions appear to be slowly declining. Aspen regeneration has been reduced, particularly around elk feedgrounds. Aspen distribution and stand vigor has declined due to aging stands and related conifer encroachment. Forest Service (2009a) suggests that lack of

disturbance is affecting the quality of this moose habitat. Winter recreation activity and other human activity on and off the BT and loss of willow habitat off the BT appears to have shifted moose habitat use in many areas to a much greater reliance on conifer forestland (Forest Service 2009). The large overrepresentation of late-seral and old-age classes limits browse production.

In contrast, willow and other riparian communities have improved due to improvements in grazing management compared to historic times. Livestock management and vegetation management on the BT can affect forage quality and quantity for moose. Retaining sufficient shrub, aspen, or willow production can benefit the moose population trend.

Forest-wide monitoring indicates that existing habitat conditions are contributing to the reduced moose population. Rangeland management practices have improved considerably in the last 50 years. However, the lack of natural or prescribed disturbance has created a higher proportion of older age class shrub stands and a decline in aspen vigor than occurred historically (Forest Service 2009a).

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA. There would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss and disturbance to moose. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in moose habitat. These can cause animal displacement, disruption of parturition, or reduced fitness in sagebrush habitat.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There are 2,107 acres of ROW exclusion areas in GRSG habitat. Some moose habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss or degradation for moose. Other impacts may include new infestations of noxious or invasive weeds. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance of moose.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT. Potential effects on moose habitat could include: site specific overgrazing; reduction in cover; structure; diversity of residual vegetation from consumption; and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include reduced fitness for winter survival. Forest Plan standards and guidelines for grazing management usually provide sufficient herbaceous forage and shrub cover and browse for moose across the BT. For example, the BT LRMP indicates that GRSG species' needs will be addressed in allotment management plans and range improvements, management activities, and trailing will be coordinated with and designed to help meet the needs of GRSG.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing including expansion of new leases. This alternative could allow a large amount of direct and indirect habitat loss and degradation of sagebrush habitat. For example, fluid mineral leases would be closed on 3,263 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). There would be greater negative effects from related noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Loss of habitat and greater disturbance could cause individual moose to have a reduced ability to survive winters.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Some moose habitat could be treated. Impacts could include regenerating younger, more palatable shrub stands and increasing herbaceous forage, benefitting survival of individuals. Forest Service (2009a) indicates "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions". Also, Forest Service (2009a) indicates that declining habitat conditions are a primary limiting factor for moose populations. Results from shrub treatment could benefit individual survival. There could also be increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Moose habitat includes the entire BT where vegetation management in timber and aspen stands can create more quality moose habitat. Appropriate grazing management also provides important healthy willow and aspen stands for moose. Moose habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing

conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in moose habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Moose Habitat Trend

If currently allowable opportunities were fully pursued in: recreation and travel; lands and realty; range; energy and minerals; and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat; more early succession grass-dominated habitat more disturbances in sagebrush habitat; and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat which is also moose habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of GRSG habitat. Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact as moose habitat.

Effects on Moose Population Trend

The moose population trend on the BT is slowly declining. This trend mimics Statewide moose population trends. As mentioned, current LRMP guidance allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat for moose. Therefore, this alternative would allow habitat change to slightly reduce the probability that the forest-wide declining population trend would slow or stabilize.

Summary of Alternative A

Existing conservation measures for sagebrush habitat are limited so there is a potential for habitat alteration or loss and disturbance in this moose habitat. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance in sagebrush habitat. Regenerating shrub stands with fuels treatments would benefit moose. However, limited conservation in the other four resource areas could allow substantial changes in moose habitat quantity, quality, and ownership in sagebrush habitat on the BT.

Currently, existing Forest Plan guidance has been adequate to manage disturbances in GRSG habitat which overlaps with some spring/summer/fall moose habitat on the BT. In general, sagebrush shrubland is not a significant component of moose habitat. Substantial changes to sagebrush quantity have not occurred but the quality of more important moose habitats have declined (Forest Service 2009a). The moose population trend on the BT is declining, which mimics Statewide trends. Management of sagebrush habitat is not likely to change this decline. Full use of Alternative A conservation measures in GRSG habitat would have a small impact on individual moose, but not a population trend. Since moose occur across all habitats on the BT,

conservation measures are limited to GRSG habitat and most sagebrush is not important moose habitat.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A retaining more sagebrush habitat for moose across the BT. There would be less displacement or reduction of moose fitness in sagebrush habitat. Of course these benefits would occur on <1 percent of Forest-wide moose habitat, therefore, they would not be noticed in the population.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some moose habitat on the BT. There would be 5,955 acres of ROW exclusion areas in sagebrush habitat. These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits moose.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG. There are 5,933 acres of PHMA across the BT in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. These would benefit moose, especially in willow, other riparian, and aspen habitat. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A, except that Alternative B provides more restrictions that would protect moose habitat. GRSG PHMA accounts for less than 0.1 percent of the land cover of the BT so any changes would be localized. There could be small areas of improvement in aspen, willow, riparian, and sagebrush for moose.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Though there are only four known active leks and only

5,933 acres of PHMA on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for moose. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. Fluid mineral leases would be closed on 8,722 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). This alternative better conserves PHMA, and therefore some moose habitat than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration, and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would limit the regeneration of shrubs on the 5,593 acres of PHMA. This habitat could not be improved for moose foraging. Still, this is only 1 percent of the sagebrush habitat on the BT. Benefits to the moose population would be immeasurable.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Moose habitat includes the entire BT where vegetation management in timber and aspen stands can create more quality moose habitat. Appropriate grazing management also provides important healthy willow and aspen stands for moose. Moose habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from: recreation and travel; ROWs granted; energy and mineral development; and range management in moose habitat off the BT. These cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Moose Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <2 percent of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality for moose, the benefits would be small in relation to the >3,000,000 acres of habitat available to moose across the BT.

Effects on Moose Population Trend

The moose population trend on the BT is slowly declining. The population trend is not expected to improve as a result of improvements across <2 percent of sagebrush habitat across the BT.

Summary of Alternative B

This alternative limits disturbance in PHMA which is <1 percent of the forest-wide moose habitat. There could be benefits to individual moose, but these would be too small to affect the

forest-wide population trend. On the other hand, limits on sagebrush treatment will restrict regeneration of shrub stands in PHMA. Generally, activities in GHMA and the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>98 percent) sagebrush habitat on the BT National Forest. Therefore, overall impacts on the moose forest-wide population would be similar to Alternative A.

Substantial changes to sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of moose habitat. The moose population trend on the BT is declining but appears to be related to the reduced quality of more important habitats and other factors (Forest Service 2009a). This population trend mimics Statewide trends. Management of sagebrush habitat is not likely to change this decline. Full use of Alternative B conservation measures in GRSG habitat would have a small impact on individual moose, but not population trend since moose occur across all habitats on the BT conservation measures are limited to GRSG habitat and most sagebrush is not important moose habitat.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to moose and their sagebrush habitat than other alternatives. Conservation measures would generally be applied to GHMA in addition to PHMA. Therefore, these measures would benefit greater than 322,000 more acres of moose habitat than other alternatives. New road construction is prohibited within four miles of active GRSG leks, and it is avoided in priority and GHMA. Existing road management would be designed to maintain or improve both priority and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among alternatives. Habitat loss and disturbance would be reduced on +8 percent of the forest-wide moose habitat. There would be less disruption in spring/summer/fall habitat and improved chances of winter survival for individuals.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for moose sagebrush habitat. Priority and GHMA would be managed as an exclusion area for new ROW projects. This is >60 percent of forest-wide sagebrush habitat. Alternative C would encourage consolidation and acquisition of all designated habitat limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

There are 5,933 acres of PHMA across the Forest Service units in this alternative. The prohibition of livestock grazing in PHMA would retain the most browse in willow communities and aspen and herbaceous forage to support moose on spring/summer/fall ranges. This result would provide the greatest opportunity among Alternatives for improved moose fitness. Still,

PHMA is <1 percent of forest-wide moose habitat; benefits would occur to individuals and not be noticed across the population.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to moose and their habitat than other alternatives. Conservation measures would be applied to PGH in addition to PHMA. Therefore, these measures would benefit greater than 300,000 more acres of moose sagebrush habitat than other alternatives. Fluid mineral leases would be closed on 315,582 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within priority (5,933 acres) and GHMA (324,243 acres). Priority and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and it would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss and disturbance would be reduced on +8 percent of the forest-wide moose habitat. There could be noticeably reduced disruption on spring/summer/fall ranges, possibly leading to improved winter survival of individuals.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA. This would limit the regeneration of shrubs across >300,000 acres of sagebrush. This habitat could not be improved for moose foraging. This is >75 percent of the sagebrush habitat on the BT.

Lack of sagebrush treatment would be detrimental to moose over the long-term. Additional information from forest-wide monitoring (Forest Service 2009) indicates that “the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions.” This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Moose habitat includes the entire BT where vegetation management in timber and aspen stands can create more quality moose habitat. Appropriate grazing management also provides important healthy willow and aspen stands for moose. Moose habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted,

energy and mineral development, and range management in moose habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Moose Habitat Trend

This alternative promotes greater conservation of GRSG priority and GHMA. These habitats constitute >75 percent of the 430,870 acres of sagebrush habitat on the BT National Forest. This alternative will maintain more habitat quantity and improve more habitat quality for moose compared to other alternatives. However, the limitation on prescribed burning could have negative impacts over time.

Effects on Moose Population Trend

The moose population trend on the BT is slowly declining. Maintenance and protection of >75 percent of the winter and transition range on the BT will slightly increase the probability that the population trend improve if other conditions also improve.

Summary of Alternative C

This alternative limits loss and disturbance in priority and GHMA which is >75 percent of the forest-wide sagebrush habitat. There could be benefits to individual moose. On the other hand, limits on sagebrush treatment will prohibit regeneration of shrub stands. Generally, activities in the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows.

Substantial changes to sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of moose habitat. The moose population trend on the BT National Forest is declining, but it appears to be related to the reduced quality of more important habitats and other factors (Forest Service 2009a). The moose population trend on the BT National Forest mimics Statewide trends. Management of sagebrush habitat is not likely to substantially alter this trend. Full use of Alternative C conservation measures in GRSG habitat would have a small impact on individual moose, but limited benefit to the population trend. Since moose occur across all habitats on the BT, conservation measures are limited to GRSG habitat and most sagebrush is not important moose habitat.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential

changes in sagebrush habitat not covered by conservation measures would be very similar to, but slightly less detrimental to moose than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA and connectivity habitat will be allowed > 0.25 miles from the four known leks and any new leks on the BT. This is closer than the disturbance allowed under the other alternatives except Alternative A. This disturbance would affect <1 percent of the forest-wide moose habitat. A few more moose could be disrupted or a little habitat lost.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures for Alternative D apply to priority core habitat. A few slight differences include that this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is 1 percent of forest-wide sagebrush habitat, these conservation measures would have a very small benefit to individual moose.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. Therefore, these measures would benefit 5,593 acres of moose sagebrush habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. For example, fluid mineral leasing would be closed on 2 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). This alternative better conserves priority core habitat and, therefore, moose habitat than Alternative A.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow WGFD Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a “disturbance” contributing toward the 9 percent threshold. Also, treatment is permitted in GRSG breeding, nesting, and winter range. Impacts could include regenerating shrub stands for moose somewhat benefitting survival of individuals. However, treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of herbaceous forage production.

Cumulative Effects for Five Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. Moose habitat includes the entire BT where vegetation management in timber and aspen stands can create more quality moose habitat. Appropriate grazing management also provides important healthy willow and aspen stands for moose. Moose habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in moose habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Moose Habitat Trend

If currently allowable opportunities were fully pursued in: recreation and travel; lands and realty; range; energy and minerals; and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat which is also moose habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of GRSG habitat. Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact as a small portion of forest-wide moose habitat.

Effects on Moose Population Trend

The moose population trend on the BT is slowly declining. This trend mimics statewide moose population trends. As mentioned, however, Alternative D allows substantial change to sagebrush habitat. Therefore, this alternative would allow sufficient habitat change to slightly reduce the probability that the forest-wide declining population trend would slow or stabilize.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional shrub treatments. Conversion to early successional shrub stands with fuels treatments would benefit moose forage quality and diversity. However, limited conservation in the other four resource areas could allow substantial changes in moose habitat quantity, quality, and ownership in sagebrush habitat on the BT. Still, this alternative prevents more disturbances in these four areas than Alternative A.

Substantial changes to sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of moose habitat. The moose population trend on the BT is declining, but it appears to be related to the reduced quality of more important habitats and other factors (Forest Service 2009). The population decline mimics Statewide trends. Management of sagebrush habitat is not likely to substantially alter this trend. Full use of Alternative D conservation measures in GRSG habitat would have a small impact on individual moose, but limited benefit to the population trend. Since moose occur across all habitats on the BT, conservation measures are limited to GRSG habitat and most sagebrush is not important moose habitat.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs. These habitats are >97,000 acres. Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat loss or degradation and less disruption during spring/summer/fall compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. A small amount of moose habitat in sagebrush could be lost, degraded, or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. The Proposed Plan Amendment includes >100,000 acres as PHMA and SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors; power lines >0.6 miles from occupied leks in PHMA and SFAs; and some special uses. There would be 3,283 acres of ROW exclusion areas in GRSG sagebrush habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on moose and sagebrush habitat would be reduced compared to Alternatives A and D and they would be greater than impacts on sagebrush habitat in Alternative C. This alternative would retain about 90,000 acres

of sagebrush habitat with the 5 percent disturbance limit compared to 5,755 acres of PHMA retained in Alternative B with a 3 percent disturbance limit.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks (four known leks) and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve habitat quality for moose especially where willow or aspen are inclusions within sagebrush. There could be more small areas of improvement in aspen, willow, riparian, and sagebrush for moose.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands >200 acres. Potential adverse effects on sagebrush habitat from this exception could include habitat loss or degradation, or fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in PHMA and SFAs (>97,000 acres), and GHMA (>170,000 acres) more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA (5,933 acres); none in SFAs; and not as much within GHMA (324,243 acres). Alternative C would apply to 330,176 acres of combined PHMA and, most often, to GHMA promoting sagebrush habitat quality more than other alternatives.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs (>100,000 acres). Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. Fluid mineral leasing would be closed on 3,262 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures inside PHMA, SFAs, and often, GHMA (>330,000 combined acres) would provide benefits to moose by retaining aspen and willow inclusions within sagebrush stands and reducing disturbance. The conservation measures for this alternative maintain or

protect sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternative B is often more restrictive but covers fewer acres of sagebrush. Alternative C is generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs (>100,000 acres).

Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D considering a no disturbance limit and a 9 percent disturbance limit for these alternatives, respectively. There are more treatment opportunities than Alternatives B and C. Sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in in PHMA, SFAs, and GHMA.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Moose habitat includes the entire BT where vegetation management in timber and aspen stands can create more quality moose habitat. Appropriate grazing management also provides important healthy willow and aspen stands for moose. Moose habitat also occurs on private, State, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in moose habitat off the BT. However, anthropogenic disturbances >5 percent on all ownerships in PHMA and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Moose Habitat Trend

This alternative promotes conservation of GRSG PHMA, SFAs, and GHMA. These habitats constitute >75 percent of the 430,870 acres of sagebrush habitat on the BT. This alternative will maintain more habitat quantity and improve more habitat quality for moose compared to other alternatives except Alternative C. However, the limitation on prescribed burning could have negative impacts over time.

Effects on Moose Population Trend

The moose population trend on the BT is slowly declining. Maintenance and protection of >75 percent of the winter and transition range on the BT will increase the probability that the population trend will improve if other conditions also improve on the remainder of moose habitat.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance will enable some limited shrub treatments. This alternative also limits disturbing activities in PHMA and SFAs, and often, GHMA. In total, there are >330,000 acres of PHMA, SFAs, and GHMA on the BT in the Proposed Plan Amendment. There would be less loss or fragmentation of mature sagebrush habitat for moose forest-wide. Other activities in GHMA and all activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. These activities could affect about 80 percent of the moose habitat on the BT. Overall, effects would be less impacting to the moose forest-wide population than Alternatives A and D. Impacts would be more pronounced than alternative C. Alternative B includes greater habitat protection in many cases but addresses a smaller area.

Substantial changes to sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of moose habitat. The moose population trend on the BT National Forest is declining, but it appears to be related to the reduced quality of more important habitats and other factors (Forest Service 2009). The population decline mimics statewide trends. Management of sagebrush habitat is not likely to substantially alter this trend. Full use of the Proposed Plan Amendment conservation measures in GRSG habitat would have a small impact on individual moose, but a limited benefit to the population trend. Since moose occur across all habitats on the BT, conservation measures are usually limited to PHMA and SFAs and sagebrush is often not important moose habitat.

Pronghorn antelope (*Antilocapra americana*)

Distribution

Pronghorn antelope is a MIS for the BT that overlaps with GRSG habitat on the National Forest. Pronghorn are common throughout the western states where sagebrush shrublands occur.

Habitat Associations and Threats

Pronghorn antelope use sagebrush and grassland habitats in Wyoming and only a small portion of the lower elevation habitat on the BT is considered pronghorn antelope habitat on both sides of the Green River basin and into the Gros Ventre River drainage (Forest Service 2009a). They also use riparian and other meadows within the sagebrush/grassland matrix as well as more limited use of short-stature mountain shrublands, open conifer forestland, and open aspen stands where there is high visibility.

Threats include loss of habitat to energy development and the contraction of obstacles constructed within migration corridors. Intensive development in the Jonah, Pinedale Anticline, and proposed expansion to the south of these areas in the Normally Pressurized Lance project area could potentially remove large areas from being useable by pronghorn (WGFD 2010).

Population Status, Trend, and Relation to Habitat

Annual Statewide pronghorn harvest has steadily increased over the last 10 years (WGFD 2011) reflecting more liberal harvest strategies aimed at maintaining or reducing animal numbers toward population objectives and habitat capability. Harvest was 30,260 in 2002 and has risen to 55,525 in 2011.

The BT includes portions of two pronghorn herds. The population trend for these two herds has generally been stable and is near the State population objective (Forest Service 2009a, 2009b). The BT population trend mimics the abundance of pronghorn Statewide.

Pronghorn were selected as a MIS for the BT as a harvest species reflecting socioeconomic status. Pronghorn rely on sagebrush shrublands. These overlap with GRSG habitat.

Livestock and vegetation management on the BT can affect forage quality and quantity for pronghorn. Retaining insufficient shrub or herbaceous production can negatively affect the pronghorn population trend. Rangeland management practices have improved considerably in the last 50 years and little sagebrush shrubland on the BT has been permanently lost.

Some habitat conditions appear to be declining. There is an overrepresentation of late-seral shrublands on the BT (Forest Service 2009) which limits nutritional quality to pronghorn. In addition to greatly increased fire-return intervals, heavy browsing by native ungulates has contributed to this. The amount of habitat off the BT is declining due to energy development and housing development.

Forest-wide monitoring indicates that existing habitat conditions are sustaining the pronghorn population. Available population and habitat information suggests pronghorn on the BT have a population trend that is generally stable.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA and there would be no density or disturbance limit for acres of sagebrush habitat

lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss and disturbance to pronghorn. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in pronghorn habitat. These can cause animal displacement or reduced fitness for parturition or wintering in sagebrush habitat.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 2,107 acres of ROW exclusion areas in GRSG habitat. Some pronghorn habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss or degradation for pronghorn. Other impacts may include new infestations of noxious or invasive weeds. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance of pronghorn.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT. Potential effects on pronghorn habitat could include site specific overgrazing, reduction in cover, structure, and diversity of residual vegetation from consumption, and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include reduced fitness for parturition or winter survival. Forest Plan standards and guidelines for grazing management usually provide sufficient herbaceous and browse forage for pronghorn across the BT. For example, the BT LRMP indicates that GRSG species' needs will be addressed in allotment management plans and range improvements, management activities, and trailing will be coordinated and designed to help meet the needs of GRSG.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing including expansion of new leases. This alternative could allow a large amount of direct and indirect habitat loss and degradation of sagebrush habitat. For example, fluid mineral leasing would be closed on 3,263 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). There would be greater negative effects from related noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Loss of habitat and greater disturbance could cause pronghorn to have reduced ability to survive winters and reduced reproductive abilities.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Much pronghorn habitat could be treated. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Impacts could include regenerating younger, more palatable shrub stands, benefitting survival of individuals. Forest Service (2009a) indicates "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions". Results could benefit individual survival. There could also be increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Pronghorn habitat includes all sagebrush on the BT, more than 430,000 acres. Pronghorn habitat also occurs on private, State, and BLM-administered land adjacent to the BT National Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in pronghorn habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Pronghorn Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of sagebrush habitat. Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact.

Effects on Pronghorn Population Trend

The pronghorn population trend on the BT is stable. This stable population trend mimics the current lack of substantial change to sagebrush habitat across the BT. As mentioned, current LRMP guidance allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat for pronghorn. Therefore, this alternative would allow sufficient habitat change to reduce the probability that the forest-wide population trend would remain stable.

Summary of Alternative A

Existing conservation measures for sagebrush habitat are limited so there is a potential for habitat alteration or loss and disturbance in this pronghorn habitat. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance in sagebrush habitat. Regenerating shrub stands with fuels treatments would benefit pronghorn in the long-term. However, limited conservation in the other four resource areas could allow substantial changes in pronghorn habitat quantity, quality, and ownership in sagebrush habitat on the BT National Forest.

Currently, existing Forest Plan guidance has been adequate to manage disturbances in GRSG habitat which overlaps with pronghorn habitat on the BT National Forest. Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the BT National Forest is stable. It appears that current sagebrush habitat conditions can sustain this population. This abundance of pronghorn mimics the status of pronghorn populations Statewide. Full use of Alternative A development opportunities in sagebrush would lead to a decline in sagebrush habitat which could cause a decline in the BT National Forest pronghorn population trend.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A retaining more habitat for pronghorn across the BT. There would be less displacement, disruption, or reduced pronghorn fitness in sagebrush habitat. Of course, these benefits would occur on <1 percent of Forest-wide pronghorn habitat; so they would not be reflected in the population trend.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some pronghorn habitat on the BT. There would be 5,955 acres of ROW exclusion areas in sagebrush habitat. These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits pronghorn.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG; therefore, favor pronghorn sagebrush habitat quality. There are 5,933 acres of PHMA across the BT in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A, except that Alternative B provides more restrictions that would protect pronghorn habitat. GRSG PHMA accounts for only 1 percent of the sagebrush cover on the BT, so any changes would be localized. There could be small improved areas of productive herbaceous and browse foraging for pronghorn.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Though there are only four known active leks and only 5,933 acres of PHMA on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for pronghorn. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat.

Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. Fluid mineral leasing would be reduced to 8,722 acres compared to Alternative A (Appendix 1). This alternative better conserves the 5,933 acres of PHMA and, therefore, pronghorn habitat than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration, and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would limit the regeneration of shrubs on the 5,933 acres of PHMA. This habitat could not be improved for pronghorn foraging. Still, this is only 1 percent of the sagebrush habitat on the BT. Impacts on the pronghorn population would be small to immeasurable.

Additional information from forest-wide monitoring (Forest Service 2009) indicates that “the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions.” This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Pronghorn habitat includes all sagebrush on the BT, more than 430,000 acres. Pronghorn habitat also occurs on private, state, and BLM-administered land

adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in pronghorn habitat off the BT. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Pronghorn Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <2 percent of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality for pronghorn, the benefits would be small in relation to the amount of habitat available across the BT.

Effects on Pronghorn Population Trend

The pronghorn population trend on the BT is stable. The population trend is not expected to change substantially as a result of improvements across <2 percent of sagebrush habitat across the BT.

Summary of Alternative B

This alternative limits disturbance in PHMA which is <2 percent of the forest-wide pronghorn habitat. There could be benefits to individuals, but these would likely be too small to affect the forest-wide population trend. Generally, activities in GHMA and the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>95 percent) sagebrush habitat on the BT National Forest. Therefore, overall impacts on the forest-wide population would be generally similar to Alternative A.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the BT is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This abundance of pronghorn mimics the status of pronghorn populations statewide. Full use of Alternative B conservation measures in GRSG habitat would have a small impact on the pronghorn population trend since pronghorn occur across all sagebrush on the BT and the conservation measures are generally limited to PHMA.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to pronghorn and their sagebrush habitat than other alternatives. Conservation measures would be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 300,000 more acres of pronghorn habitat than other alternatives. New road construction is prohibited within 4 miles of active GRSG leks, and avoided in priority and GHMA. Existing road management would be designed to maintain or improve both priority and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among alternatives. Habitat loss and disturbance would be reduced on >75 percent of the forest-wide pronghorn habitat. There would be less disruption of wintering and parturition and improved chances of winter survival.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for pronghorn sagebrush habitat. Priority and GHMA would be managed as an exclusion area for new ROW projects. This is much of the forest-wide sagebrush habitat. Alternative C would encourage consolidation and acquisition of GRSG habitat, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

There are 5,933 acres of PHMA across the BT in this alternative. The prohibition of livestock grazing in PHMA would retain the most herbaceous forage to support pronghorn. This result would provide the greatest opportunity among alternatives for improved pronghorn fitness. Still, PHMA is <1 percent of forest-wide pronghorn habitat and benefits would occur to individuals and not be reflected in the population trend.

Energy and Minerals Direct and Indirect Effects

Conservation measures would be more beneficial to pronghorn and their habitat than other alternatives. Many conservation measures would be applied to GHMA in addition to PHMA. Therefore, these measures would benefit greater than 260,000 more acres of pronghorn sagebrush habitat than other alternatives. For example, fluid mineral leases would be closed on 315,583 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within priority (5,933 acres) and GHMA (324,243 acres). Priority and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and it would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing and winter habitats during their season of use by

GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss and disturbance would be reduced on much of the forest-wide pronghorn habitat. There could be noticeably reduced disruption possibly leading to improved winter survival or reproductive ability.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA promoting the conservation of mature sagebrush habitat. Sagebrush canopy cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GHMA would be avoided in <12 inch precipitation zone. These measures would limit the regeneration of shrubs across >300,000 acres of sagebrush.

Lack of sagebrush treatment would be detrimental to pronghorn over the long-term. Additional information from forest-wide monitoring (Forest Service 2009) indicates that "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions." This alternative would perpetuate this condition.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Pronghorn habitat includes all sagebrush on the BT, more than 430,000 acres. Pronghorn habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in pronghorn habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Pronghorn Habitat Trend

This alternative promotes greater conservation of GRSG priority and GHMA. These habitats comprise much of the 430,870 acres of pronghorn habitat on the BT. This alternative will maintain and improve habitat quantity and quality across the BT for Brewer's sparrow more than other alternatives. However, the limitation on prescribed burning could have negative impacts over time.

Effects on Pronghorn Population Trend

The population trend on the BT National Forest is stable. Maintenance and protection of much of the sagebrush habitat on the BT National Forest will increase the probability that the population trend will remain stable.

Summary of Alternative C

This alternative limits loss, fragmentation, and disturbance in priority and GHMA. There could be benefits to pronghorn across much of this forest-wide habitat that could be observed in the forest-wide population trend compared to other alternatives. However, the limit on sagebrush treatment limits opportunities to improve habitat conditions over time. Generally, activities in the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the BT National Forest is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This abundance of pronghorn mimics the status of pronghorn populations statewide. Full use of Alternative C conservation measures in GRSG habitat could have a noticeable effect on the pronghorn population trend since measures would affect much of the BT's sagebrush habitat.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to pronghorn than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA and connectivity habitat will be allowed > 0.25 miles from the four known leks and any new leks on the BT. This is closer than the disturbance allowed under the other alternatives except Alternative A. This disturbance would affect <1 percent of the forest-wide pronghorn habitat. A few more pronghorn could be disrupted or a little habitat lost.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures of

Alternative D apply to priority core habitat. A few slight differences include this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is 1 percent of forest-wide sagebrush habitat, these conservation measures would have a very small benefit to the forest-wide population.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. Fluid mineral leasing would be closed on 2 acres of federal surface and federal mineral leases compared to Alternative A (Appendix 1). Conservation measures would benefit 5,593 acres of pronghorn sagebrush habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PHMA and, therefore, pronghorn habitat than Alternative A.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow WGFD Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a "disturbance" contributing toward the 9 percent threshold. Treatment is permitted in GRSG breeding, nesting, and winter range. Impacts could include regenerating shrub stands for pronghorn, benefitting survival of individuals over the long-term. However, treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of cover. These limited conservation measures in PHMA and the lack of measures in the remainder of sagebrush habitat would have detrimental impacts on pronghorn compared to Alternatives B, C, and E.

Cumulative Effects for 5 Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. Pronghorn habitat includes all sagebrush on the BT, more than 430,000 acres. Pronghorn habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in pronghorn habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Pronghorn Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat. Range conservation measures in Alternative D apply only to priority or priority core habitat, which is 1 percent of pronghorn habitat on the BT. Therefore, sagebrush habitat quality could be reduced on the majority of pronghorn habitat. Likewise, oil, gas, and geothermal development can be permitted with stipulations on >300,000 acres of GRSG habitat subject only to a 9 percent disturbance limit in priority core habitat. This alternative will allow substantial loss or degradation of pronghorn habitat compared to Alternatives B, C, and E.

Effects on Pronghorn Population Trend

The pronghorn population trend on the BT is stable. This population trend mimics the current lack of substantial change to sagebrush habitat across the BT. However, Alternative D allows a substantial change to sagebrush habitat. Therefore, this alternative would allow sufficient habitat change to reduce the probability that the forest-wide population trend would remain stable.

Summary of Alternative D

This alternative is most similar to Alternative A. However, this alternative includes a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional shrub treatments. Conversion to early successional shrub stands with fuels treatments would benefit pronghorn forage quality and diversity over the long-term. However, limited conservation in the other four resource areas could allow substantial changes in pronghorn habitat quantity, quality, and ownership in sagebrush habitat on the BT. Still, this alternative prevents more disturbance in these four areas than Alternative A.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the BT is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This abundance of pronghorn mimics the status of pronghorn populations statewide. Full use of development opportunities in sagebrush areas not conserved by Alternative D would lead to a decline in sagebrush habitat which would reduce the probability that the forest-wide population trend would remain stable.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs. These comprise >100,000 acres. Similarly,

secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat loss or degradation and less disturbance in sagebrush habitat compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of pronghorn habitat could be lost, degraded, or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. The Proposed Plan Amendment includes >97,000 acres as PHMA and SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 3,283 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on pronghorn sagebrush habitat, predominantly PHMA and SFAs, would be reduced compared to Alternatives A and D and would be greater than impacts on sagebrush habitat in Alternative C. This alternative would retain about 90,000 acres of sagebrush habitat with the 5 percent disturbance limit compared to 5,755 acres of PHMA retained in Alternative B with a 3 percent disturbance limit.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks (four known leks) and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush habitat quality for pronghorn. There could be areas of improved foraging for pronghorn.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands <200 acres. Potential adverse effects on sagebrush habitat from this exception could include habitat loss or degradation, or fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in PHMA and SFAs (>97,000 acres), and GHMA (>170,000 acres) more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA, but not as much within GHMA (5,933

acres), none in SFAs, and not as much within GHMA (324,243 acres). Alternative C would apply to 330,176 acres of combined PHMA and most often to GHMA.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs (>100,000 acres). Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. Fluid mineral leases would be closed on 3,262 acres of federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA, SFAs, and often GHMA (>330,000 combined acres) would provide benefits to pronghorn by retaining shrub forage and reducing disturbance. The conservation measures for this alternative maintain or protect sagebrush habitat in in PHMA, SFAs, and GHMA more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternative B is often more restrictive, but covers fewer acres of sagebrush. Alternative C is generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs, and most often, in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs (>100,000 acres).

Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D, considering a no disturbance limit and a 9 percent disturbance limit for these alternatives, respectively. There are more treatment opportunities than Alternatives B and C. Sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in PHMA, SFAs, and GHMA. More mature sagebrush habitat would be maintained, but regeneration of older, decadent stands would be more limited.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Pronghorn habitat includes all sagebrush on the BT, more than 430,000 acres. Pronghorn habitat also occurs on private, state, and BLM-administered land adjacent to the BT National Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in pronghorn habitat off the BT. However, anthropogenic disturbances >5 percent on all ownerships in PHMA and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Pronghorn Habitat Trend

This alternative promotes greater conservation of GRSG PHMA, SFAs and often, GHMA. These habitats comprise much of the 430,870 acres of sagebrush habitat, pronghorn habitat, on the BT. This alternative will maintain and improve habitat quantity and quality across the BT for pronghorn more than other alternatives except Alternative C.

Effects on Pronghorn Population Trend

The population trend on the BT is stable. The population trend could remain stable or increase with conservation measures on much of the sagebrush habitat if substantial habitat loss or degradation does not occur on the remaining portion of forest-wide habitat that will not benefit from the proposed conservation measures.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance will cause some loss of sagebrush habitat for pronghorn. This alternative also limits disturbing activities in PHMA and SFAs and often GHMA management areas. In total, there are >330,000 acres of combined PHMA, SFAs, and GHMA on the BT National Forest. There would be less loss or fragmentation of mature sagebrush habitat for pronghorn. Generally, other activities in GHMA management areas and all activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. These activities could affect a substantial amount of the pronghorn habitat on the BT National Forest. Overall, effects of the Proposed Plan Amendment would be less impacting to the pronghorn forest-wide population than Alternatives A and D. Impacts would be more pronounced than Alternative C. Alternative B includes greater habitat protection in many cases, but addresses a smaller area.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the BT is stable. It appears that existing sagebrush habitat conditions with proposed conservation measures can sustain this population. This relative abundance of pronghorn mimics the status of pronghorn populations statewide. Full use of the Proposed Plan Amendment

conservation measures in GRSG habitat could have a noticeable effect on the pronghorn population trend since the conservation measures affect much of the available habitat.

Boreal toad (*Anaxyrus boreas boreas*)

Distribution

The boreal toad is a R2 and R4 Sensitive Species and a MIS for the BT. Boreal toads overlap with some GRSG habitat on the BT. Boreal toads occur from northern New Mexico to Alaska, including the Rocky Mountains and west to the west to the Pacific Coast. In Wyoming, its range is restricted to mountains and foothills and relatively moist conditions, ranging in elevation from about 6,500 to 12,000 feet (WGFD 2005).

Habitat Associations and Threats

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. Breeding occurs in: ponds, slow streams, river backwater channels, and along lake edges. They require three main habitat components: 1) shallow wetlands for breeding, 2) terrestrial habitats with vegetative cover for foraging, and 3) burrows for winter hibernation (Loeffler 2001). Adults can move to drier terrestrial habitat after breeding. 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 (Keinath and McGee 2005). Any activity that alters mountain wetland habitats can affect boreal toad populations. The primary threat is considered to be chytrid fungus (Keinath and McGee 2005).

Population Status, Trend, and Relation to Habitat

Boreal toads were formerly widespread and common, but have declined dramatically in the last three decades in many portions of its extensive range in western North America (Carey 1993; Corn 1994; Keinath and McGee 2005). It is a species of concern in Wyoming. “Boreal toad populations appear to be in a state of severe decline.” (WGFD 2005).

Currently, boreal toads appear to be rare to uncommon on the BT. In 2005, five boreal toad breeding sites were selected as monitor sites based on information in Patla (2002). Three sites were located between the Buffalo and Jackson Ranger Districts, and two sites in the Big Piney/Pinedale Districts. In the first year of monitoring, evidence of breeding was only observed at one site (Buffalo Ranger District). The other sites were flooded out or somehow changed when the surveys took place.

In 2006, the boreal toad sites were revisited and breeding toads were found only at the Blackrock site. Adults were observed, but not young, at the Pinedale sites due to the time of year the

monitoring took place and, therefore, we were unable to confirm breeding. New boreal toad observations were made on the Greys River and Kemmerer Ranger Districts, but they were not observed at a time to indicate breeding. The scarcity of breeding sites on the BT mimics the state conclusion that populations appear to be in a state of decline.

Boreal toad was selected as a MIS for the BT to reflect the condition of wetlands. Boreal toad adults can also use upland shrublands after breeding that overlap with some GRSG habitat.

Across the BT, condition of riparian areas and wetlands is variable. A BT assessment concluded the risk to be "high trending toward moderate," meaning that functionality is still reduced in many riparian areas but many riparian areas are fully functioning, especially those at higher elevations not associated with roads.

In addition, upland and riparian communities have improved due to improvements in grazing management compared to historic times. Livestock management and vegetation management on the BT can affect herbaceous cover for boreal toads. Retaining sufficient shrub and herbaceous cover in upland and riparian habitats can benefit the boreal toad population trend.

Forest-wide monitoring suggests that existing habitat conditions might be contributing to the uncommon occurrence of boreal toads on the BT. While improving, some riparian conditions are still functionally reduced. On the other hand, rangeland management practices have improved considerably in the last 50 years and upland habitat, which overlaps with GRSG habitat, has improved. The impact of chytrid fungus, a primary population threat (Keinath and McGee (2005), is unknown.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA and there would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of habitat loss and disturbance to boreal toad. Less restrictive recreation travel usually means higher concentrations of human use adjacent to motorized routes and in boreal toad habitat. These can cause animal displacement, disrupt seasonal movement, or reduced individual fitness in sagebrush habitat.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 2,107 acres of ROW exclusion areas in GRSG habitat. Some boreal toad habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in habitat loss or degradation for boreal toad. Other impacts may include new infestations of noxious or invasive weeds. Though most projects would attempt to mitigate or minimize impacts, there could be loss or degradation of habitat or disturbance of boreal toads.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT. Potential effects on boreal toad habitat could include: site specific overgrazing, reduction in cover, structure, and diversity of residual vegetation from consumption, and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts could include reduced fitness for individuals. Forest Plan standards and guidelines for grazing management usually provide sufficient herbaceous and shrub cover for boreal toads across the BT. For example, the BT LRMP indicates that GRSG species' needs will be addressed in allotment management plans and range improvements, management activities, and trailing will be coordinated with and designed to help meet the needs of GRSG.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing, including expansion of new leases. As such, this alternative could allow a large amount of direct and indirect habitat loss and degradation of sagebrush habitat. For example, fluid mineral leasing would be closed on only 3,263 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). There would be greater negative effects from related noise, increased presence of roads/humans, and anthropogenic structures in an otherwise open landscape. Loss of habitat and greater disturbance could cause a few individual boreal toads to have a reduced fitness.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. A small amount of adult toad habitat could be treated. The primary impact would be the loss of cover, making sites to dry to maintain body moisture or thermoregulate. This sagebrush habitat would be unsuitable to boreal toads. Results from shrub treatment would be detrimental to individual survival. There could also be increasing nonnative or exotic grasses

or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Boreal toad habitat includes wetland and riparian and forested cover types where grazing management and vegetation management in timber and aspen stands can reduce cover that leads to habitat becoming unsuitable. Appropriate grazing management provides important healthy willow and aspen stands for boreal toad. A small amount of adult toad habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. However, cumulatively there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in boreal toad habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Boreal Toad Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development limitations are small compared to other alternatives (Appendix 1). Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact.

Effects on Boreal Toad Population Trend

The population trend on the BT is believed to be declining. This population trend mimics statewide trends. As mentioned, however, current LRMP guidance allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat that overlaps with boreal toad habitat. Therefore, this alternative would allow sufficient habitat change to slightly reduce the probability that the forest-wide population trend would slow or stabilize.

Summary of Alternative A

The overwhelming majority of boreal toad habitat does not occur in sagebrush. However, existing conservation measures for sagebrush habitat are limited, so there is a potential for small habitat alterations or loss and disturbance in adult boreal toad habitat. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance in

sagebrush habitat. Regenerating shrub stands with fuels treatments would eliminate boreal toad habitat. Limited conservation in the other four resource areas could allow substantial changes in boreal toad habitat quantity and quality in the small amount of boreal toad sagebrush habitat.

Currently, existing Forest Plan guidance has been adequate to manage disturbances in GRSG habitat which overlaps with some adult boreal toad habitat on the BT. In general, sagebrush shrubland is not a significant component of boreal toad habitat. Substantial changes to sagebrush quantity have not occurred, but the quality of more important boreal toad habitats have declined (Forest Service 2009). Boreal toads across the BT are rare, which mimics population situation statewide. Management of sagebrush habitat is not likely to change this unless a new breeding site is found in sagebrush. Full use of Alternative A conservation measures in GRSG habitat could have a small impact on a few individual boreal toads, but not population trend since there is a small amount of overlap of sagebrush and boreal toad habitat across the BT.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative B. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A, retaining more sagebrush habitat for boreal toads across the BT. There would be less displacement or reduction of boreal toad fitness in sagebrush habitat. Of course, these benefits would occur on very little boreal toad habitat so they would not be noticed in the population.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some boreal toad habitat on the BT. There would be 5,955 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA which also benefits boreal toad.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG improved habitat quality; therefore, in favor of boreal toad habitat quality. There are 5,933 acres of PHMA across the BT in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. These would benefit boreal toad ensuring cover important for retaining moisture and thermoregulation. The potential effects due to livestock grazing, vegetation disturbance, and range improvements would be similar to Alternative A, except that Alternative B provides more restrictions that would protect boreal toad habitat. GRSG PHMA accounts for less than 1 percent of the land cover of the BT so any changes would be localized. There could be small areas of improvement in aspen, willow, riparian, and sagebrush for boreal toad.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Though there are only four known active leks and only 5,933 acres of PHMA on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for boreal toad. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat.

Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. Fluid mineral leasing would be closed on 8,722 acres of GRSG habitat (Appendix 1). This alternative better conserves the 5,933 acres of PHMA, and therefore Brewer's sparrow habitat, than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would limit the regeneration of shrubs on the 5,593 acres of PHMA. This restriction would benefit retaining more boreal toad habitat. Still, this is only 1 percent of the sagebrush habitat on the BT. Impacts on the boreal toad population would be small to immeasurable.

Cumulative Effects for five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Boreal toad habitat includes wetland, riparian and forested cover types where grazing management and vegetation management in timber and aspen stands can reduce cover that leads to habitat becoming unsuitable. Appropriate grazing management provides important healthy willow and aspen stands for boreal toad. A small amount of adult toad habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively,

there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in boreal toad habitat off the BT. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Boreal Toad Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <2 percent of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality for boreal toads, the benefits would be small since this habitat is a minor component of boreal toad habitat across the BT.

Effects on Boreal Toad Population Trend

The population trend on the BT is declining. The population trend is not expected to improve as a result of improvements across <2 percent of sagebrush habitat across the BT.

Summary of Alternative B

This alternative limits disturbance in PHMA, which is <2 percent of the forest-wide sagebrush habitat and a minor component of boreal toad habitat. There could be benefits to individual boreal toads, but these would be too small to affect the forest-wide population trend. On the other hand, limits on sagebrush treatment will prohibit regeneration of shrub stands, conserving cover for boreal toads. Generally, activities in GHMA and the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (98 percent) sagebrush habitat on the BT National Forest. Therefore, overall impacts on the boreal toad forest-wide population would be similar to Alternative A.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of boreal toad habitat. Boreal toads are rare on the BT National Forest mimicking the condition throughout Wyoming. This scarcity is believed related primarily to chytrid fungus among other factors (Keinath and McGee 2005). Management of sagebrush habitat is not likely to change this situation unless a new breeding site is found in sagebrush. Full use of Alternative B conservation measures in GRSG habitat could have a small impact on a few individual boreal toads, but not population trend since there is a small amount of overlap of sagebrush and boreal toad habitat across the BT.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to boreal toads and their sagebrush habitat than other alternatives. Conservation measures would be applied to GHMA, more than 300,000

additional acres in addition to PHMA. New road construction is prohibited within four miles of active GRSG leks, and avoided in priority and GHGHMA. Existing road management would be designed to maintain or improve both priority and GHGHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures allow the least habitat loss and disturbance among alternatives. Habitat loss and disturbance would be reduced. There would be less disruption in adult habitat and improved fitness of some individuals.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for boreal toad sagebrush habitat. Priority and GHMA would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of all designated habitat, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

There are 5,933 acres of PH across the BT National Forest in this alternative. The prohibition of livestock grazing in PHMA would retain the most cover in this habitat to support adult boreal toads. This result would provide the greatest opportunity among alternatives for improved boreal toad fitness. Still, PHMA is <2 percent of forest-wide boreal toad habitat and benefits would occur to individuals and not be reflected in the population trend.

Energy and Minerals Direct and Indirect Effects

Conservation measure would be more beneficial to boreal toads and their habitat than other alternatives. Many conservation measures would be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 260,000 acres of GRSG habitat, some boreal toad habitat than other alternatives. Fluid mineral leases would be closed on 315,583 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within PHMA (5,933 acres) and GHMA. Priority and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss and disturbance would be reduced. There could be some reduced disruption in adult habitat, providing improved fitness to some individuals.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA. Sagebrush canopy

cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GHMA would be avoided in <12 inch precipitation zone. These would limit the regeneration of shrubs across >300,000 acres. These restrictions would benefit retaining more boreal toad habitat. Still, this is a small portion of Forest-wide toad habitat. Impacts on the boreal toad population would be small.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Boreal toad habitat includes wetland and riparian and forested cover types where grazing management and vegetation management in timber and aspen stands can reduce cover that leads to habitat becoming unsuitable. Appropriate grazing management provides important healthy willow and aspen stands for boreal toad. A small amount of adult toad habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in boreal toad habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Boreal Toad Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <2 percent of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain a considerable amount of habitat quantity and improve habitat quality for boreal toads, the benefits would be small since this habitat is a minor component of boreal toad habitat across the BT.

Effects on Boreal Toad Population Trend

The population trend on the BT National Forest is declining. Habitat conserved or improved with this alternative is not likely to improve the population trend since sagebrush is a minor habitat component, other factors are having a greater influence on boreal toads, and there are only five known breeding sites on the BT National Forest.

Summary of Alternative C

This alternative limits loss and disturbance in priority and GHMA, which is >75 percent of the forest-wide sagebrush habitat. There could be benefits to individual boreal toads, but these would likely be too small to affect the forest-wide population trend unless a new breeding site was discovered in priority or general sagebrush habitat. Additionally, limits on sagebrush treatment will protect some toad habitat. Generally, activities in the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of boreal toad habitat. Boreal toads are rare on the BT

National Forest, mimicking the condition throughout Wyoming. This scarcity is believed related primarily to chytrid fungus among other factors (Keinath and McGee 2005). Management of sagebrush habitat is not likely to change this situation unless a new breeding site is found in sagebrush. Full use of Alternative C conservation measures in GRSG habitat could have a small impact on a few individual boreal toads, but not population trend since there is a small amount of overlap of sagebrush and boreal toad habitat across the BT.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more disturbance, habitat loss, and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in priority core habitat. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to boreal toads than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA will be allowed > 0.25 miles from the four known leks and any new leks on the BT. This is closer than the disturbance allowed under the other alternatives except Alternative A. This disturbance would affect <1 percent of the forest-wide boreal toad habitat. A few more boreal toads could be disrupted or a little habitat lost.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures of Alternative D apply priority core habitat. A few slight differences include this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is 1 percent of forest-wide sagebrush habitat, these conservation measures would have a small benefit to a few individuals.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. Therefore, these measures could benefit boreal toad habitat within the

5,593 acres of sagebrush priority core habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. Fluid mineral leasing closures would be reduced to 2 acres on federal surface and federal mineral leases compared to Alternative A (Appendix 1). This alternative better conserves priority core habitat and, therefore, some boreal toad habitat, than Alternative A.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. A small amount of forest-wide, adult toad habitat could be treated. The primary impact would be the loss of cover, making sites too dry to maintain body moisture or thermoregulate. This sagebrush habitat would be unsuitable to boreal toads. Results from shrub treatment would be detrimental to individual survival. Treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of cover.

Cumulative Effects for Five Resource Areas

This alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. Boreal toad habitat includes wetland and riparian and forested cover types where grazing management and vegetation management in timber and aspen stands can reduce cover that leads to habitat becoming unsuitable. Appropriate grazing management provides important healthy willow and aspen stands for boreal toad. A small amount of adult toad habitat also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in boreal toad habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Boreal Toad Habitat Trend

If currently allowable opportunities were fully pursued in: recreation and travel; lands and realty; range; energy and minerals; and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more early succession grass-dominated habitat, more disturbances in sagebrush habitat, and higher occurrence of invasive and nonnative plants. For example, livestock grazing occurs on >70 percent of available GRSG habitat. Range conservation measures in Alternative D apply only to PHMA, which is <1 percent of boreal toad habitat on the BT. Likewise, oil, gas, and geothermal development constraints are limited across GRSG habitat (Appendix 1). Since these allowable opportunities have not been implemented, sagebrush habitat has remained largely intact.

Effects on Boreal Toad Population Trend

The population trend on the BT is believed to be declining. This population trend mimics statewide trends. As mentioned, however, Alternative D allows a substantial change to sagebrush habitat. This alternative provides the least amount of guidance to conserve sagebrush habitat that overlaps with boreal toad habitat. Therefore, this alternative would allow sufficient habitat change to slightly reduce the probability that the forest-wide population trend would become stable.

Summary of Alternative D

This alternative is most similar to Alternative A. This alternative does include a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional shrub treatments, degrading or eliminating toad habitat. Limited conservation in the other four resource areas could allow substantial changes in boreal toad habitat quantity and quality in sagebrush habitat on the BT. These activities affect almost all (>98 percent) sagebrush habitat on the BT. Therefore, overall impacts on the boreal toad forest-wide population would be similar to Alternative A.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of boreal toad habitat. Boreal toads are rare on the BT, mimicking the condition throughout Wyoming. This scarcity is believed related primarily to chytrid fungus among other factors (Keinath and McGee 2005). Management of sagebrush habitat is not likely to change this situation unless a new breeding site is found in sagebrush. Full use of Alternative D conservation measures in GRSG habitat could have a small impact on a few individual boreal toads but not population trend since there is a small amount of overlap of sagebrush and boreal toad habitat across the BT.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs (>97,000 acres). Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA management areas and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat

loss or degradation, and less disturbance in some adult habitat compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of boreal toad habitat could be lost, degraded or disturbed due to the 5 percent allowance for sagebrush habitat lost in PHMA or SFAs. The Proposed Plan Amendment includes >97,000 acres as PHMA and SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 3,283 acres of ROW exclusion areas in sagebrush habitat. Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on sagebrush habitat, predominantly PHMA and SFAs, would be reduced compared to Alternatives A and D and would be greater than impacts on sagebrush habitat in Alternative C. This alternative would retain about 90,000 acres of sagebrush habitat with the 5 percent disturbance limit compared to 5,755 acres of PHMA retained in Alternative B with a 3 percent disturbance limit.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks (four known leks) and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve sagebrush and some riparian habitat quality for boreal toads.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands <200 acres. Potential adverse effects on sagebrush habitat from this exception could include habitat loss or degradation or fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in PHMA and SFAs (>100,000 acres), and GHMA (>170,000 acres) more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA (5,933 acres), none in SFAs, and not as much within GHMA (324,243 acres). Alternative C would apply to 330,176 acres of combined PHMA and most often, to GHMA.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs (>100,000 acres). Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible

impact on GRSG habitat. Fluid mineral leasing would be closed on 3,262 acres of GRSG habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA, SFAs, and often, GHMA (>330,000 combined acres), would provide benefits to boreal toads by retaining shrub stands and reducing disturbance. The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA management areas more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternative B is often more restrictive, but covers fewer acres of sagebrush. Alternative C is generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs and, most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs (>97,000 acres). In addition, vegetation treatment in PHMA and SFAs in nesting and wintering habitat in northeast Wyoming that would reduce sagebrush canopy to <15 percent would be restricted.

Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D, considering a no disturbance limit and a 9 percent disturbance limit for these Alternatives, respectively. There are more treatment opportunities than Alternatives B and C. Sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in priority and GHMA management areas.

Conservation measures would be more beneficial to maintaining sagebrush than Alternatives A and D, considering a no disturbance limit and a 9 percent disturbance limit for these alternatives, respectively. Sagebrush treatment would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in PHMA, SFAs, and GHMA. More mature sagebrush habitat would be maintained to provide adult habitat and some riparian inclusions would be maintained.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Boreal toad habitat includes wetland and riparian and forested cover types where grazing management and vegetation management in timber and aspen stands can reduce cover that leads to habitat becoming unsuitable. Appropriate grazing management provides important healthy willow and aspen stands for boreal toad. A small amount of adult toad habitat also occurs on private, state, and BLM-administered land adjacent to the BT National Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss, degradation, or disturbance from recreation and travel, ROWs granted, energy and mineral development, and range management in boreal toad habitat off the BT National Forest. However, anthropogenic disturbances >5 percent on all ownerships in PHMA and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Boreal Toad Habitat Trend

This alternative promotes greater conservation of GRSG PHMA, SFAs and often, GHMA. These habitats comprise much of the 430,870 acres of sagebrush habitat on the BT. While this alternative will maintain a considerable amount of habitat quantity and improve habitat quality for boreal toads, the benefits would be small since this habitat is a minor component of boreal toad habitat across the BT.

Effects on Boreal Toad Population Trend

The population trend on the BT is declining. Habitat conserved or improved with this alternative is not likely to improve the population trend since sagebrush is a minor habitat component. Other factors are having a greater influence on boreal toads, and there are only five known breeding sites on the BT.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance will cause some loss of sagebrush habitat for adult boreal toads. This alternative also limits disturbing activities in PHMA and SFAs and often, GHMA. In total, there are >330,000 acres of combined PHMA, SFAs, and GHMA on the BT National Forest. There would be less loss or fragmentation of mature sagebrush habitat and some riparian inclusions for boreal toads. Generally, other activities in GHMA management areas and all activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. These activities could affect boreal toad habitat on the BT National Forest.

Overall, effects of the Proposed Plan Amendment would be less impacting to the boreal toad forest-wide population than Alternatives A and D. Impacts would be more pronounced than

Alternative C. Alternative B includes greater habitat protection in many cases but addresses a smaller area.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component of boreal toad habitat. Boreal toads are rare on the BT National Forest, mimicking the condition throughout Wyoming. This scarcity is believed to be related primarily to chytrid fungus among other factors (Keinath and McGee 2005). Management of sagebrush habitat is not likely to change this situation unless a new breeding site is found in sagebrush. Full use of the Proposed Plan Amendment conservation measures in GRSG habitat could have a small impact on a few individual boreal toads, but not population trend since there is a small amount of overlap of sagebrush and boreal toad habitat across the BT.

Populus tremuloides (Aspen)

Distribution

This plant is a MIS for the BT that overlaps some GRSG habitat on the BT. Aspen occupies only 5 percent of the BT and a much smaller amount overlaps with GRSG habitat. Aspen is one of the most widely distributed trees in North America. It extends from Newfoundland and Labrador across the northern limit of trees to northwestern Alaska, south throughout the northern tier of the United States, and along the Rockies into Mexico.

Habitat Associations and Threats

Aspen is generally found in the elevation zone between lower elevation shrublands to higher elevation conifer forest and along drainages in each of these other vegetation communities.

Threats include continued succession to later seral conifer stands due to lack of disturbance and localized lack of resprouting due to elk browsing near feedgrounds (Forest Service 2009).

Population Status, Trend, and Relation to Habitat

In the State of Wyoming, 53 percent of the historic aspen had converted to another vegetation type. On some areas of the BT, aspen has declined by 32 percent (Forest Service 2009). Through continued plant succession, presumably with a continued lack of disturbance, it was predicted that there could be a 50 percent reduction of total acres of aspen over the next 20-30 years on the BT. The slow, forest-wide decline of aspen mimics conditions across Wyoming.

Aspen was selected as a MIS for the BT in order to monitor the condition of this valuable habitat type for wildlife. Some aspen occurs within sagebrush shrubland used by GRSG.

Some aspen conditions appear to be declining. Regeneration has been reduced, particularly around elk feedgrounds. Aspen distribution and stand vigor has declined due to aging stands and related conifer encroachment. Some stands still receive higher than desired use by livestock and wild ungulates.

Some aspen stand conditions are improving. Rangeland management practices have improved considerably in the last 50 years, generally leading to better understory production. There have been more than 17,000 acres of prescribed aspen regeneration between 1987 and 1997 with a lesser amount since that decade.

Livestock management and vegetation management on the BT can affect aspen condition. Retaining insufficient shrub, aspen, or herbaceous production can reduce fine fuels needed for natural fire regeneration. Forest Service (2009) indicates that lack of disturbance is affecting the quality and distribution of this habitat.

Forest-wide monitoring indicates that aspen is declining on the BT. The lack of natural or prescribed disturbance has created a higher proportion of older age class stands and a decline in aspen vigor than occurred historically (Forest Service 2009a).

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current BT National Forest system roads, transportation plan, or recreation management. There would be few seasonal restrictions on casual use, and some new roads and upgrading of existing roads would be permitted. There are few restrictions on recreation special uses. These activities would continue on 5,933 acres of PHMA and 324,243 acres of GHMA and there would be no density or disturbance limit for acres of sagebrush habitat lost to road construction. In general, more acres and lineal miles of routes and use equate to a greater likelihood of loss of aspen.

Lands and Realty Direct and Indirect Effects

There would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service-administered lands. There would be 2,107 acres of ROW exclusion areas in GRSG habitat (Appendix 1). Some aspen habitat could be traded to other ownership where there is greater potential for development for economic benefits in this area and less probability that regeneration treatment will occur. All Forest Service-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation activities that may result in aspen loss. Other impacts may include new infestations of noxious or invasive weeds. Though most projects would attempt to mitigate or minimize impacts, there could be loss of aspen.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing on the BT. Livestock grazing is permitted on 3,270 acres (55 percent) of priority core habitat on the BT. Potential effects on aspen habitat could include site specific overgrazing, reduction in structure

and diversity of residual vegetation from consumption, and degradation of rangeland habitat due to trampling near riparian vegetation. Related impacts include reduced potential for regeneration from wildfires. Forest Plan standards and guidelines for grazing management usually provide sufficient cover and diversity for healthy aspen across the BT. For example, the BT LRMP indicates that GRSG species' needs will be addressed in allotment management plans and range improvements, management activities, and trailing will be coordinated with and designed to help meet the needs of GRSG.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PHMA would be closed to non-energy leasable minerals. The majority and remainder of all designated habitats are open to leasing, including expansion of new leases. This alternative could allow a large amount of direct and indirect habitat loss and degradation of sagebrush habitat. For example, fluid mineral leasing would be closed on only 3,263 acres of federal surface and federal mineral leases (Appendix 1). Direct loss of sagebrush habitat could also include loss of adjacent aspen.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. There would be no disturbance limit for acres of sagebrush moved into an early successional stage by wildfires and prescribed fires. Some aspen habitat could be treated. Benefits would include regenerating younger, more vigorous aspen clones. Forest Service (2009a) indicates "the existing proportion of the big sagebrush type in late succession exceeds what would exist if the communities were in healthy, functioning conditions". Also, Forest Service (2009) indicates that a lack of fire is the primary reason for the decline of aspen on the BT. Results from shrub treatment would benefit aspen persistence. There could also be increasing nonnative or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Aspen occurs across the entire BT where vegetation management in timber and aspen stands can create more quality aspen habitat. Appropriate grazing management also provides healthy aspen stands. Aspen also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss from recreation and travel, ROWs granted, energy and mineral development, and range management in aspen habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Aspen Habitat Trend

If currently allowable opportunities were fully pursued in recreation and travel, lands and realty, range, energy and minerals, and fire and fuels then the combined impact would be a trend toward

more loss and degradation of sagebrush habitat, more disturbances in sagebrush habitat, higher occurrence of invasive and nonnative plants, but also more early succession grass-dominated habitat or regenerated aspen,. For example, livestock grazing occurs on >70 percent of available GRSG habitat. While there is LRMP guidance to address GRSG habitat needs in allotment management plans, there is currently no other specific guidance in the BT LRMP for grazing relative to promoting quality GRSG habitat. Likewise, oil, gas, and geothermal development constraints are limited in GRSG habitat (Appendix 1). Since these allowable opportunities have not been implemented, sagebrush habitat, and adjacent aspen, has remained largely intact although aspen quality continues to slowly decline.

Effects on Aspen Population Trend

The aspen population trend on the BT is declining. This population trend mimics statewide trends. As mentioned, current LRMP guidance allows a substantial change to sagebrush habitat and the small amount of forest-wide aspen inclusions. This alternative provides the least amount of guidance to conserve sagebrush habitat that intersects with aspen. On the other hand, this alternative provides the greatest opportunity to regenerate aspen inclusions within sagebrush habitat. Therefore, this alternative would allow sufficient habitat change to slightly improve the probability that the forest-wide population trend would stabilize.

Summary of Alternative A

Existing conservation measures for sagebrush habitat are limited, so there is a potential for habitat alteration or loss in aspen. Limitations would be provided only by Forest Plan guidance, which generally allows substantial disturbance in sagebrush habitat. Regenerating shrub stands with fuels treatments would benefit aspen. However, limited conservation in the other four resource areas could allow substantial changes in aspen habitat quantity, quality, and ownership in sagebrush habitat on the BT.

Currently, existing Forest Plan guidance has been adequate to manage loss in GRSG habitat which overlaps with some aspen habitat on the Forest. In general, sagebrush shrubland has a small amount of overlap with aspen on the BT. Substantial changes to sagebrush quantity have not occurred, but the quality of aspen habitat has declined (Forest Service 2009). The aspen population trend on the BT is declining, which mimics statewide trends. Prescribed fire in sagebrush habitat could have a small impact on reducing the decline of aspen since there is small forest-wide overlap. Full use of Alternative A conservation measures in GRSG habitat would have a small impact on individual aspen clones since there is little overlap, most aspen is adjoining to other forest vegetation types, and conservation measures are limited to GRSG habitat.

Alternative B

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PHMA coupled with allowing only the minimum necessary road standard and no upgrading of current roads. There would be a 3 percent disturbance limit on sagebrush lost in PHMA to road construction and other activities. The disturbance limit would be applied to 5,933 acres of PHMA in Alternative. All travel would remain on designated routes. Recreational use permits would only be permitted in PHMA if there was a neutral or beneficial impact on GRSG. All GRSG PHMA and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss than Alternative A, retaining more sagebrush habitat and intermixed aspen across the BT. Of course these benefits would occur on only a small percentage of Forest-wide aspen, so they would not be reflected in the population trend.

Lands and Realty Direct and Indirect Effects

PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation and acquisition of GRSG PHMA and, therefore, a potential gain of some aspen habitat on the BT. There would be 5,955 acres of ROW exclusion areas (Appendix 1). These conservation measures would be more protective than conservation measures in Alternatives A, D, and E, but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of GRSG PHMA, which also benefits limited amounts of aspen.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PHMA in favor of GRSG habitat quality; therefore, in favor of aspen habitat quality. There are 5,933 acres of PHMA across the BT National Forest in this alternative. Many livestock infrastructure improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. These measures would benefit aspen. The potential effects due to livestock grazing and range improvements would be similar to Alternative A, except that Alternative B provides more restrictions that would protect aspen habitat. GRSG PHMA accounts for less than 1 percent of the land cover of the BT so any changes would be localized. There could be small areas of improved aspen quality.

Energy and Minerals Direct and Indirect Effects

PHMA would be closed to new fluid mineral leases and existing leases would have a four mile, no surface occupancy buffer around leks. Though there are only four known active leks and only 5,933 acres of PHMA on the BT, this alternative would conserve this habitat now and into the future for GRSG and, consequently, for aspen. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat.

Additionally, there would be a 3 percent disturbance limitation and a one disturbance/section limitation in PHMA. Fluid mineral leasing would be closed on 8,722 acres of federal surface and federal mineral leases compared to Alternative A (Appendix 1). This alternative better conserves the 5,933 acres of PHMA, and therefore aspen, than Alternatives A, D, and E and is equal to Alternative C in PHMA.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PHMA. Suppression, protection, restoration and recovery would be emphasized in PHMA. Prescribed burning in PHMA would be avoided in <12 inch precipitation zone. Burning would also be included in the 3 percent disturbance limit. These measures would limit the regeneration of shrubs on the 5,593 acres of PHMA. Less aspen would not be regenerated here. Still, this is only 1 percent of the sagebrush habitat on the BT. Impacts on the aspen population would be small to immeasurable.

Additional information from forest-wide monitoring (Forest Service 2009) indicates that a lack of fire is the primary reason for the decline of aspen on the BT. This alternative would perpetuate this condition in PHMA.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Aspen occurs across the entire BT where vegetation management in timber and aspen stands can create more quality aspen habitat. Appropriate grazing management also provides healthy aspen stands. Aspen also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss from recreation and travel, ROWs granted, energy and mineral development, and range management in aspen habitat off the BT. However, anthropogenic disturbances >3 percent on all ownerships in PHMA would restrict more disturbance on federal lands. Cumulative effects are discussed in greater detail in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Aspen Habitat Trend

This alternative promotes greater conservation of GRSG PHMA. PHMA constitutes <2 percent of the 430,870 acres of sagebrush habitat, some intermingled with aspen, on the BT. While this alternative will maintain some habitat quantity and improve some habitat quality, benefits would be small in relation to the amount of aspen present across the BT.

Effects on Aspen Population Trend

The aspen population trend on the BT is declining. This population trend mimics statewide trends. The population trend is not expected to change substantially as a result of management changes across <2 percent of the sagebrush habitat across the BT. On the other hand, this

alternative would allow the opportunity to regenerate aspen on the remaining 98 percent of forest-wide sagebrush, though this is still a small portion of forest-wide aspen.

Summary of Alternative B

This alternative limits disturbance in PHMA, which intermingles with a very small portion of the forest-wide aspen habitat. There could be benefits to individual aspen clones, but these would be too small to affect the forest-wide population trend. On the other hand, limits on sagebrush treatment will prohibit regeneration of some intermingled aspen stands. Generally, activities in GHMA and the remaining sagebrush habitat on the BT National Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all 98 percent of sagebrush habitat on the BT National Forest. Therefore, overall impacts on the aspen forest-wide would be similar to Alternative A.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component intermixed with aspen on the BT. Aspen on the BT National Forest is declining and is related to a lack of disturbances (Forest Service 2009). The aspen trend on the Forest mimics statewide trends for the same reason. Prescribed burning within priority sagebrush habitat alone is not likely to change this decline. Full use of Alternative B conservation measures in GRSG habitat would have a small impact on individual aspen clones, but not the population. Since aspen occurs across all habitats on the BT, conservation measures are limited to GRSG habitat and most sagebrush is not intermixed with aspen habitat.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measures would be more beneficial to aspen than other alternatives. Conservation measures would generally be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 300,000 more acres of sagebrush habitat intermixed with aspen than other alternatives. New road construction is prohibited within four miles of active GRSG leks and avoided in priority and GHMA. Existing road management would be designed to maintain or improve both priority and GHMA. Camping and other non-motorized recreation would be seasonally prohibited within four miles of active GRSG leks. These measures would limit habitat loss and benefit aspen where it is intermixed with sagebrush across more than 300,000 acres.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for sagebrush intermixed with aspen. Priority and GHMA would be managed as an exclusion area for new ROW projects. This is much of forest-wide sagebrush habitat, some intermixed with aspen. Alternative C would encourage consolidation and acquisition of GRSG habitat, limiting the possibilities for loss of habitat.

Range Direct and Indirect Effects

There are 5,933 acres of PHMA across the Forest Service units in this alternative. The prohibition of livestock grazing in PHMA would promote the most cover and diversity within aspen, indicators of stand health. This cover would provide the greatest opportunity for regeneration through fire. Still, PHMA includes a very small portion of forest-wide aspen habitat; benefits would occur to individual clones and not be reflected in the population trend across the BT.

Energy and Minerals Direct and Indirect Effects

Conservation measure would be more beneficial to aspen habitat than other alternatives. Many conservation measures would be applied to GHMA in addition to PHMA. Therefore, these measures would benefit more than 260,000 more acres of sagebrush where aspen can be intermingled. Fluid mineral leases would be closed on 315,582 acres of federal surface and federal mineral leases (Appendix 1). No exceptions, waivers, modifications to lease stipulations, COAs, and T&Cs will be considered within PHMA (5,933 acres) and GHMA. Priority and GHMA would be closed to fluid mineral leasing. As existing leases expire or are terminated, no new nominations would be accepted for parcels within priority or GHMA. Geophysical exploration would only be allowed in priority and GHMA to obtain exploratory information for areas outside of and adjacent to these habitats and it would be subject to seasonal restrictions that preclude activities in GRSG breeding, nesting, brood rearing, and winter habitats during their season of use by GRSG. All PHMA would be closed to non-energy leasable mineral leasing. PHMA would be closed to mineral material exploration, sales, and free use permits. Overall, habitat loss would be reduced on this portion of forest-wide aspen habitat.

Fire and Fuels Management Direct and Indirect Effects

Suppression, protection, restoration, and recovery would be emphasized in priority and GHMA. Prescribed fire in sagebrush would be very limited in PHMA and GHMA. Sagebrush canopy cover would generally not be reduced to less than 15 percent. Prescribed burning in priority and GHMA would be avoided in <12 inch precipitation zone. This alternative would limit the regeneration of shrubs across >300,000 acres of sagebrush. Aspen regeneration would also be prohibited in these areas.

Lack of sagebrush treatment would be detrimental to aspen over the long-term. Additional information from forest-wide monitoring (Forest Service 2009) indicates that a lack of fire is the primary reason for the decline of aspen on the BT. This alternative would perpetuate this condition in priority and GHMA.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects in addition to impacts described above. Aspen occurs across the entire BT where vegetation management in timber and aspen stands can create more quality aspen habitat. Appropriate grazing management also provides healthy aspen stands. Aspen also occurs on private, state, and

BLM-administered land adjacent to the BT National Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss from recreation and travel, ROWs granted, energy and mineral development, and range management in aspen habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Aspen Habitat Trend

This alternative promotes greater conservation of GRSG priority and GHMA. These habitats comprise much of the 430,870 acres of sagebrush habitat on the BT National Forest, some intermingled with aspen. While this alternative will maintain some habitat quantity and improve some habitat quality, benefits would be small in relation to the amount of aspen present across the BT National Forest.

Effects on Aspen Population Trend

The aspen population trend on the BT is declining. This population trend mimics statewide trends. The population trend is not expected to change substantially as a result of management changes within the sagebrush habitat across the BT, only some of which overlaps with aspen.

Summary of Alternative C

This alternative limits loss in priority and GHMA, which is >75 percent of the forest-wide sagebrush habitat. There could be benefits to individual aspen clones, but these would be small improvements to aspen forest-wide. On the other hand, limits on sagebrush treatment will also limit regeneration of intermingled aspen. Generally, activities in the remaining sagebrush habitat on the BT will occur as they do currently or could expand as existing direction allows.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component intermixed with aspen on the BT. Aspen on the BT is declining and is related to a lack of disturbances (Forest Service 2009). The aspen trend on the Forest mimics statewide trends for the same reason. Prescribed burning of sagebrush habitat alone is not likely to change this decline. In addition, full use of Alternative C conservation measures in GRSG habitat would have a small impact on individual aspen clones but not the population since aspen occurs across all habitats on the BT, conservation measures are limited to GRSG habitat, and most sagebrush is not intermixed with aspen habitat.

Alternative D

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The allowances for road construction, road upgrades, and recreation special uses in this alternative will result in more habitat loss and habitat degradation of sagebrush than most other alternatives. Most measures are similar to Alternative A, although Alternative D has a 9 percent

disturbance cap and three disturbances per 640 acres in priority core habitat and it does require consideration of GRSG needs for recreation special uses in PHMA. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to aspen than Alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PHMA will be allowed > 0.25 miles from the four known leks and any new leks on the BT. This is closer than the disturbance allowed under the other alternatives except Alternative A. This disturbance would affect <2 percent of the forest-wide sagebrush habitat, some of which is intermixed with aspen. A few more aspen clones could be disrupted.

New ROWs and SUAs in priority core habitat would generally be excluded; those allowed would be subject to the 9 percent disturbance limit. This is more disturbance, habitat loss, and habitat degradation than allowed in Alternatives B, C, and E, but less disturbance than Alternative A. These same uses would be allowed in GHMA.

Range Direct and Indirect Effects

Conservation measures are generally similar to Alternative A. Vegetative management and grazing infrastructure remain the same as Alternative A. Many conservation measures of Alternative D apply to priority core habitat. A few slight differences include this alternative recommends considering GRSG habitat objectives in permit renewals and changes in response to drought in priority core habitat. Since priority core habitat is 1 percent of forest-wide sagebrush habitat, these conservation measures would have a very small benefit to aspen forest-wide.

Energy and Minerals Direct and Indirect Effects

Most conservation measures are generally similar to Alternative A. However, there is a 9 percent disturbance cap and a three disturbances/640 acres limit in priority core habitat that does not exist in Alternative A. Fluid mineral leasing would be closed on 2 acres of federal surface and federal mineral leases compared to Alternative A (Appendix 1). Therefore, these measures would benefit 5,593 acres of sagebrush, some intermixed with aspen. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves priority core habitat and, therefore, some aspen habitat, than Alternative A.

Fire and Fuels Management Direct and Indirect Effects

Treatment is restricted only by the 9 percent disturbance cap in priority core habitat. Sagebrush treatment would follow WGFD Protocols for treating sagebrush to benefit GRSG; a tool to determine whether proposed treatment constitutes a “disturbance” contributing toward the 9 percent threshold. Also, treatment is permitted in GRSG breeding, nesting, and winter range. Benefits could include regenerating aspen intermixed with sagebrush. However, treated areas would not be rested from livestock grazing. This allowance alone will promote the expansion of noxious weeds and a lack of aspen stand health.

Cumulative Effects for Five Resource Areas

This Alternative mirrors much of the management direction in Alternative A. Many of the conservation measures included in this alternative are limited to priority core habitat. There could be additional effects from past, present, and reasonably foreseeable future projects. Aspen occurs across the entire BT where vegetation management in timber and aspen stands can create more quality aspen habitat. Appropriate grazing management also provides healthy aspen stands. Aspen also occurs on private, state, and BLM-administered land adjacent to the BT. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss from recreation and travel, ROWs granted, energy and mineral development, and range management in aspen habitat off the BT. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Aspen Habitat Trend

If currently allowable opportunities were fully pursued in: recreation and travel; lands and realty; range; energy and minerals; and fire and fuels then the combined impact would be a trend toward more loss and degradation of sagebrush habitat, more disturbances in sagebrush habitat, higher occurrence of invasive and nonnative plants, but also more early succession grass-dominated habitat or regenerated aspen. For example, livestock grazing occurs on >70 percent of available GRSG habitat. Range conservation measures in Alternative D apply only to PHMA, which is 1 percent of sagebrush habitat on the BT. Therefore, sagebrush and intermixed aspen habitat quality could be reduced across much of the sagebrush on the BT. Likewise, oil, gas, and geothermal development can be permitted with stipulations on 234,000 acres of GRSG habitat. Since these allowable opportunities have not been implemented, sagebrush habitat, and adjacent aspen, has remained largely intact although aspen quality continues to slowly decline.

Effects on Aspen Population Trend

The aspen population trend on the BT is declining. This population trend mimics statewide trends. The population trend is not expected to change substantially as a result of management changes across approximately 2 percent of the sagebrush habitat on the BT. On the other hand, this alternative would allow the opportunity to regenerate aspen on the remaining 98 percent of forest-wide sagebrush. Therefore, this alternative would allow some habitat change to slightly improve the probability that the forest-wide population trend would stabilize.

Summary of Alternative D

This alternative is most similar to Alternative A. This Alternative does include a cap on disturbance in priority core habitat while there is no similar limit in Alternative A. The allowance of 9 percent disturbance in priority core habitat will allow some additional shrub treatments. These could include aspen regeneration. However, limited conservation in the other four resource areas could allow substantial changes in aspen habitat quantity, quality, and ownership

in sagebrush habitat on the BT. This Alternative prevents more disturbance in these four areas than Alternative A.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland is not a significant component intermixed with aspen on the BT. Aspen on the BT is declining and is related to a lack of disturbances (Forest Service 2009). The aspen trend on the BT mimics statewide trends for the same reason. Prescribed burning of sagebrush habitat alone is not likely to change this decline. In addition, full use of Alternative D conservation measures in GRSG habitat would have a small impact on individual aspen clones but not the population since aspen occurs across all habitats on the BT, conservation measures are limited to GRSG habitat, and most sagebrush is not intermixed with aspen habitat.

Proposed Plan Amendment (Preferred Alternative)

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

New primary (category level 4 and 5) roads would be restricted within 1.9 miles of the perimeter of occupied GRSG leks within PHMA and SFAs. These comprise >97,000 acres. Similarly, secondary road construction would be prohibited within 0.6 miles of occupied leks in PHMA and SFAs and both would be prohibited within 0.25 miles in GHMA. In addition, road upgrades would be prohibited in PHMA management areas and SFAs. Any necessary new roads in PHMA and SFAs would be limited to the minimum standard. There would be a 5 percent disturbance limit on sagebrush lost in PHMA and SFAs. Disruptive activities are restricted from 6:00 p.m. to 9:00 a.m. from March 1 – May 15 on or within 0.6 miles of occupied GRSG leks. Some recreation special uses would be allowed as long as habitat loss and disturbance do not occur in PHMA and SFAs. Conservation measures would be more restrictive to recreation and transportation than Alternatives A and D, but less restrictive than Alternatives B and C. There would be less habitat loss or degradation compared to Alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some short-term impacts could occur. Some small amount of aspen habitat could be lost, degraded or disturbed. The Proposed Plan Amendment includes >97,000 acres as PHMA and SFAs. Conservation measures would allow some power lines or upgrades in designated transmission corridors, power lines >0.6 miles from occupied leks in PHMA and SFAs, and some special uses. However, there would be 3,283 acres of ROW exclusion areas in sagebrush habitat (Appendix 1). Small sagebrush habitat changes could also occur because sagebrush habitat could be exchanged to other ownership in limited situations. Overall, impacts on sagebrush and intermixed aspen would be reduced compared to Alternatives A and D and would be greater than impacts on sagebrush habitat in Alternative C. This Alternative would retain about 90,000 acres of sagebrush habitat with the 5 percent disturbance limit compared to 5,755 acres of PHMA retained in Alternative B with a 3 percent disturbance limit.

Range Direct and Indirect Effects

Conservation measures place more focus on incorporating practices to provide adequate habitat quality for GRSG within 5.3 miles of occupied leks (four known leks) and in other seasonal habitats. Most conservation measures apply to PHMA and SFAs. Livestock grazing and associated range improvement projects would be planned and authorized in a manner that contributes to rangeland health and maintains or improves GRSG sagebrush habitat. These measures would also maintain or improve aspen stands intermixed with this sagebrush habitat.

There would be some exceptions for areas with less than 200 acres of GRSG habitat in an allotment or on isolated parcels of Forest Service lands <200 acres. Potential adverse effects on sagebrush habitat and intermixed aspen from this exception could include habitat loss, degradation, or fragmentation due to infrastructure development.

The conservation measures for this alternative improve sagebrush habitat in in PHMA and SFAs (>100,000 acres), and GHMA (232,423 acres) more than Alternatives A and D. Alternative B provides more restrictions on livestock grazing in PHMA (5,933 acres), none in SFAs, and not as much within GHMA. Alternative C would apply to 330,176 acres of combined PHMA and most often, GHMA.

Energy and Minerals Direct and Indirect Effects

In all GRSG habitats, but especially PHMA and SFAs, minerals operators will be encouraged to reduce disturbance to GRSG habitat. There is a 5 percent disturbance of habitat limit and one facility per 640 acres density limit in PHMA and SFAs (>100,000 acres). Habitat disturbing activities that fit within the 5 percent disturbance cap will be designed to cause the least possible impact on GRSG habitat. Fluid mineral leasing would be closed on 3,262 acres of habitat on federal surface and federal mineral leases (Appendix 1). Where there are existing leases, stipulations for the protection of GRSG or their habitats could be added to COAs when approving exploration and development activities. There are timing and/or distance restrictions for PHMA, SFAs, and GHMA during GRSG breeding and winter concentration. All timing, distance, density, and disturbance restrictions will be applied to non-energy leasable, salable, and locatable mineral activities as well. Development activities, such as dams and impoundments, will be constructed to reduce the potential for West Nile virus.

Conservation measures in PHMA, SFAs, and often, (>330,000 combined acres) would also maintain or reduce disturbance to inclusions of aspen. The conservation measures for this alternative maintain or protect sagebrush habitat in PHMA, SFAs, and GHMA more than Alternatives A and D. For example, Alternative A has no disturbance limit and Alternative D has a 9 percent disturbance limit, compared to 5 percent for this alternative. Alternative D also allows three energy production locations per 640 acres and Alternative A has no limitation. Alternative B is often more restrictive, but covers fewer acres of sagebrush. Alternative C is generally more restrictive or prohibitive to energy development than this alternative.

Fire and Fuels Management Direct and Indirect Effects

There are numerous conservation measures in this alternative to maintain and protect sagebrush habitat in priority areas and SFAs and, most often, also in GHMA. There is a 5 percent disturbance limit for sagebrush disturbance in PHMA and SFAs (>97,000 acres).

Conservation measures would be more beneficial to maintaining sagebrush and aspen inclusions than Alternatives A and D considering a no disturbance limit and a 9 percent disturbance limit for these alternatives, respectively. There are more treatment opportunities than Alternatives B and C. Sagebrush treatment, with intermixed aspen, would be limited by Table 1 Seasonal Habitat Desired Conditions, the 5 percent disturbance cap, and the standards and guidelines for Fire Management in this alternative to maintain sagebrush in priority and GHMA management areas. More mature sagebrush habitat and intermixed aspen would be maintained but these measures would also limit some opportunities to regenerate declining aspen clones.

Cumulative Effects for Five Resource Areas

There could be additional effects from past, present, and reasonably foreseeable future projects. Aspen occurs across the entire BT where vegetation management in timber and aspen stands can create more quality aspen habitat. Appropriate grazing management also provides healthy aspen stands. Aspen also occurs on private, state, and BLM-administered land adjacent to the Forest. Activities occurring in the five resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, there could be additional habitat loss from recreation and travel, ROWs granted, energy and mineral development, and range management in aspen habitat off the BT. However, anthropogenic disturbances >5 percent on all ownerships in PHMA and SFAs would restrict more disturbance on federal lands. Cumulative effects are discussed at greater length in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Effects on Aspen Habitat Trend

This alternative promotes greater conservation of GRSG PHMA, SFAs and often, GHMA. These habitats comprise much of the 430,870 acres of sagebrush habitat on the BT, some intermixed with aspen. This alternative will maintain and improve sagebrush and some aspen habitat quantity and quality across the BT. However, the limitation on prescribed burning could have negative impacts over time.

Effects on Aspen Population Trend

The aspen population trend on the BT is declining. This population trend mimics statewide trends. The population trend is not expected to change substantially as a result of management changes within much of the sagebrush habitat across the BT, only some of which overlaps with aspen.

Summary of Proposed Plan Amendment

This alternative limits habitat loss and fragmentation in PHMA and SFAs to 5 percent and one disturbance per 640 acres. This 5 percent disturbance allowance could cause some loss of aspen inclusions within sagebrush. This 5 percent disturbance allowance will also allow some limited shrub (and aspen) treatments. In total, there are >100,000 acres of PHMA and SFAs and 232,423 acres of GHMA on the BT in the Proposed Plan Amendment. There would be less loss or fragmentation of aspen inclusions within sagebrush habitat. Generally, other activities in GHMA management areas and all activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. These activities could affect the vast majority of aspen habitat on the BT National Forest. Overall, effects of the Proposed Plan Amendment would be less impacting to aspen forest-wide than Alternatives A and D. Impacts would be more pronounced than Alternative C. Alternative B includes greater habitat protection in many cases but addresses a smaller area.

Substantial changes to existing sagebrush habitat have not occurred. In general, sagebrush shrubland intermixed with aspen is not a significant component on the BT. Aspen on the BT National Forest is declining and is related to a lack of disturbances (Forest Service 2009). The aspen trend on the BT National Forest mimics statewide trends for the same reason. Management of sagebrush habitat alone is not likely to change this decline. In addition, full use of the Proposed Plan Amendment conservation measures in GRSG habitat would have a small impact on individual aspen clones, but not the population since aspen occurs across the BT, conservation measures are limited to GRSG habitat, and most sagebrush is not intermixed with aspen habitat.

III. CONCLUSION

There are no noticeable impacts on MIS on the MB at the landscape level since GRSG habitat associated with this unit is scattered and generally on the periphery of the unit. However, several MIS for the BT National Forest and TB National Grassland could potentially be impacted by the no action and action Alternatives. A comparison of alternatives is provided in Table 15. When considering the potential for population-level impacts on MIS other than GRSG, across three planning areas, it is important to consider that PHMA and GHMA comprise a small portion of the overall habitat in the planning areas for most the MIS under analysis. Therefore, it is unlikely that population-level trends at the Forest scale would be significantly altered by any of the action alternatives for most MIS. A more likely scenario under the action alternatives is that there could be slight changes in the numbers of individuals and quality of habitat in localized areas of designated habitat for most MIS. This MIS analysis indicates that implementation of any of the action alternatives for most MIS would cause small habitat changes in the analysis area that could cause no change to small changes for stable or improving habitats and MIS populations at the Forest or Grassland scale.

The NFMA implementing regulations require that "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." Species are to be selected as MIS because their population changes are believed to indicate the effects of land management activities. Below are the specific conclusions for each MIS species except those on the MB National Forest where no noticeable impacts on MIS are expected. This is due to the fact that GRSG habitat associated with this unit is scattered and generally on the periphery of the unit.

Table 15. Summary of Alternative Comparisons for Species Addressed.

Resource	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Recreation and Travel	Least Protective	More protective than Alternative A, D, E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
Lands and Realty	Least Protective	More protective than Alternative A, D, E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
Range	Least Protective	More protective than Alternative A, D Not C & E	More protective than A, B and D Not E	Better than A Not B, C, or E	Most Protective
Energy and Minerals	Least Protective	More protective than Alternative A, D, E Equal to C in PHMA.	More protective than Alternative A, D, E Equal to B in PHMA.	Better than A Not B, C, or E	More protective than A, and D Not B or C
Fire and Fuels	Least Protective	More protective than Alternative A, D, E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C
CUMULATIVE EFFECTS	Least Protective	More protective than Alternative A, D, E Not C	Alternative C Most Protective	Better than A Not B, C, or E	More protective than A, and D Not B or C

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APPENDIX 1

Table 1: Combined Acres by Land Use Restriction for Bridger-Teton National Forest, Medicine Bow National Forest, and Thunder Basin National Grassland Federal Surface and Federal Mineral Leases

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
Surface Disturbing Activities	Prohibited Areas	core	0	0.00	0.00	0.00	5,003.18
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core	0.00	0.00	0.00	0.00	2,135.35
		proposed connectivity	0.00	0.00	0.00	0.00	1,383.76
		SFAs	0	0.00	0.00	0.00	6.47
		GHMA	0	0.00	0.00	0.00	12.98
		TOTAL	**0**	**0.00**	**0.00**	**0.00**	**8542.00**
	Restricted Areas	core	4,617.65	0.00	0.00	819.61	2,444.47
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core	0	0.00	0.00	0	0.00
		proposed connectivity	0.00	0.00	0.00	0.00	0.00
		SFAs	0	0.00	0.00	0	0.00
		GHMA	2170	0.00	0.00	258	69
		TOTAL	**6,788.52**	**0.00**	**0.00**	**1,078**	**2,514**
Fluid Mineral Leasing	Closed	core	2,166.46	335,873.94	333,388.47	6,736.35	2,164.87
		connectivity	0.00	10,099.89	10,099.89	0.00	0.00
		proposed core	0.00	0.00	0	0.00	0.00
		proposed connectivity	0.00	0.00	0	0.00	0.00
		SFAs	0	0	0	0	0

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		GHMA	1,178.47	2,776.29	1,096,184.87	3.46	0.00
		TOTAL	**3,344.93**	**348,750.12**	**1,439,673.23**	**6,739.82**	**3,343.34**
	No Surface Occupancy	core	4,505.06	114,779.91	114,761.52	0.00	22,235.40
		connectivity	0.00	139.29	139.29	0.00	0.00
		proposed core	0	0.00	0.00	0.00	3,576.69
		proposed connectivity	0.00	0.00	0.00	0.00	1,383.76
		SFAs	0	0	0	0.00	6.45
		GHMA	3,586.52	0.00	0.00	0.00	1,474.36
		TOTAL	**8,091.57**	**114,919.19**	**114,900.81**	**0.00**	**28,676.67**
	Controlled Surface Use	core	180,517.76	0.00	0.00	87,223.23	291,563.16
		connectivity	320.84	0.00	0.00	57.86	5,589.99
		proposed core	0	0.00	0.00	0	76,257.96
		proposed connectivity	0.00	0.00	0.00	0	61,066.72
		SFAs	0	0.00	0.00	0	1591
		GHMA	162,950.09	0.00	0.00	55,956.89	42,683.89
		TOTAL	**343,788.69**	**0.00**	**0.00**	**143,237.99**	**478,715.18**
Rights-of-Way	**Exclusion Areas**	core	2,165.61	101,174.34	101,174.34	101,174.33	2,164.01
		connectivity	0.00	2,827.77	2,827.77	2,827.77	0.00
		proposed core	0.00	0.00	0	0.00	0.00
		proposed connectivity	0.00	0.00	0	0.00	0.00
		SFAs	0	0	0	0	1178
		GHMA	2,020.55	2,020.55	481,831.60	2,090.00	2,020.55
		TOTAL	**4,186.16**	**106,022.66**	**585,833.71**	**106,092.10**	**5,362.33**
	Avoidance	core	11,538.52	0.00	0.00	0.00	99,010.33

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
	Areas	connectivity	0.00	0.00	0.00	0.00	817.69
		proposed core	0	0	0.00	0	62,768.35
		proposed connectivity	0.00	0	0.00	0	62,435.15
		SFAs	0	0	0.00	0.00	1599
		GHMA	27,012.33	479,811.19	0.00	28,481.57	14,023.82
		TOTAL	**38,550.85**	**479,811.19**	**0.00**	**28,481.57**	**240,650.35**
Mineral Materials	**Closed Areas**	core	0.00	373,616.32	373,616.32	0.00	0.00
		connectivity	0.00	10,906.65	10,906.65	0.00	0.00
		proposed core	0.00	0.00	0.00	0.00	0.00
		proposed connectivity	0.00	0.00	0.00	0.00	0.00
		SFAs	0	0	0	0	0
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL	**0.00**	**384,522.97**	**384,522.97**	**0.00**	**0.00**
Locatable Minerals	**Existing Withdrawals**	core	96.58	101.36	101.36	96.58	2,188.20
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core	0.00	0.00	0.00	0.00	0.00
		proposed connectivity	0.00	0.00	0.00	0.00	0.00
		SFAs	0	0	0	0	1178
		general habitat	0.00	0.00	0.00	0.00	0.11
		TOTAL	**96.58**	**101.36**	**101.36**	**96.58**	**3,366.05**
	Proposed Withdrawals	core	0.00	373,514.84	373,514.84	0.00	0.00
		connectivity	0.00	10,906.66	10,906.66	0.00	0.00
		proposed core	0.00	0.00	0.00	0.00	0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		proposed connectivity	0.00	0.00	0.00	0.00	0.00
		SFAs	0.00	0	0	0.00	0
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL	**0.00**	**384,421.50**	**384,421.50**	**0.00**	**0.00**
	Considered for Proposed Withdrawal	core	0.00	0.00	0.00	0.00	1,015.93
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core	0.00	0.00	0.00	0.00	0.00
		proposed connectivity	0.00	0.00	0.00	0.00	0.00
		SFAs	0.00	0.00	0.00	0.00	1016
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL	**0.00**	**0.00**	**0.00**	**0.00**	**2,032.31**
Solid Leasable Minerals (non-energy)	**Closed Areas**	core	0.00	373,616.32	373,616.32	0.00	25.64
		connectivity	0.00	10,906.65	10,906.65	0.00	6,385.87
		proposed core	0.00	0.00	0.00	0.00	87,031.96
		proposed connectivity	0.00	0.00	0.00	0.00	63,217.27
		SFAs	0	0	0	0	6.76
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL	**0.00**	**384,522.97**	**384,522.97**	**0.00**	**156,623.01**
Wind Energy	**Excluded**	core	957.34	101,174.34	101,174.34	957.34	957.34
		connectivity	0.00	2,827.77	2,827.77	0.00	0.00
		proposed core	0.00	0.00	62,706.08	0.00	254.29
		proposed connectivity	0.00	0.00	62,435.15	0.00	0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		SFAs	0	0	0	0	0
		GHMA	0.00	2,776.27	481,831.74	0.00	0.00
		TOTAL	**957.34**	**106,778.37**	**585,833.85**	**957.34**	**1,211.63**
	Avoided	core	47,474.63	0.00	0.00	100,216.99	100,216.99
		connectivity	13,485.40	0.00	0.00	32,834.17	30,824.09
		proposed core	0.00	0.00	0.00	0.00	62,514.06
		proposed connectivity	0.00	0.00	0.00	0.00	62,435.15
		SFAs	915,882.81	0.00	0.00	1,629,900.02	1,629,900.03
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL	**2,438,850.00**	**0.00**	**0.00**	**4,608,420.00**	**4,731,350.00**

Table 2: Combined Acres by Land Use Restriction for Bridger-Teton National Forest Federal Surface and Federal Mineral Leases.

Resource/ Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
Surface Disturbing Activities	Prohibited Areas	core	0.00	0.00	0.00	0.00	6.47
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					724.26
		proposed connectivity					1,383.76
		SFAs					6.47
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Prohibited acres within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**2,120.97**
	Restricted Areas	core	0.00	0.00	0.00	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Restricted acres within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Fluid Mineral Leasing	Closed	core	2,084.91	5,945.46	3,460.00	1.89	2,083.32
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					1,178.47
		GHMA	1,178.47	2,776.29	312,122.83	0.00	0.00

Resource/ Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		TOTAL Closed acres within Forest Service Unit	**3,263.38**	**8,721.76**	**315,582.82**	**1.89**	**3,261.79**
	No Surface Occupancy	core	0.00	18.38	0.00	0.00	6.45
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					724.26
		proposed connectivity					1,383.76
		SFAs					6.45
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL NSO acres within Forest Service Unit	**0.00**	**18.38**	**0.00**	**0.00**	**2,120.93**
	Controlled Surface Use	core	1,306.05	0.00	0.00	8.36	3,855.69
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					28,699.85
		proposed connectivity					61,051.37
		SFAs					1,591.37
		GHMA	6,255.37	0.00	0.00	845.77	17.96
		TOTAL CSU acres within Forest Service Unit	**7,561.43**	**0.00**	**0.00**	**854.13**	**95,216.24**
Rights-of-Way	**Exclusion Areas**	core	2,083.21	5,931.12	5,931.13	5,931.12	2,081.60
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					1,177.77
		GHMA	24.02	24.02	324,181.11	24.02	24.02

Resource/ Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		TOTAL Exclusion acres within Forest Service Unit	**2,107.23**	**5,955.15**	**330,112.23**	**5,955.14**	**3,283.40**
	Avoidance Areas	core	0.00	0.00	0.00	0.00	3,849.52
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					29,384.94
		proposed connectivity					62,435.13
		SFAs					1,598.50
		GHMA	2.59	324,157.20	0.00	2.59	2.59
		TOTAL Avoidance acres within Forest Service Unit	**2.59**	**324,157.20**	**0.00**	**2.59**	**97,270.68**
Mineral Materials	**Closed Areas**	core	0.00	6,188.23	6,188.23	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**0.00**	**6,188.23**	**6,188.23**	**0.00**	**0.00**
Locatable Minerals	**Existing Withdrawals**	core	0.00	0.00	0.00	0.00	2,081.69
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					1,177.85
		GHMA	0.00	0.00	0.00	0.00	0.00

Resource/ Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		TOTAL Existing Withdrawals within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**3,259.54**
	Proposed Withdrawals	core	0.00	6,188.19	6,188.19	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Proposed Withdrawals within Forest Service Unit	**0.00**	**6,188.19**	**6,188.19**	**0.00**	**0.00**
	Considered for Proposed Withdrawal	core	0.00	0.00	0.00	0.00	1,015.93
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					1,016.38
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Considered for Proposed Withdrawal within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**2,032.31**
Solid Leasable Minerals (non-energy)	**Closed Areas**	core	0.00	6,188.23	6,188.23	0.00	25.64
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					32,756.82
		proposed connectivity					63,195.32

Resource/ Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		SFAs					6.76
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**0.00**	**6,188.23**	**6,188.23**	**0.00**	**95,984.55**
Wind Energy	**Excluded**	core	0.00	5,931.12	5,931.13	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	2,776.27	324,181.22	0.00	0.00
		TOTAL Excluded acres within Forest Service Unit	**0.00**	**8,707.39**	**330,112.35**	**0.00**	**0.00**
	Avoided	core	1,127.15	0.00	0.00	5,931.12	5,931.12
		connectivity	0.00	0.00	0.00	2,776.27	0.00
		proposed core					29,384.94
		proposed connectivity					62,435.13
		SFAs					2,776.27
		GHMA	1,127.11	0.00	0.00	0.00	0.00
		TOTAL Avoidance acres within Forest Service Unit	**2,254.27**	**0.00**	**0.00**	**8,707.39**	**100,527.46**

Table 3: Combined Acres by Land Use Restriction for Medicine Bow National Forest Federal Surface and Federal Mineral Leases.

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
Surface Disturbing Activities	Prohibited Areas	core	0.00	0.00	0.00	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Prohibited acres within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Restricted Areas	core	0.00	0.00	0.00	0.00	2,444.47
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	69.44
		TOTAL Restricted acres within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**2,513.91**
Fluid Mineral Leasing	Closed	core	81.54	6,280.80	6,280.80	0.00	81.54
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		GHMA	0.00	0.00	28,609.35	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**81.54**	**6,280.80**	**34,890.15**	**0.00**	**81.54**
	No Surface Occupancy	core	0.00	0.00	0.00	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	1.31
		TOTAL NSO acres within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**1.31**
	Controlled Surface Use	core	407.13	0.00	0.00	0.00	6,199.26
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	3,331.73	0.00	0.00	0.00	0.00
		TOTAL CSU acres within Forest Service Unit	**3,738.86**	**0.00**	**0.00**	**0.00**	**6,199.26**
Rights-of-Way	**Exclusion Areas**	core	82.40	5,019.37	5,019.37	5,019.37	82.40
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		GHMA	193.57	193.57	22,635.07	263.02	193.57
		TOTAL Exclusion acres within Forest Service Unit	**275.97**	**5,212.95**	**27,654.45**	**5,282.39**	**275.97**
	Avoidance Areas	core	239.89	0.00	0.00	0.00	4,936.97
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	2,087.81	22,441.51	0.00	3,557.05	2,087.81
		TOTAL Avoidance acres within Forest Service Unit	**2,327.69**	**22,441.51**	**0.00**	**3,557.05**	**7,024.78**
Mineral Materials	**Closed Areas**	core	0.00	6,438.52	6,438.52	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**0.00**	**6,438.52**	**6,438.52**	**0.00**	**0.00**
Locatable Minerals	**Existing Withdrawals**	core	96.58	96.58	96.58	96.58	97.02
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Existing Withdrawals within Forest Service Unit	**96.58**	**96.58**	**96.58**	**96.58**	**97.02**
	Proposed Withdrawals	core	0.00	6,341.93	6,341.93	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Proposed Withdrawals within Forest Service Unit	**0.00**	**6,341.93**	**6,341.93**	**0.00**	**0.00**
	Considered for Proposed Withdrawal	core	0.00	0.00	0.00	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Considered for Proposed Withdrawal within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Solid Leasable Minerals (non-energy)	**Closed Areas**	core	0.00	6,438.52	6,438.52	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed					0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		connectivity					
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**0.00**	**6,438.52**	**6,438.52**	**0.00**	**0.00**
Wind Energy	**Excluded**	core	0.00	5,019.37	5,019.37	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	22,635.08	0.00	0.00
		TOTAL Excluded acres within Forest Service Unit	**0.00**	**5,019.37**	**27,654.46**	**0.00**	**0.00**
	Avoided	core	378.20	0.00	0.00	5,019.37	5,019.37
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Avoidance acres within Forest Service Unit	**378.20**	**0.00**	**0.00**	**5,019.37**	**5,019.37**

Table 4: Combined Acres by Land Use Restriction for Thunder Basin National Grassland Federal Surface and Federal Mineral Leases.

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
Surface Disturbing Activities	Prohibited Areas	core	0.00	0.00	0.00	0.00	4,996.71
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					1,411.09
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	12.98
		TOTAL Prohibited acres within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**6,420.78**
	Restricted Areas	core	4,617.65	0.00	0.00	819.61	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	2,170.87	0.00	0.00	258.08	0.00
		TOTAL Restricted acres within Forest Service Unit	**6,788.52**	**0.00**	**0.00**	**1,077.69**	**0.00**
Fluid Mineral Leasing	Closed	core	0.00	323,647.68	323,647.67	6,734.47	0.00
		connectivity	0.00	10,099.89	10,099.89	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	755,452.70	3.46	0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		TOTAL Closed acres within Forest Service Unit	**0.00**	**333,747.56**	**1,089,200.26**	**6,737.93**	**0.00**
	No Surface Occupancy	core	4,505.06	114,761.52	114,761.52	0.00	22,228.95
		connectivity	0.00	139.29	139.29	0.00	0.00
		proposed core					2,852.43
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	3,586.52	0.00	0.00	0.00	1,473.05
		TOTAL NSO acres within Forest Service Unit	**8,091.57**	**114,900.81**	**114,900.81**	**0.00**	**26,554.43**
	Controlled Surface Use	core	178,804.57	0.00	0.00	87,214.87	281,508.21
		connectivity	320.84	0.00	0.00	57.86	5,589.99
		proposed core					47,535.56
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	153,362.99	0.00	0.00	55,111.12	42,665.93
		TOTAL CSU acres within Forest Service Unit	**332,488.40**	**0.00**	**0.00**	**142,383.86**	**377,299.68**
Rights-of-Way	**Exclusion Areas**	core	0.00	90,223.84	90,223.84	90,223.84	0.00
		connectivity	0.00	2,827.77	2,827.77	2,827.77	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	1,802.96	1,802.96	135,015.42	1,802.96	1,802.96

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		TOTAL Exclusion acres within Forest Service Unit	**1,802.96**	**94,854.57**	**228,067.03**	**94,854.57**	**1,802.96**
	Avoidance Areas	core	11,298.63	0.00	0.00	0.00	90,223.84
		connectivity	0.00	0.00	0.00	0.00	817.69
		proposed core					33,379.94
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	24,921.93	133,212.48	0.00	24,921.93	11,933.42
		TOTAL Avoidance acres within Forest Service Unit	**36,220.56**	**133,212.48**	**0.00**	**24,921.93**	**136,354.89**
Mineral Materials	**Closed Areas**	core	0.00	360,989.58	360,989.58	0.00	0.00
		connectivity	0.00	10,906.65	10,906.65	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**0.00**	**371,896.23**	**371,896.23**	**0.00**	**0.00**
Locatable Minerals	**Existing Withdrawals**	core	0.00	4.78	4.78	0.00	9.49
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		TOTAL Existing Withdrawals within Forest Service Unit	**4.78**	**4.78**	**4.78**	**0.00**	**9.49**
	Proposed Withdrawals	core	0.00	360,984.72	360,984.72	0.00	0.00
		connectivity	0.00	10,906.66	10,906.66	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Proposed Withdrawals within Forest Service Unit	**0.00**	**371,891.38**	**371,891.38**	**0.00**	**0.00**
	Considered for Proposed Withdrawal	core	0.00	0.00	0.00	0.00	0.00
		connectivity	0.00	0.00	0.00	0.00	0.00
		proposed core					0.00
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Considered for Proposed Withdrawal within Forest Service Unit	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Solid Leasable Minerals (non-energy)	**Closed Areas**	core	0.00	360,989.58	360,989.58	0.00	0.00
		connectivity	0.00	10,906.65	10,906.65	0.00	6,385.87
		proposed core					54,252.59
		proposed connectivity					0.00

Resource/Activity	Land Use Restriction	Habitat Evaluated	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Closed acres within Forest Service Unit	**0.00**	**371,896.23**	**371,896.23**	**0.00**	**60,638.47**
Wind Energy	**Excluded**	core	957.34	90,223.84	90,223.84	957.34	957.34
		connectivity	0.00	2,827.77	2,827.77	0.00	0.00
		proposed core					254.29
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	135,015.44	0.00	0.00
		TOTAL Excluded acres within Forest Service Unit	**957.34**	**93,051.61**	**228,067.05**	**957.34**	**1,211.63**
	Avoided	core	45,969.27	0.00	0.00	89,266.50	89,266.50
		connectivity	174.85	0.00	0.00	2,827.77	817.69
		proposed core					33,125.65
		proposed connectivity					0.00
		SFAs					0.00
		GHMA	0.00	0.00	0.00	0.00	0.00
		TOTAL Avoidance acres within Forest Service Unit	**46,144.12**	**0.00**	**0.00**	**92,094.27**	**123,209.84**