
APPENDIX M—WILDLIFE AND BOTANY REPORT AND MANAGEMENT INDICATOR SPECIES REPORT

Wildlife and Botany Report

for the

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

December 13, 2013

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I. INTRODUCTION

The purpose of this biological evaluation is to identify the likely effects of management decisions associated with the Greater Sage-Grouse (GRSG) Planning Decision, specifically for the Bridger-Teton National Forest (BT) on USDA Forest Service Region 4 sensitive species and for the Medicine Bow National Forest (MB) and Thunder Basin National Grassland (TBNG) on USDA Forest Service Region 2 sensitive species. Regional sensitive species lists are comprised of plants, birds, mammals, amphibians, reptiles, fish, and invertebrates.

This biological evaluation 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 USDA Forest Service has developed policy regarding the designation of plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following three criteria:

- 1) The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend.
- 2) The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline.
- 3) The species' population or habitat is stable but limited.

Forest Service Objectives- Under FSM 2672.41, the objectives for completing biological evaluations for proposed Forest Service programs or activities are:

- 1) To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or contribute to animal species or trends toward Federal listing of any species listed as sensitive by USDA Forest Service Region 2.
- 2) To comply with the requirements of the Endangered Species Act, actions of Federal agencies should not jeopardize or adversely modify critical habitat of federally listed species.
- 3) To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process, and to enhance opportunities for mitigation.

FSM 2670.22 #2 regarding objectives for sensitive species states, "Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System Lands." FSM 2600, Section 2671.44 (Supplement 2600-94-2) provides direction on the review of actions and programs authorized, funded or implemented by the Forest Service relative to the requirements of the Endangered Species Act.

II. PROJECT HISTORY

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

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

In 2011 and 2012, the United States Fish and Wildlife Service (FWS) submitted letters to the BLM and Forest Service recommending that the agencies amend Land Use Plans to provide adequate regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 National Forests viewed as “high priority” to ensure appropriate regulatory mechanisms. Following scoping and discussion the Forest Service added an additional 10 Forest Plans that would be considered for amendment. The Forest Service is participating in several joint Environmental Impact Statements (EISs) with the BLM to develop Records of Decision that will be used as a basis for amending Land Use Plans, including Forest Plans.

Since half of all GRSG habitat occurs on BLM-administered lands, the BLM is leading the effort to amend or revise land use plans, with the Forest Service as a cooperating agency. The purpose is to provide direction in land management plans that conserve and protect sage-grouse habitat and to provide assurances to the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for seven sage-grouse planning 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/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision.” The Forest Service is involved in five of these efforts (<http://fsweb.r4.fs.fed.us/unit/nr/sagegrouse/index.shtml>)

This specialist report was prepared in support of the Wyoming 9 Plan EIS. The BT, MB, and TBNG are planning to amend respective Land and Resource Management Plans for the GRSG.

III. PURPOSE AND NEED

The purpose of the Land and Resource Management Plan amendment for the GRSG is to identify and incorporate appropriate conservation measures to conserve, enhance, and/or restore sage-grouse habitat by reducing, eliminating, or minimizing threats to their habitat. The need to create this amendment arose when the inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The USFWS identified conservation measures within Forest Service Land and Resource Management Plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the Land and Resource Management Plan amendment will focus on areas affected by threats to sage-grouse habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

IV. DESCRIPTION OF THE ALTERNATIVES

The BLM and Forest Service are developing a range of alternatives that are specifically structured to identify and incorporate appropriate conservation measures in Land Use Plans to conserve, enhance or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. There are currently five alternatives to consider under this analysis: Alternative A - No action, Alternative B – National Technical Team (NTT) alternative, Alternative C – Conservation groups (citizen’s based) alternative, Alternative D – Wyoming sub-regional alternative, and Alternative E – Wyoming sub-regional combination of Governor’s Executive Order and NTT measures. A brief description of each of the alternatives is provided below. For a full description of the alternatives, as well as project design criteria, mitigation and monitoring requirements, please refer to chapter 2 of the EIS prepared for this project.

One of the key differences among the alternatives is the type of designated habitat applicable to each. Designated sage-grouse habitat is divided into two main categories—preliminary priority habitat (PPH) and preliminary general habitat (PGH). PPH is defined as areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. These areas include breeding, late brood-rearing and winter concentration areas. PGH is defined as areas of occupied seasonal or year-round habitat outside of PPH. A third category of linkage areas is also present. Within the document, all designated habitat (ADH) refers to all PPH, PGH, and connectivity habitat.

Alternative A: No-action

Under the no-action alternative the Land and Resource Management Plans would not be amended. The existing management direction set for sage-grouse and sagebrush habitat would continue. New road construction would be allowed near leks, in PPH, and in PGH with few limitations. There are no specific limitations on upgrading roads. There are few limitations on recreation special uses. Some Rights-of-way would be allowed in sage-grouse habitat for powerlines. Mineral and energy development is allowed in most PPH and PGH with some limitations. Wind energy development is allowed in some PPH with some limitations. Disturbances from new facilities would be limited from 0.25 to 2 miles from active leks or nesting habitat. Disturbance of nesting habitat is prohibited on the Medicine Bow and Thunder Basin Grassland within 2 miles of leks. Some noise restrictions apply for the Medicine Bow and Thunder Basin Grassland. Livestock grazing will retain herbaceous material to provide cover and forage for GRSG (MB). GRSG needs will be addressed in allotment management plans

(BT). Livestock grazing will retain nesting cover within 2-3 miles of leks. There are some limitations on shrub treatments in the Medicine Bow and Thunder Basin Plans. Treatments in winter range would be limited but permitted. Treated areas would be rested from grazing. Post treatment rehabilitation includes native plants or seed.

Alternative B:

All applicable and appropriate conservation measures that were developed in the NTT's 2011 report (Sage Grouse National Technical Team 2011) would be considered and incorporated into this alternative. These conservation measures would apply most often to GRSG PPH, less often to PGH, and, rarely, to connectivity habitat. There would be a 3% cap on disturbance in these areas.

Travel construction would be limited in PPH, minimum standards would be applied and there would be no upgrading of roads. Travel would be limited to existing roads. Recreation special use permits in PPH would only be allowed if they are deemed to have a neutral or beneficial effect on GRSG. All GRSG core habitat areas and Important Bird Areas could be designated as SIAs.

Rights-of-way would be excluded in PPH. The Forests and Grassland would aim to keep and acquire PPH.

PPH would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy buffer around leks. Exceptions and modifications to leases would not be considered in PPH. Geophysical exploration is prohibited in PPH with few exceptions. Most coal and non-energy mineral leasing is unsuitable in PPH. Wind energy development would be allowed but met towers are prohibited in PPH. There is a seasonal restriction on disturbance of nesting habitat in PPH. Noise restrictions are 10 dB above ambient during elk season.

Only light grazing is allowed in PPH in allotments not meeting standards. Grazing direction would be adjusted to improve management for GRSG. Planning efforts will identify grazing allotments where permanent retirement of grazing privileges is beneficial to GRSG. Water developments are authorized only when beneficial to upland and riparian GRSG habitat.

Wildfire/Fuels would aim to protect sagebrush habitats in PPH. No prescribed fire treatment is allowed in PPH in $\leq 12''$ precipitation zone. Habitat restoration would be a priority, with a focus on native species. Treatments in sage-grouse winter range would be very limited. Fuels treatments in PPH would retain 15% sagebrush cover. Treatments would be rested from grazing for 2 growing seasons. Post treatment rehabilitation includes native plants.

Alternative C:

During scoping, conservation groups had the opportunity to submit suggestions on how to define PPH and PGH areas and developed their own conservation measures that would be applied to those areas (proposing more stringent management). All of the reasonable conservation measures across the sage grouse range have been consolidated into one alternative which each sub-region will analyze in detail. This alternative would apply to all designated GRSG habitat, including PPH, PGH, and connectivity habitat. There would be a 3% cap on disturbance in these areas.

Travel construction would be limited in all designated habitat and no new roads would be constructed within 4 miles of a lek or occupied habitat. Travel would be limited to existing roads. No road upgrading would be allowed in designated habitat. Recreation special use permits in PPH would only be allowed if they are deemed to have a neutral or beneficial effect on GRSG. Recreation would seasonally prohibit camping and non-motorized recreation within 4 miles of a lek. Designate SCAs for GRSG.

All designated habitat would be exclusion areas for rights-of-way and special use permits. The Forests and Grassland would aim to keep and acquire all designated habitat.

Wind and solar installations would not be allowed to be sited in designated habitat. All designated habitat would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy buffer around leks. Exceptions and modifications to leases would not be considered in PPH. Geophysical exploration is prohibited in PPH. Most coal and non-energy mineral leasing is unsuitable in PPH. There is a seasonal restriction on disturbance in nesting habitat in all designated habitat. Noise restrictions are 10 dB above ambient during lek season.

PPH would be closed to livestock grazing. Grazing direction would be adjusted to improve management for GRSG on other habitat. Planning efforts will identify grazing allotments where permanent retirement of grazing privileges is beneficial to GRSG. No water developments are permitted within PPH or PGH.

Wildfire/Fuels would aim to protect and restore sagebrush habitats in PPH and PGH; areas would be closed to grazing after wildfire. No prescribed fire treatment is allowed in <12” precipitation zone in PPH or PGH. Treatments in sage-grouse winter range would be very limited. Post treatment rehabilitation will include native plants including sagebrush.

Alternative D:

In this alternative, sub-regions will have the opportunity to make changes to the recommendations from the NTT report and adjust habitat boundaries based on science, resource trade-offs, scoping comments, and internal staff expertise. In Wyoming, this alternative incorporates comments from Wyoming cooperators. Conservation measures would apply to GRSG PPH and PGH and, rarely, to connectivity habitat. There would be a 9% cap on disturbance in PPH.

New roads would not be constructed within 0.25 miles of a lek in PPH. Road upgrades would be allowed in PPH and PGH. Recreation special use permits in PPH would be allowed on a case by case basis. No GRSG SIAs would be designated.

Rights-of-way would permit new power lines in PPH within 2 identified transmission line corridors, near existing large transmission lines, or areas deemed to have minor impacts on GRSG. Other GRSG habitat would be available for Rights-of-way. The Forests and Grassland would aim to keep and acquire PPH. Exceptions and modifications to leases would be considered in PPH and PGH. Disruptive activities would be precluded within 0.25 miles of occupied leks in PPH or connectivity habitat.

New fluid mineral leases would be allowed. Geophysical exploration is not permitted. Coal and non-energy mineral leasing in PPH can be suitable with stipulations. Wind energy development would be prohibited in PGH unless there would be no decline in GRSG populations. There is a seasonal restriction on nesting habitat in PPH within 2 miles of a lek. Some noise restrictions apply for the Medicine Bow and Thunder Basin Grassland.

Grazing direction would be monitored to meet Wyoming land health standards and consider GRSG objectives in PPH. Water developments are authorized as needed for grazing in PPH.

Wildfire/Fuels treatments in sagebrush in PPH could occur up to a 9% disturbance threshold. Prescribed fire would not be limited in ≤ 12 " precipitation zone. Treatment in sage-grouse winter range would be permitted. Treated areas would not be rested from grazing. No rehabilitation is identified for prescribed fires or wild fires.

Alternative E:

This sub-regional adjustment alternative generally applies to PPH with some measures also applying in PGH and connectivity habitat. This alternative includes elements from the BLM IM, the Governor's EO and the NTT alternative in areas not addressed in Wyoming specific directives.

New primary and secondary roads would not be constructed within 1.9 miles of a lek in PPH. Other roads would not be constructed within 0.6 miles of a lek in PPH. Some road upgrades would be allowed in PPH. Recreation special use permits in PPH would be allowed unless impacts cannot be mitigated. No GRSG SIAs would be designated.

Rights-of-way would permit new power lines in PPH within 2 identified transmission line corridors, near existing large transmission lines, or areas deemed to have minor impacts on GRSG. Other GRSG habitat would be available for Rights-of-way. GRSG PPH could be sold or exchanged for economic benefits. Exceptions and modifications to leases would be considered in PPH and PGH. Disruptive activities would be precluded within 0.6 miles of occupied leks in PPH or connectivity habitat.

New fluid mineral leases would be allowed. Geophysical exploration is allowed within PPH when fragmentation does not occur. Coal and non-energy mineral leasing in PPH can be suitable with stipulations. Wind energy development would be prohibited in PGH unless there would be no decline in GRSG populations. There is a seasonal restriction on disturbance in nesting habitat in PPH. Noise restrictions would be developed over time.

Wyoming land health standards would be monitored to determine if grazing is a significant factor where unsatisfactory conditions exist and to determine adjustments. Water developments are authorized when beneficial to upland and riparian habitat in PPH.

The BTNF currently utilizes the full spectrum of fire management practices. Wildfires on the BTNF are assessed according to their location, current conditions, Forest Plan objectives, values, and current and projected fire behavior to determine the most appropriate response to ensure firefighter and public safety, protect values, and manage for ecosystem health. Fires, or portions thereof, that pose significant threat to values are suppressed as safely and quickly as possible.

For wildland fires, management action points are utilized as planning tools to inform actions that may need to occur based on values for a specific fire. The BTNF also utilizes prescribed fires to treat fuels in pre-identified areas to either reduce fuel build up or create diversity in age classes of vegetation types.

V. ANALYSIS AREA

The analysis area consists of areas of the Bridger-Teton National Forest (BT), Medicine Bow National Forest (MB), and Thunder Basin National Grassland (TBNG) that have been identified as Greater Sage-Grouse habitat. Table 1 identifies the amount of GRSG Preliminary Primary Habitat (PPH) and Preliminary General Habitat (PGH) by management unit. The amount of GRSG habitat varies considerably among the units.

Table 1. Acres of GRSG habitat on each management unit (percentage of total acres).

Management Unit	Total Unit Area	GRSG PPH	GRSG PGH
Bridger-Teton	3,400,000	5933 (1.7)	262,018 (7.7)
Medicine Bow	1,262,325	4564 (0.4)	22,915 (1.8)
Thunder Basin	553,864	217,768 (39.2)	336,096 (60.7)

VII. SPECIES CONSIDERED IN THE ANALYSIS

THREATENED, ENDANGERED, PROPOSED AND CANDIDATE SPECIES

A Biological Assessment (BA) will be prepared on the selected alternative developed for the Record of Decision and will be included with the FEIS developed for this project. The BA will conform to the legal requirements set forth under section 7 of the Endangered Species Act (ESA) (19 U.S.C. 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, or destroy or adversely modify designated critical habitat. A Biological Assessment must be prepared for federal actions to evaluate the potential effects of the proposal on listed or proposed species. 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)).

A BA is not included with this DEIS. This Wildlife and Botany Specialist Report provides preliminary background information that will be utilized in the development of a BA and Biological Evaluation (BE) for the selected alternative. It also provides insight into the currently anticipated effects to threatened, endangered, proposed and candidate species. Species identified by the USFWS as ‘candidate’ species have no ESA protections but by Forest Service policy, they are designated as Regional Forester ‘sensitive species’ and afforded special management attention by the US Forest Service. They are analyzed in the Biological Evaluation developed for

the FEIS and are discussed in the sensitive species section of this specialist report, if they occur on one of the Forest Units.

A list of threatened, endangered, proposed, and candidate (TEPC) species was determined for this project in consultation with the USFWS. Close coordination with USFWS will continue throughout the project. Table 2 is the list of TEPC species likely to be included in the Biological Assessment prepared for the selected alternative. Overall it is generally assumed that implementation of any of the action alternatives that adds additional conservation measures for Greater Sage-Grouse may also result in indirect positive outcome for other listed species associated with sage-grouse or sagebrush habitats, if they occur in the area where the conservation measures are applied. Negative consequences to other listed species are not envisioned as an outcome of selection of any of the alternatives.

Table 2. Special Status Species Evaluated in This Report

Common Name	Scientific Name	Federal Status
Wildlife		
Black-footed ferret	<i>Mustela nigripes</i>	Experimental Population, Non-Essential
Canada Lynx	<i>Lynx canadensis</i>	Threatened
Bonytail Chub	<i>Gila elegans</i>	Endangered
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Gray Wolf	<i>Canis lupus</i>	Experimental
Grizzly bear	<i>Ursus arctos horribilis</i>	Threatened
Humpback Chub	<i>Gila cypha</i>	Endangered
Kendall Warm Springs Dace	<i>Rhinichthys osculus thermalis</i>	Endangered
Least Tern	<i>Sterna antillarum</i>	Endangered
North American Wolverine	<i>Gulo gulo luscus</i>	Proposed Threatened
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered
Piping Plover	<i>Charadrius melodus</i>	Threatened
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	Threatened
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered
Whooping Crane	<i>Grus americana</i>	Endangered
Wyoming Toad	<i>Bufo baxteri</i>	Endangered
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Proposed Threatened
Northern Long-eared Myotis	<i>Myotis septentrionalis</i>	Proposed Endangered
Plants		
Blowout Penstemon	<i>Penstemon haydenii</i>	Endangered
Colorado Butterfly Plant	<i>Gaura neomexicana ssp. coloradensis</i>	Threatened
Desert Yellowhead	<i>Yermo xanthocephalus</i>	Threatened
Fremont County Rockcress	<i>Boechera pusilla</i>	Candidate

Fringed Orchid	<i>Platanthera praeclara</i>	Endangered
Ute Ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened
Whitebark Pine	<i>Pinus albicaulis</i>	Candidate
Critical Habitat		
Canada Lynx Critical habitat		
Colorado Butterfly Plant Critical Habitat		
Colorado River Fish Critical Habitat		
Desert Yellow head Critical Habitat		
Platte River Species Critical Habitat		

FOREST SERVICE SENSITIVE SPECIES

The Region 2 and 4 sensitive species lists are composed of plants, birds, mammals, amphibians, fish, and invertebrates identified for that region. We 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. Existing occurrence information, 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 U.S. Forest Service, Region 2 Threatened, Endangered, and Sensitive Species (TES) Program has developed a Technical Conservation Assessment program to assist Forest Service wildlife biologists and others in conducting project impact analysis on many of Region 2 Sensitive Species. These Assessments, “produced by the Rocky Mountain Region’s (R2) Species Conservation Project (SCP) is intended to serve a variety of purposes. Ultimately, they are a component of a broad science platform being developed to reshape planning for 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 on approximately 225 species and as input to a process that synthetically marries ecological processes and conditions with species needs to lay a foundation for ecologically based forest management. (Region 2 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 have been used extensively. They can be generally found at: <http://www.fs.fed.us/r2/projects/scp/assessments>

Table 3 is a list of Region 2 and Region 4 Forest Service sensitive species. Threatened, endangered, and proposed species are addressed separately in the biological assessment prepared for this project. All of the species in Table 2 were considered for this analysis and compared to the 5 criteria listed below. The criteria were used to identify species that would experience “no impact” from the implementation of the action alternatives and could therefore be eliminated from detailed analysis. These numerical categories below are referred to in Table 3:

1. Analysis area is outside the species’ range.

2. Potential habitat for the species does not exist within Greater Sage-Grouse habitat (sagebrush-steppe) or is outside the elevation range of the Greater Sage-Grouse.
3. The type or intensity of the activity in the proposed action is expected to have no impact/effect on these species or their habitat.
4. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic or opportunistic visitors to the habitat(s) impacted by the proposal, but no affiliation or dependence upon these habitat(s) has been shown.
5. The associated conservation design or mitigations eliminate any potential for impact on the species.

Species in Table 3 that are likely to occur within or near the analysis area, or with 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 were it carried forward into Table 4, and a more detailed analysis of the project effects was subsequently conducted.

The Analysis of Management Situation (AMS) for this sage-grouse 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 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.

Table 3. USDA Forest Service Region 2 and 4 sensitive species occurring or potentially occurring on the Bridger-Teton (BT) or Medicine Bow (MB) National Forests or Thunder Basin National Grassland (TBNG) that may be influenced by an action alternative and will be 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 <i>Ovis canadensis canadensis</i>	High elevation alpine habitats with steep escape terrain adjacent to open foraging areas during summer. Habitat overlap on MB.	Y		See detailed analysis below.
Fisher <i>Martes pennanti</i>	Extensive, mature to old-growth spruce-fir forests with high levels of canopy closure on BT.	N	2	No Impact
American marten <i>Martes americana</i>	SF, LPP	N	2	No Impact
Spotted Bat <i>Euderma maculatum</i>	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, TBNG.	Y		See detailed analysis below.
Townsend's Western Big-eared Bat <i>Corynorhinus townsendii townsendii</i>	Strongly correlated with the availability of caves and abandoned mines for roosts. Habitat overlap on MB, TBNG.	Y		See detailed analysis below.
Fringed myotis <i>Myotis thysanodes</i>	Forages in PP, oak, shrublands, pinyon/juniper on MB, TBNG	Y		See detailed analysis below.
Hoary bat <i>Lasiurus cinereus</i>	Conifer forest, woodland on MB, SS areas on TBNG	Y		See detailed analysis below.

Pygmy shrew <i>Sorex hoyi</i>	Wetland edges in SF above 9000 ft. on MB	N	1	No Impact
Black-tailed prairie dog <i>Cynomys ludovicianus</i>	Grasslands on TBNG	Y		See detailed analysis below
White-tailed prairie dog <i>Cynomys leucurus</i>	Colony at Six-Mile/Platte River on MB	Y		See detailed analysis below.
Swift fox <i>Vulpes velox</i>	Grasslands on TBNG	Y		See detailed analysis below
Wyoming pocket gopher <i>Thomomys clusius</i>	SS, Grassland near MB	Y		See detailed analysis below.
River otter <i>Lontra canadensis</i>	Rivers on MB	N	2	No Impact
BIRDS (32)				
American bittern <i>Botaurus lentiginosus</i>	Marshes on TBNG	N	3	No impact
Bald eagle <i>Haliaeetus leucocephalus</i>	Lakes, rivers	N	4	No impact
Greater Sage-Grouse <i>Centrocercus urophasianus</i> (C)	Sagebrush and diverse native grass and forb understory.	Y		See detailed analysis below.
Yellow-billed Cuckoo <i>Coccyzus americanus</i> (C)	Large areas of dense woody riparian vegetation with cottonwood overstory.	N	2	No Impact

Ferruginous hawk <i>Buteo regalis</i>	SS, Grassland on MB, TBNG	Y		See detailed analysis below.
American Peregrine Falcon <i>Falco peregrinus anatum</i>	Vertical cliff habitat, preferentially near high avian prey populations on BT, MB, TBNG	Y	4	No Impact
Northern harrier <i>Circus cyaneus</i>	Grassland, Marsh, SS near water, <2400m on MB, TBNG	Y		See detailed analysis below.
Columbian sharp-tailed grouse <i>T. phasianellus columbianus</i>	MS west of Continental Divide on MB	Y		See detailed analysis below.
Northern Goshawk <i>Accipiter gentilis</i>	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 <i>Lagopus leucurus</i>	Alpine willow. Currently considered extirpated on the MB.	N	1,2	No Impact
Short-eared owl <i>Asio flammeus</i>	SS, grasslands, marshes. Might occur only on the Laramie Peak unit of MB	Y		See detailed analysis below.
Burrowing owl <i>Athene cunicularia</i>	Grasslands on TBNG	Y		See detailed analysis below
Lewis' woodpecker <i>Melanerpes lewis</i>	PP. Occurs on the Laramie Peak unit of MB	N	2	No Impact
Black-backed woodpecker <i>Picoides arcticus</i>	SF, PP and recently burned conifer forest on MB	N	2	No Impact

Olive-sided flycatcher <i>Contopus borealis</i>	SF, LP, WET, FM on MB	N	2	No Impact
Purple martin <i>Progne subis</i>	AS in specific area on west side of Continental Divide on MB	N	2	No Impact
Loggerhead shrike <i>Lanius ludovicianus</i>	Grassland w/shrubs <8000 ft. on MB, TBNG	Y		See detailed analysis below.
Brewer's sparrow <i>Spizella breweri</i>	SS on MB, TBNG	Y		See detailed analysis below.
Grasshopper sparrow <i>Ammodramus savannarum</i>	Grasslands on TBNG	Y		See detailed analysis below.
Sage sparrow <i>Amphispiza bellii</i>	SS below 6500 ft. on MB, TBNG	Y		See detailed analysis below.
McCown's longspur <i>Calcarius mccownii</i>	Grasslands on TBNG	Y		See detailed analysis below.
Chestnut-collared longspur <i>Calcarius ornatus</i>	Grasslands on TBNG	Y		See detailed analysis below.
Boreal Owl <i>Aegolius funereus</i>	Large expanses of contiguous forests that are typically structurally complex Engelmann spruce/subalpine fir forest types.	N	2	No Impact
Great Gray Owl <i>Strix nebulosa</i>	Dense coniferous forest types usually associated with mature or old growth Douglas fir for nesting on BT	N	2	No Impact
Flammulated owl <i>Otus flammeolus</i>	Ponderosa pine, Douglas fir stands mixed with aspen on BT, MB	N	2	No Impact

Three-toed Woodpecker <i>Picoides tridactylus</i>	Mixed conifer forests of lodgepole pine, Douglas-fir, Engelmann spruce, and subalpine fir; large numbers of recently killed trees provide the best habitat. *Sage-grouse general habitat boundary on BT broadly includes this conifer habitat but there is no habitat association with sage-grouse.	N	2	No Impact
Harlequin duck <i>Histrionicus histrionicus</i>	Low gradient streams with dense shrubs, braided channels, swift currents, and abundant aquatic insects on BT.	N	2	No Impact
Trumpeter Swan <i>Cygnus buccinator</i>	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 <i>Gavia immer</i>	Breeding habitat includes secluded, clear-water lakes more than 10 acres in size located between 6-8,000ft elevation on BT	N	2	No Impact
Long-billed curlew <i>Numenius americanus</i>	Grasslands on TBNG	Y		See detailed analysis below.
Mountain plover <i>Charadrius montanus</i>	Grassland habitat overlap on TBNG	Y		See detailed analysis below.
Black tern <i>Chlidonias niger</i>	Wetlands on TBNG	Y	3	No Impact
REPTILES AND AMPHIBIANS (4)				
Columbia spotted frog <i>Rana luteiventris</i>	Subalpine forests, grasslands and sagebrush habitats at elevations from 1,700 feet to 6,400 feet on BT	Y	3	No Impact
Boreal Toad <i>Bufo boreas boreas</i>	Montane forests between 7,000' and 12,000' 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 <i>Lithobates pipiens</i>	Wide variety aquatic habitats, wetlands on MB	Y	3	No Impact
Wood frog <i>Lithobates pipiens</i>	Sedge, grass meadows, willow hummocks, aspen, lodgepole forests, woodlands on MB	N	1	No Impact
FISH (13)				
Bonneville Cutthroat Trout <i>Oncorhynchus clarki utah</i>	Native to Salt Creek and Smith Fork drainages of the Bear River system on BT	N	3	No Impact
Colorado River Cutthroat Trout <i>Oncorhynchus clarki pleuriticus</i>	Native to the Green River drainage on BT and Little Snake on MB	N	3	No Impact
Northern Leatherside <i>Lepidomeda copei</i>	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 <i>Oncorhynchus clarki spp</i>	Native to the Yellowstone and Snake River systems on the Jackson and Buffalo Ranger Districts on BT	N	3	No Impact
Mountain sucker <i>Catostomus platyrhynchus</i>	Clear, cold creeks, small to medium-sized rivers with sand, gravel, rubble substrate on MB	N	3	No Impact
Hornyhead chub <i>Nocomis biguttatus</i>	Isolated populations in the Laramie and North Laramie rivers on MB	N	3	No Impact
Lake chub <i>Couesius plumbeus</i>	Permanent spring flow, usually at the headwaters of small streams on TBNG	Y	3	No Impact
Plains minnow <i>Hybognathus placitus</i>	Great Plains streams with fluctuating stream flows, shifting sand substrates on TBNG	Y	3	No Impact

Sturgeon chub <i>Macrhybopsis gelida</i>	Great Plains rivers on TBNG	N	3	No Impact
Northern redbelly dace <i>Phoxinus eos</i>	Permanent spring seeps, usually at the extreme headwaters of small streams	Y	3	No Impact
Southern redbelly dace <i>Phoxinus erythrogaster</i>	Streams and ponds that are clear with sand and silt substrates.	Y	3	No Impact
Finescale dace <i>Phoxinus neogaeus</i>	Permanent spring seeps, usually at the extreme headwaters of small streams on TBNG	Y	3	No Impact
Flathead chub <i>Platygobio gracilis</i>	Big Horn, Tongue, Powder, Little Powder, Belle Fourche, and Cheyenne river systems on TBNG	Y	3	No Impact
INSECTS (1)				
Hudsonian emerald <i>Somatochlora hudsonica</i>	Boggy ponds on MB	N	2	No impact
PLANTS (49)				
Pink agoseris <i>Agoseris lackschewitzii</i>	Wet meadow habitat without a sagebrush component on BT	N	1	No Impact
Sweet-flowered rock jasmine <i>Androsace chamaejasme ssp. carinata</i>	Exposed rocky ridge crests, 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
Barr's milkvetch <i>Astragalus barrii</i>	In badland islands in sage brush and grassland matrices. 3,500-6,700 ft. on TBNG	Y	Y	See detailed analysis below.

Meadow milkvetch <i>Astragalus diversifolius</i> var. <i>diversifolius</i>	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.
<i>Astragalus jejunus</i> var. <i>jejunus</i> 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
<i>Astragalus paysonii</i> 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.
<i>Aquilegia laramiense</i> Laramie columbine	Crevices in north facing granite boulders, 6,250-8,000 ft. on MB	N	2	No Impact
<i>Astragalus leptaleus</i> park milkvetch	Willow carrs/ Sedge-grass transition to shrub. 8,800 ft. on MB	N	2	No Impact
<i>Botrychium lineare</i> narrowleaf moonwort	Grass, stream, forest edges, also upland habitats, 0 ft. -10,500 ft. on MB	N	2	No Impact
<i>Carex diandra</i> lesser panicled sedge	Peatland-fens, pond edge, 6,100 to 8,600 ft. on MB	N	2	No Impact
<i>Carex incurviformis</i> Seaside sedge	Alpine and subalpine moist tundra and wet rock ledges 10,000 to 12,200 elevation on BT	N	1	No Impact
<i>Carex livida</i> livid sedge	Floating mats, bogs, fens, and marls with <i>Carex</i> , hummocks, 9,000 to 10,000 ft. on MB	N	2	No Impact

<i>Carex luzulina</i> var. <i>atropurpurea</i> Black and purple sedge	Subalpine wet meadows and stream sides at 10,000 to 10,600 feet elevations on BT	N	1	No Impact
<i>Cypripedium</i> <i>parviflorum</i> lesser yellow lady's slipper	Mossy woods, streams and bogs, 4,000m to 6,400m on MB	N	2	No Impact
Wyoming tansymustard <i>Descurainia</i> <i>torulosa</i>	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
<i>Draba</i> <i>exunguiculata</i> Clawless draba (Gray's peak draba)	Alpine fell fields, 10,000 ft.+ on MB	N	2	No Impact
<i>Draba globosa</i> 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
<i>Draba grayana</i> Gray's draba	Alpine fell fields, 10,000 ft.+ on MB	N	1	No Impact
<i>Drosera</i> <i>rotundifolia</i> roundleaf sundew	Acid fens, float mats, bogs, 9,100 to 9,800 ft. on MB	N	1	No Impact
<i>Eleocharis</i> <i>elliptica</i> Elliptic spike rush (boreal spike rush)	Thermal seeps/ springs, stock ponds, 6,200 to 7,250 ft. on MB	N	2	No Impact

<i>Ericameria discoidea</i> var. <i>linearis</i> 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
<i>Erigeron lanatus</i> Woolly daisy	Alpine or subalpine limestone talus slopes at 11,000 feet elevation on BT	N	1	No Impact
<i>Eriogonum exilifolium</i> dropleaf (slender leaved) buckwheat	Semi bare sandy bunchgrass communities, seleniferous gumbo, 6,900 to 8,800 ft. on MB	Y		See detailed analysis below.
<i>Eriophorum altaicum</i> var. <i>neogaeum</i> whitebristle cottongrass	Fens, 9,500-14,000 ft. on MB	N	1	No Impact
<i>Eriophorum gracile</i> slender cottongrass	Sedge meadows, floating bogs saturated soil to shallow water, 6,900 to 10,500 ft. on MB	N	2	No Impact
<i>Festuca hallii</i> plains rough fescue (Hall's fescue)	Sloped montane meadows, edges open conifer 6,800 to 11,000 ft. on MB	N	2	No Impact
<i>Ipomopsis aggregata</i> ssp. <i>weberi</i> scarlet gilia (Rabbit Ears gilia)	Openings in conifer forest slopes, ridges 7,200 to 8,300 ft. on MB	N	2	No Impact
<i>Kobresia simpliciuscula</i> simple bog sedge (Kobresia)	Flooded marl wetlands with <i>Carex simulata</i> 6,000 ft. on MB	N	2	No Impact

<i>Lesquerella paysonii</i> Payson's bladderpod	Carbonate mountain ranges of west-central Wyoming, eastern Idaho, and southwestern Montana. Rocky, sparsely-vegetated slopes, often calcareous substrates at elevations of 5,500 to 10,600 feet. Wide elevation range indicates possible association with sage-grouse habitat on BT	Y		See detailed analysis below.
<i>Machaeranthera coloradoensis</i> <i>var. coloradensis</i> Colorado tansyaster	Gravelly places in Mtn parks, sparsely vegetated knolls with cushion plants in sagebrush and grassland matrices, 6,800-8,500 ft.	Y		See detailed analysis below.
<i>Mimulus gemmiparus</i> Rocky Mountain monkeyflower	Granitic seeps, slopes and alluvium in open sites w/ SF and aspen , 8,500 to 10,500 ft. on MB	N	2	No Impact
<i>Parnassia kotzebuei</i> Kotzebue's grass of Parnassu	Moist seeps, wet tundra on thin clay soil, moist ledges 10,000 to 12,000 ft. on MB	N	1	No Impact
<i>Parrya nudicaulis</i> Naked-stemmed parrya	Alpine talus, often on limestone substrates at 10,700 to 11,400 feet elevation on BT	N	1	No Impact
<i>Penstemon harringtonii</i> Harrington's beardtongue	Open sagebrush moderate slopes calcareous soils, 6,800 to 9,200 ft. on MB	N	2	No Impact
<i>Physaria integrifolia</i> <i>var. monticola</i> Creeping twinpod	Barren, rocky, calcareous hills and slopes at 6,500 to 8,600 feet elevation on BT	N	2	No Impact

<i>Potentilla rupincola</i> rock cinquefoil (front range cinquefoil)	Mountain gravel soils or shelves /niches cliffs-often granite, 6,900 to 10,500 ft. on MB	N	2	No Impact
<i>Primula egalikensis</i> Greenland primrose	Wet meadows along streams and calcareous montane bogs from 6600 to 8000 ft. Sagebrush is not a component of this habitat type on BT	N	2	No Impact
<i>Ranunculus karelinii</i> ice cold buttercup	Ridges, peaks, in rocks and scree, low-lying snow banks 10,000-14,100 ft. on MB	N	1	No Impact
<i>Rubus arcticus</i> ssp. <i>acaulis</i> dwarf raspberry (nagoon berry)	Dense canopy in lodgepole, spruce-fir w/ <i>Linnaea borealis</i> , 7,000 to 10,000 ft. on MB	N	2	No Impact
<i>Salix candida</i> sageleaf willow (hoary willow)	Cool, boreal forests and prairies in remnant fen and seeps, 6,600 to 10,600 ft. on MB	N	2	No Impact
<i>Salix serissima</i> autumn willow	Calcareous fen meadow, 7,800-9,300 ft. on MB	N	2	No Impact
<i>Saussurea weberi</i> 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
<i>Selaginella selaginoides</i> Club spikemoss (northern spikemoss)	Mossy banks, wet meadows, marsh wet spruce forests, 7,700 to 8,000 (9,500) ft. on MB	N	2	No Impact
<i>Sphagnum angustifolium</i> sphagnum	Fens, acid fens, floating vegetation mats. 7,000-12,000 ft. on MB	N	2	No Impact

<i>Sphagnum balticum</i> Baltic sphagnum	Iron fens, wetter areas of ombrotrophic bogs 7,000-12,000 ft. on MB	N	2	No Impact
<i>Symphotrichum molle</i> 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. As such, presence is acknowledged for the project area on BT	Y		See detailed analysis below.
<i>Triteleia grandiflora</i> largeflower triteleia	Grassy areas in sagebrush at edge of aspen, lodgepole to 8,400 ft. on MB	Y		See detailed analysis below.
<i>Utricularia minor</i> lesser bladderpod	Shallow fens, wetland, subalpine ponds, 6,600 to 8,600 ft. on MB	N	2	No Impact
<i>Viola selkirkii</i> Selkirk's violet	Moist, shaded ravines and cold boreal forest 8,500 to 9,100 ft. 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				

Table 4. Bridger-Teton and Medicine Bow National Forests and Thunder Basin National Grassland Sensitive Species that may be influenced by an action alternative and will be further analyzed in this document.

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

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

VII. SPECIES INFORMATION AND EFFECTS ANALYSIS (Direct, Indirect and Cumulative)

A. Greater Sage-Grouse (*Centrocercus urophasianus*)

Distribution

Sage-Grouse 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 (U.S. Fish and Wildlife Service, 2013). They are an R2 and R4 sensitive species and are found in association with shrub steppe and grassland habitats specifically having sage brush as a component. Within Wyoming, Greater Sage-Grouse (GSG) habitats within National Forest System (NFS) lands to support Sage-Grouse population include the Medicine Bow National Forest (MBNF), Bridger-Teton National Forest (BTNF), and Thunder Basin National Grassland (TBNG). Table 4 below shows the amount of sage grouse habitat found on each unit.

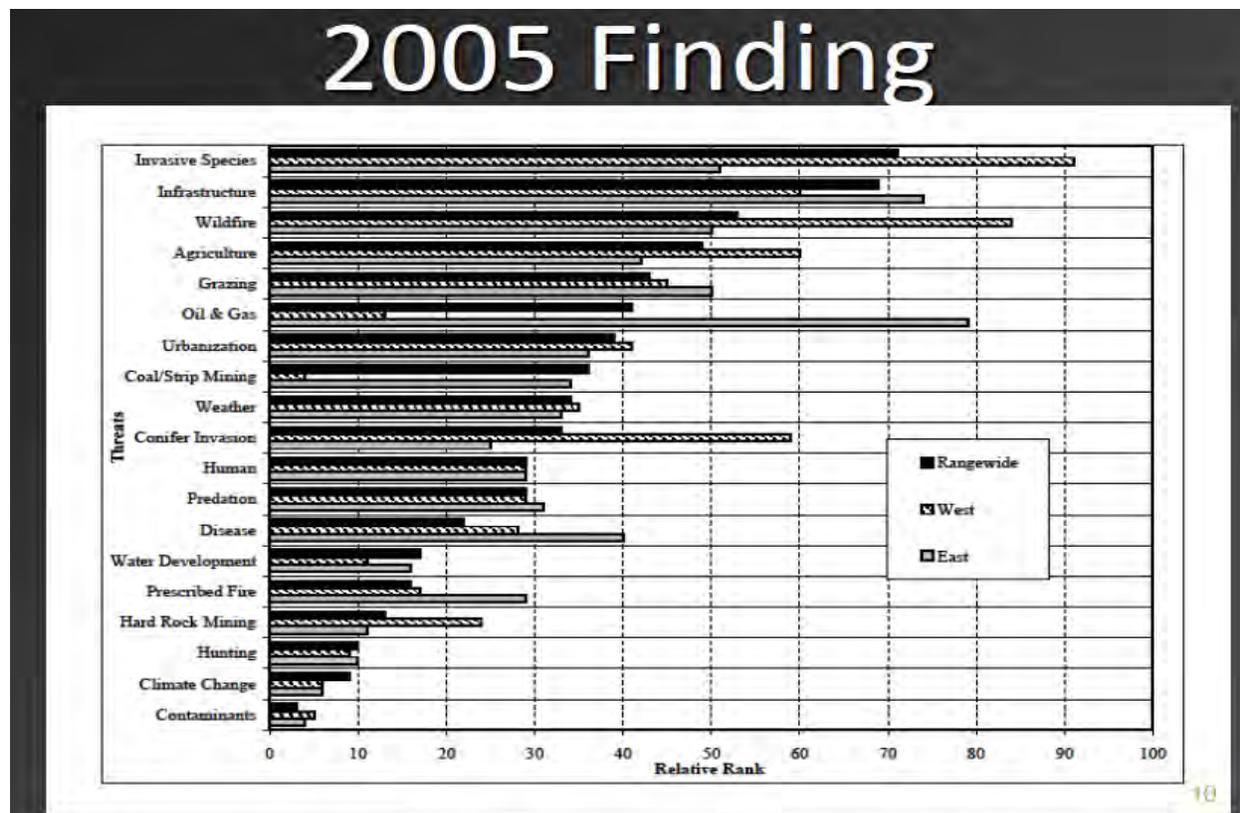
Table 4: Acres of Sage-grouse Habitat On Forest Service Lands

Unit	Core Habitat Acres	General Habitat Acres	Occupied Habitat Acres (Outside Core and General)	Total Acres of Mapped Sage Grouse Habitat*
Bridger-Teton National Forest	5,933	262,018	60,584	328,535
Medicine Bow National Forest	4,564	22,915	0	27,479
Thunder Basin National Grassland	217,768	336,096	0	553,864
Total Acres	228,265	621,029	60,584	909,878

Habitat Associations and Threats

This large grouse requires a variety of sagebrush structural stages to meet seasonal habitat requirements. Sagebrush is essential for sage grouse during all seasons of the year. This relationship is perhaps tightest in the late fall, winter, and early spring when sage grouse are dependent on sagebrush for both food and cover. During the spring and summer, succulent forbs and insects become important additional food sources. Sage grouse 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 Greater Sage Grouse Conservation Plan 2003).

Current threats to Sage-Grouse in Wyoming include conversion and fragmentation of sagebrush habitats through infrastructure development (including energy development), wildfire, invasive species encroachment, noise, drought and the emergence of West Nile Virus in the Powder River Basin. Below is the complete list identified by the U.S. Fish and Wildlife Service in 2005 as threats to sage grouse range-wide. For the purposes of the following table, Wyoming is considered a part of the eastern population.



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

Population Status and Trend

The Wyoming Game and Fish Department monitors sage grouse populations throughout the state including TBNG, BTNF, and the MBNF. They currently use the males/lek statistic to track population changes. This will indicate population fluctuations and is generally accepted as reflective of Sage-Grouse population’s dynamics, but will not give a population estimate.

Thunder Basin National Grassland is in the Northeast Wyoming Sage Grouse Working Group Area. Figure 1 shows the average number of males/lek for lek counts and all lek monitoring combined from 1967 to 2012 for the Northeast Wyoming Local Working Group Area (NEW LWG). Using this information the regional trend suggests about a 10 year cycle of periodic highs and lows. Of concern, however, 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 Sage-Grouse population.

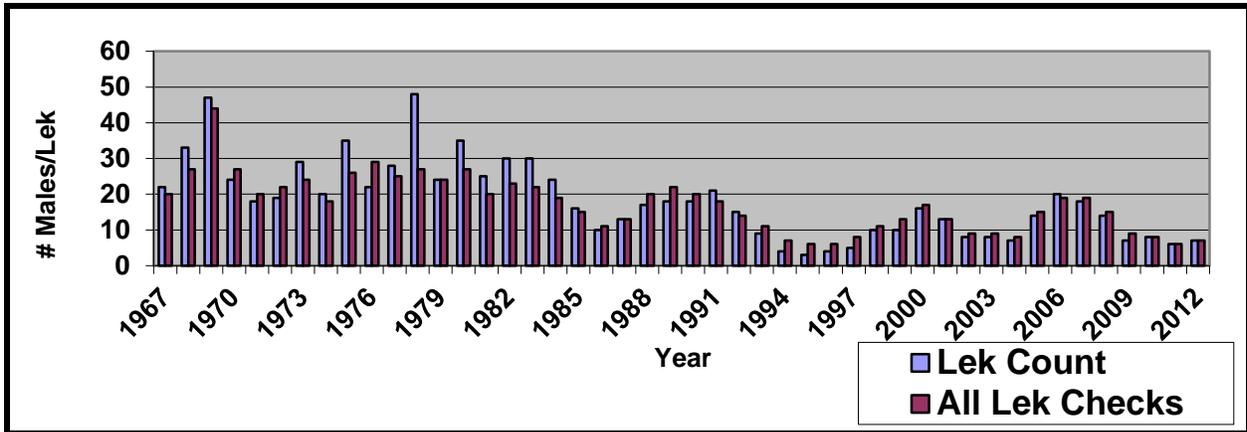


Figure 1. Northeast Wyoming Local Working Group Area Average Number Of Males/lek For lek Counts and all leks (1967-2012). Source: Ne Wyoming Local Working Group Area, Draft Plan Addendum, January 18, 2013.

Figure 2 below illustrates the mean male attendance per lek at the state, Northeast Working Group Area, and Thunder Basin National Grassland. Of the 6 working groups, Northeast Wyoming has the lowest average male lek attendance in the state, averaging 7 males per active lek in 2012 compared to the statewide average of 17 males per active lek (Figure 2). Male lek attendance for the other working group areas ranged from 14 to 30 males per active lek. In 2012, the average males per lek on TBNG were 3.8.

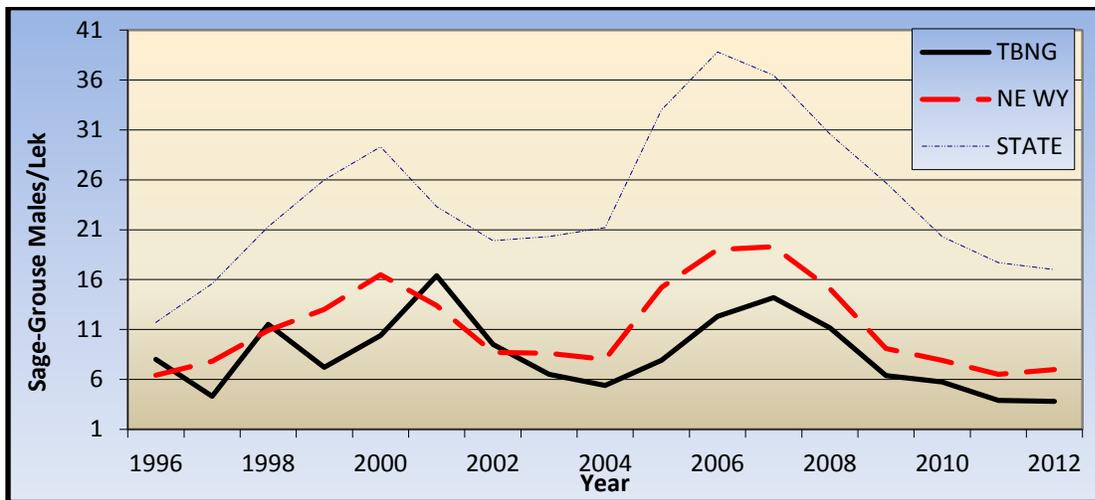


Figure 2. Mean males/lek for Wyoming, Northeast Wyoming, and TBNG (1996-2012)

The most recent peak minimum estimated population of greater-Sage-Grouse on the TBNG was in 2007 at 2,762 birds. The population has been in a steady decline since then. The current (2012) population estimate is 660 birds. This is a loss of 2,102 birds, or a 76% reduction over the last 5 years. The current population estimate is the lowest it has been in 17 years (Figure 3).

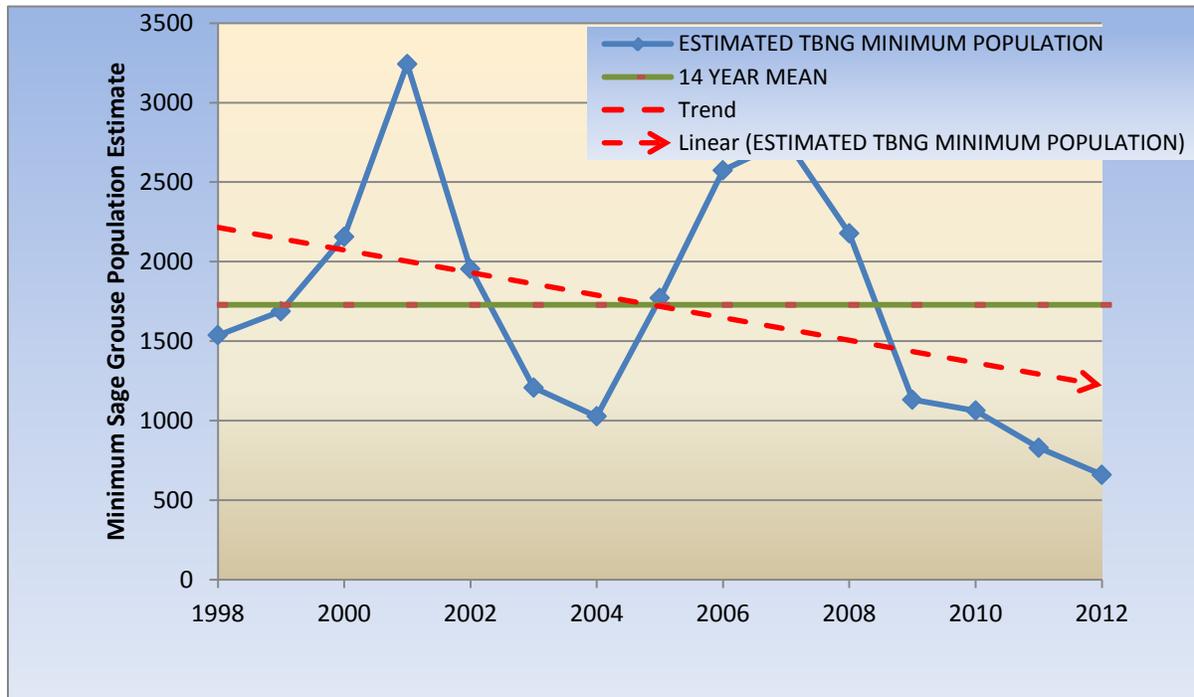


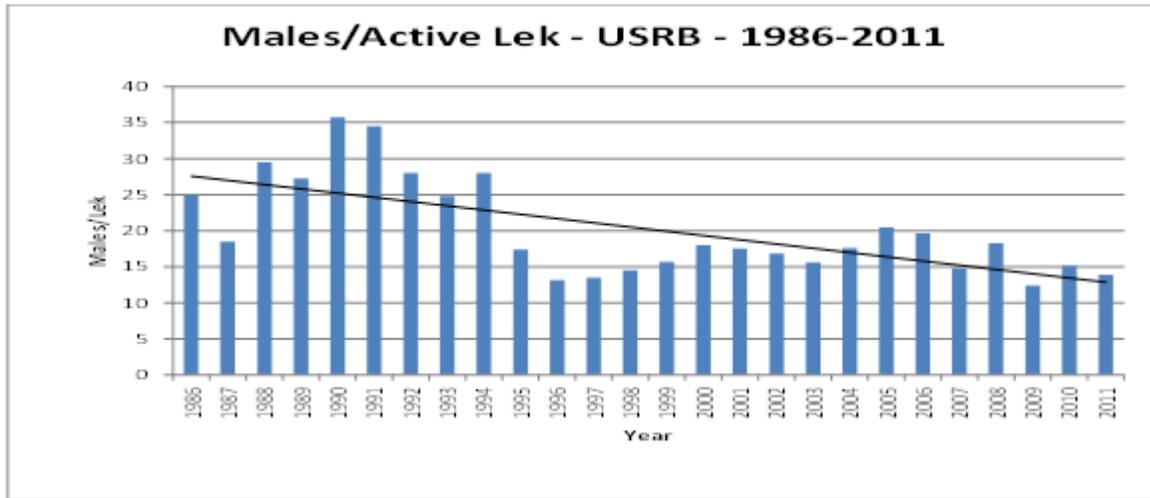
Figure 3. Minimum Sage-Grouse Population estimates for TBNG and the 15 year average.

Thunder Basin National Grassland is divided into 6 subunits called Geographic Areas (GA) for management purposes, and each Geographic Area has sage grouse as a Management Indicator Species and therefore monitored in each GA. Currently on TBNG, Sage-Grouse lek attendance is stable or slightly declining in two geographic areas, steeply declining in three geographic areas, and one geographic area no longer has active leks.

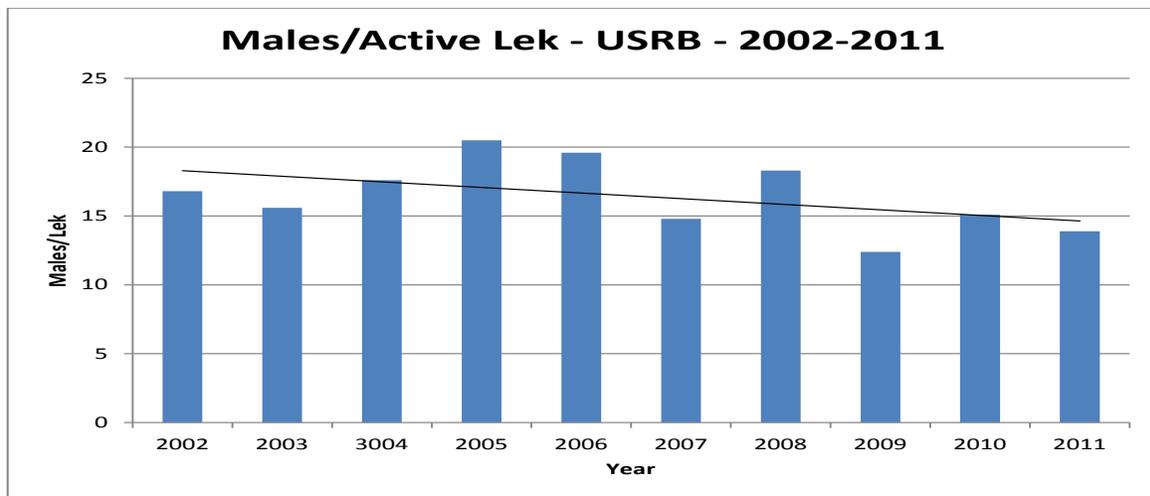
Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was a 16.5% chance of the population dropping below 500 birds/200 males by 2037.

The Bridger-Teton National Forest populations fall within the Upper Snake River Basin (USRB) and the Upper Green River Basin (UGRB) Working Group Areas. These populations include some of the smallest and the largest populations in Wyoming. The Upper Snake River Basin includes the Jackson Hole population and the Upper Green River Basin (UGRB) includes the Wyoming Basin populations in Management Zone 2. These populations include some of the smallest and the largest populations in the range of the species. The majority of habitat provided for sage grouse use in these populations is under the jurisdiction of the BLM. Currently, there are 2 active and 1 satellite lek(s) known to occur on the Forest; 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 Occupied Habitat; no known lek sites on the BTNF are located within Core Habitat.

Though there may not be many leks on the Forest, it still provides approximately 267,951 acres of occupied grouse habitat (262,018 acres of General habitat and 5,933 acres of Core PGH - see table above). Sage-grouse numbers within the Jackson Hole population are small and largely declining; while those associated with the Upper Green River populations are generally stable. The following tables show the overall population trends for the Upper Snake River (USRB) population.

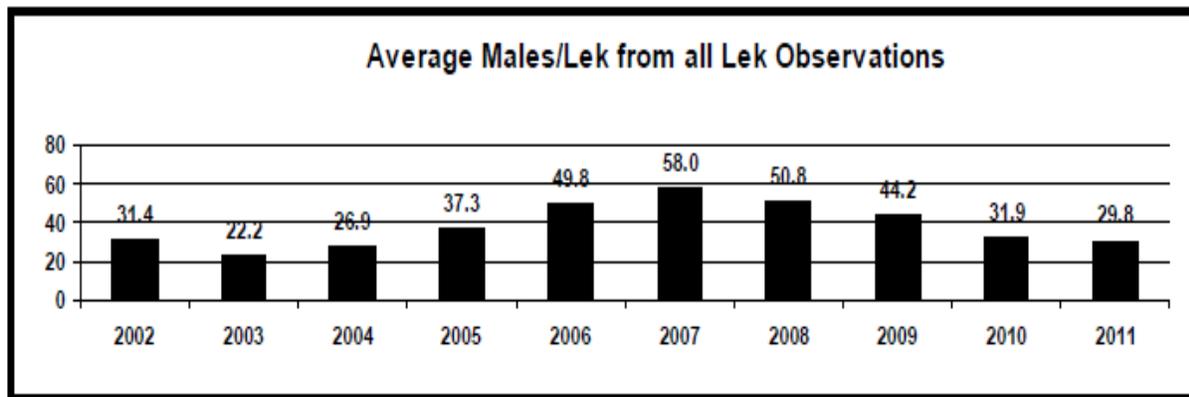


Wyoming Game and Fish Department 2011 Greater Sage-Grouse Job Completion Report



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

Upper Green River Basin trend based on the average males per lek attendance for all leks observed.



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

Since the BT makes up about 60% of mapped sage grouse habitat within the Snake River Basin and less than 03% of mapped sage grouse habitat within the Upper Green River Basin, the Bridger Teton National Forest management has a much large influence on the Upper Snake River sage-grouse, and more specifically the Jackson Hole Sage-Grouse population. Based on current management strategies and threats and known population numbers in this area, Garton et al. (2011), suggested that there was zero chance of the Wyoming Basin population dropping below 500 birds/200 males by 2037. On the other hand, in the Jackson Hole population, there was a 100% chance of dropping below 500 birds/200 males by 2037.

The Medicine Bow National Forest contains a very small amount of GRSG habitat. Of the more than one million acres on the Forest, only 3% or 27,479 acres of combined core and general habitat exists.

MBNF Units and their Associated General and Core Sage-grouse Habitat

Unit	Unit Acres	General Acres/ % of Unit	Core Acres / % of Unit
Laramie Peak	437,781	5,523 (1%)	2,638 (0.6%)
Sierra Madre	362,217	15,267 (4%)	1,294 (0.4%)
Snowy Range	406,743	2,025 (0.5%)	632 (0.2%)
Total	1,262,325	22,915 (0.4%)	4,564 (3%)

Habitat on the Forest falls within the Bates Hole/Shirley Basin and the South Central Working Groups. The habitat on NFS land is largely an ecological transition from lodgepole pine forests to sagebrush steppe interspersed by rock outcrops and is the outside fringe of the occupied habitat. There are no known leks on the Forest to provide local population information.

Within the Working Group Areas, the Bates Hole/Shirley Basin Area has (as of 2011) an average of approximately 15 males per count lek. The South Central Working Group Area had a 2011 average of 24.7 males per count lek. Both areas experienced increases from 2003 until 2005 - 2006, and then have been experiencing a decline through 2011. Currently these declines are

being attributed to normal population fluctuations and cycles. Based on current management strategies and threats and known population numbers in the Wyoming Basin population, Garton et al. (2011), suggested that there was zero chance of the population dropping below 500 birds/200 males by 2037.

Threats by Forest

Bridger-Teton NF

Key threats to sage-grouse on and around the Bridger-Teton NF include: energy development and transfer (including both renewable and non-renewable resources), long-term drought, and brush eradication programs. Residential development has also been identified as a threat. In concert with the remaining portions of this population, the Wyoming Governor's Executive Order designating protective stipulations for core areas (PACs), and the overall size of the population, the management area is considered low risk.

Medicine Bow NF

Key threats to sage-grouse on and around the Medicine Bow NF include: energy development, infrastructure within the habitat, grazing, and recreation. In addition there are localized threats affecting differing portions of the population, including the elimination of sagebrush, wildland fire and the subsequent invasion of weeds and annual grasses, conifer encroachment, mining, urbanization of sagebrush habitats, and effects from free roaming equids.

Thunder Basin NG

The largest threats to sage-grouse and their habitat on and around the Thunder Basin National Grasslands 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 that leads to a lack of connectivity, noise pollution, and West Nile Virus due to the readily available water from energy development. This area is at high risk for continued decline if conditions do not change in favor of sage grouse and their habitats.

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, 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 Sage-Grouse (Holloran.2005). These disturbances can cause impacts to reproduction and survival (Blickley and Patricelli.2012). Under this alternative most recreational activities and noise associated with traffic would not be moderated in sage grouse habitat.

Bridger Teton National Forest

Motorized travel is currently limited to designated routes (roads and trails). New or modified management practices may develop as a result of further analysis. 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. In addition, with increased road use, comes increased noise. Under this alternative most recreational activities and noise associated with traffic would not be moderated in sage grouse habitat.

Medicine Bow National Forest

Travel Management plans currently in place across the MBNF. Motorized travel is currently limited to designated routes (roads and trails). Some Level 2 and 3 roads traverse the sage-grouse areas on the MBNF. With the infrequent maintenance that these level 2 roads receive they typically have low traffic volumes throughout of 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. 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. Under this alternative most recreational activities and noise associated with traffic would not be moderated in sage grouse habitat.

Analysis

There would be no changes to the current 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 is a current Travel Management Plan in place for all 3 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 acres and lineal miles of routes and use equate to a greater likelihood of habitat loss, fragmentation, and disturbance to Sage-Grouse.

Lands and Realty

Thunder Basin National Grassland

As a Region 2 Sensitive Species, sage grouse habitat acquisition may be emphasized, however, some Sage-Grouse 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 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 remaining in- holding opportunities to secure additional lands for inclusion in the Forest through land adjustments (purchase, exchange, donation). The 1990 Forest Plan does not speak to the sage-grouse specifically. However, because the sage-grouse has been identified as a concern by the State of Wyoming (Governor Dave Freudenthal), any proposed actions would consider effects to the sage-grouse habitat.

Medicine Bow National Forest

As a Region 2 Sensitive Species, sage grouse habitat acquisition may be emphasized, however, some Sage-Grouse 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.

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. 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, most rangelands and sage-grouse habitats are grazed annually by livestock. Exceptions are mostly 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 as inaccessible. Much of the secondary range is almost exclusively the result of topography and not the lack of water. The amount of secondary range due to distance from water is minimal. These results suggest that most suitable rangeland is primary range that likely 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%); 2) Deferred use (3%); and 3) Deferred rotation (90%). Although most capable acres of rangeland are grazed annually, not all acres are grazed simultaneously. Generally, no more than 40 percent of the TBNG capable 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 such time as allotment specific desired conditions and management plans can be developed. The BTNF allotments are managed under a various grazing systems including rotational rest, rotational deferment, herded once-over grazing (sheep), and season-long grazing. An approximate total of 3,076 acres of core sage-grouse habitat overlaps some of the lower elevations of four active BTNF cattle allotments. Data reflecting stream-bank disturbance has been used to identify grazing related issues in some 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 sage-grouse 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%) are applied to rangelands in unsatisfactory condition. Additional guidelines for riparian areas include leaving 4-6 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 not have a direct negative effect on Sage-Grouse, some range improvements may still create negative impacts to sage-grouse. Un-marked fences and stock water tanks without escape ramps suitable for sage-grouse would exist. Other potential adverse effects to sage-grouse habitat could include habitat fragmentation due to infra-structure 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 and 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. These sources include 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 Greater Sage-Grouse habitat, energy development will continue to be an issue relevant to the conservation of Sage-Grouse. 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 NFS lands. These lands produced 22.2 percent of the entire nation's coal in 1997 and 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 Sage-Grouse 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 NFS 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. 14 leases held by production and have authorized and ongoing activities. Of the remaining areas available to future

leasing on the forest, most areas are in the far eastern portion of the forest and on the front range of the Wind River Range outside the Wind River Wilderness. The Wyoming Range Legacy Act allows a very limited area of 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 expressed interest on the forest in the near future. There were two placer mines in operation on the forest in the recent past. There are no current placer operations on the forest. Locatable minerals in the forest are limited to gravel and sand sales. Gravel and sand mines are limited in number and located in the vicinity of areas needing such materials. There are numerous past geothermal exploration sites on the forest. There are no renewable energy projects on the forest, nor any foreseeable interest.

Medicine Bow National Forest

Mineral resource use on the MBNF has historically been widespread but sporadic. Mineral activity is presently concentrated in a few scattered areas. In 1995 the MBNF had 12 active oil and gas leases all of which expired without drilling activity by the year 2000. There are presently no oil and gas leases on the MBNF or any requests for leases on the Forest. The Forest has experienced limited seismic exploration. Most of the current mining activity on the Forest has been considered “recreational” in nature. This includes panning, and suction dredging with a suction diameter of 3 inches or less for short durations in specified timeframes. There are between 1 and 3 bonded small mining operations on the 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 Forest about every third year, but after the exploratory drilling is done, there has been no further interest shown. While there has been some exploration of wind, solar, biomass, and geothermal resources, none of this has occurred in core or general sage-grouse habitat in this area.

Analysis

All leasing and lease operations are conducted in accordance to applicable laws, Forest Service policies, the current Forest or Grassland Plan, and lease stipulations. This energy development is a significant threat to Sage-Grouse as noted by the Fish and Wildlife Service in the 2010 finding (75 FR 13910-14014):

Energy development is a significant risk to the Greater Sage-Grouse 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 Greater Sage-Grouse 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 Sage-Grouse 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 sage- grouse habitat, off road vehicle use, increased traffic on NFS 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

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% reduction (NE Wyoming Sage Grouse Conservation Plan; 2006). 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, averaging 19 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 5 of the 11 years had more than 2,500 acres burned each year. The dominant fuel types on TBNG are Sage-Grouse habitat (sagebrush and mixed-grass prairie), with lightning being the primary cause of wildfire (61%), and the railroad caused fires being the next most frequent cause (20%), the remaining wildfires are caused by a variety of other sources.

Bridger Teton National Forest

The BTNF currently utilizes the full spectrum of fire management practices. Wildland fires 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 Forest. Early burns were 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 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 MBNF 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 and the highest elevations. Current fire management options in the critical sage-grouse habitat include Direct Control (not specifically identified but always an option), Perimeter Control, and Prescription Control, depending upon the specific location

Analysis

Impacts from wildfires include removal or loss of large tracts of sagebrush habitat, resulting in a direct loss of nests, as well as a loss of nesting habitat, hiding cover and winter range. Wildfire can also increase non-native 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, comes potential increases in wildfire. Fire within a cheatgrass invaded vegetation type becomes cyclic, fire removes the vegetation, cheatgrass re-grows to denser conditions, and

creates a fine fuel accumulation ready to burn again at a much reduced fire return interval (Davies et al, 2011).

Under this alternative the use of prescribed fire generally is to be 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 Sage-Grouse 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.

Most of the published literature concludes that fire has a negative effect to sage grouse (Braun 2006; Knick and Connelly 201; 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 resulting near total removal of sage brush 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 Sage-Grouse 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 effect of the current management on Sage-Grouse habitat is a trend toward less suitable occupied habitat due to the combination of impacts from habitat modification, fragmentation, or loss due to anthropogenic disturbance, wildfire, and invasion of un-wanted vegetation. Sage-Grouse populations have been steadily declining on or associated with National Forest System (National Grassland and National Forest) lands since between 2006 and 2007 with cyclic trends declining over a much longer period. With the above discussion about habitat in mind, it could be expected that the National Forest System associated population would continue to decrease. This trend, combine with the potential for impacts associated with disease such as West Nile, is likely to lead to additional reductions in the distribution of Sage-Grouse within Geographic Areas, and across the entire National Grassland. As the “No Action” alternative, this alternative provides the least Sage-Grouse conservation.

Alternative B

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

In Priority Sage-Grouse habitats (PPH also known as Core Areas) new road construction would be limited to areas with less than 3% 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 to GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels (which are lower in this alternative (20-24 dBA) 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 (Core Habitat) 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 Sage-Grouse 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 Sage-Grouse needs in all Sage-Grouse 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 Sage-Grouse habitat could include habitat fragmentation due to infra-structure 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, fluid mineral leases. Existing leases would have a 4 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 to Sage-Grouse through a project design. Exceptions, waivers, and modifications to lease stipulations, (COAs), and terms and conditions (T&Cs) for Sage-Grouse would not be considered within Sage-Grouse priority habitat. Outside of PPH (Core), mineral development would be the same as Alternative A. This alternative better conserves PPH (Core) Sage-Grouse 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 Sage-Grouse 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% 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

Within PPH (Core) the 3% disturbance limitation would limit anthropogenic impacts to Sage-Grouse structural habitat conditions. With the increased emphasis on fire suppression, reduced

energy development, noise restrictions, and livestock grazing modifications within PPH (Core), overall Sage-Grouse habitat usability should remain stable with a potential for increasing increase in areas exceeding the 3% disturbance limitation. Additional protections and directions for PGH (General habitat) will further provide habitat protections under this alternative. This alternative conserves more habitat than Alternatives A, D, and E but conserves less than Alternative C. Based upon the above habitat discussion and protections, the Sage-Grouse population would have a better chance of developing a stable or upward trend. Many of the documented stressors have been reducing in PGH (General Habitat), 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 Sage-Grouse to re-populate geographic areas where they are absent or decreasing in Alternative A.

Alternative C

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

Conservation measure would be more beneficial to Sage-Grouse and their habitat than other alternatives. In this Alternative conservation measures are generally applied to both PPH (Core Habitat) and PGH (General Habitat). Sage-Grouse priority and general habitat areas would be managed as ROW exclusion areas for new Right Of Way or Special Use Authorization permits. New road construction would be prohibited within 4 miles of active Sage-Grouse leks, and avoided in PPH (Core) and PGH (General Habitat). Existing road management would be designed to maintain or improve both PPH (Core) and PGH (General Habitat). Road associated noise would be limited to less than 10 decibels above ambient levels (20-24 dBA). Camping and other non-motorized recreation would be seasonally prohibited within 4 miles of active Sage-Grouse 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 Sage-Grouse. No Sage-Grouse habitat in PPH (Core) would be exchanged away. The Forest Service (Forest Service) will strive to acquire important private lands in areas identified as Sage-Grouse Special Areas. Alternative C would encourage consolidation and acquisition of Sage-Grouse habitat. This alternative would promote the greatest distribution and highest density of suitable Sage-Grouse habitat.

Range

Livestock grazing would be prohibited within Sage-Grouse PPH (Core). All new structural range developments and location of supplements would be avoided in both PPH (Core) and PGH (General Habitat) unless they can be shown to benefit Sage-Grouse. 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 Sage-Grouse. Post fire (both prescribed and wildfire) monitoring is required in all Sage-Grouse habitat to re-establish grazing. Within Sage-Grouse

PPH (Core) and PGH (General Habitat), livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve Sage-Grouse 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 sage grouse leks (Beck and Mitchell .2000), and 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 Sage-Grouse habitat.

Energy and Minerals

No exceptions, waivers, and modifications to lease stipulations, Conditions of Approval (COAs), and terms and conditions (T&Cs) will be considered within Sage-Grouse PPH (Core) and PGH (General Habitat). Both sage-grouse PPH (Core) and PGH (General Habitat) 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 Sage-Grouse PPH (Core) or PGH (General Habitat). Oil and Gas Leasing would not be allowed in Sage-Grouse PPH (Core). Geophysical exploration would only be allowed in Sage-Grouse PPH (Core) and PGH (General Habitat) to obtain exploratory information for areas outside of and adjacent to PPH (Core) and PGH (General) sage-grouse habitat and would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by Sage-Grouse. Where existing leases exist in all Sage-Grouse habitat, stipulations for the protection of Sage-Grouse or their habitats could be added to Conditions of Approval (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. Sage grouse PPH (Core) areas would be closed to mineral material exploration, sales, and free use permits.

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

Fire and Fuels Management

Within all Sage-Grouse habitat, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all Sage-Grouse 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% within any sage grouse habitat and vegetation treatments in both habitats would be designed to create landscape patterns which most benefit sage-grouse. For all Sage-Grouse 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 Sage-Grouse habitat objectives. No fuels treatments would be allowed in known Sage-Grouse 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 Sage-Grouse habitat would utilize mowing of grass. In PPH (Core) habitat areas, fire suppression to conserve the Sage-Grouse habitat would be prioritized immediately after firefighter and public safety.

Prescribed fire in sagebrush would be very limited in all Sage-Grouse 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 Sage-Grouse 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

This alternative provides habitat protections for both PPH (Core) and PGH (General) Sage-Grouse habitats. While these two habitats combined represent only a small portion of the Medicine Bow and the Bridger Teton National Forests, they represent the entire Sage-Grouse 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 to Sage-Grouse structural habitat conditions on all units. With the increased emphasis on fire suppression, reduced energy development, noise restrictions, and livestock grazing limitations, overall Sage-Grouse 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 provides more suitable habitat than Alternatives A, B, D, and E. Based upon the above habitat discussion and protections, the Sage-Grouse 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 Sage-Grouse habitat across the National Forests and 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 sage grouse to repopulate geographic areas where they are absent or decreasing in Alternative A.

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% disturbance in PPH and 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 Sage-Grouse than alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PPH (Core) and connectivity habitat will be allowed > 0.25 miles from Sage-Grouse. This is closer than the disturbance allowed under the other alternatives except alternative A.

New rights-of way and special use authorizations in PPH (Core) would generally be excluded; those allowed would be subject to the 9% 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).

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 sage grouse habitat. As grazing permits are renewed in PPH (Core), sage grouse habitat objectives and management considerations could be incorporated. Up to 15% 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 infra-structure is essentially the same as Alternative A. Potential adverse effects to Sage-Grouse habitat could include habitat fragmentation due to infra-structure 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% disturbance cap that does not exist in alternative A. The lack of conservation measures in sagebrush outside of PPH (Core) could lead to increased anthropogenic disturbance of sage-grouse habitat, off road vehicle use, increased traffic on NFS 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% disturbance cap in PPH. This treatment would follow Wyoming Game and Fish Department Protocols for Treating Sagebrush to Benefit Sage-Grouse to determine 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 Sage-Grouse breeding, nesting, and winter range. These limited conservation measures on PPH (Core) and the lack of measures in the remainder of Sage-Grouse habitat would have detrimental impacts on Sage-Grouse. 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

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 small portions of the Sage-Grouse habitat within TBNG and the BTNF, they are not expected to be sufficient to create a noticeable positive change in Sage-Grouse habitat across either planning unit (TBNG or BTNF). 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 Sage-Grouse habitat. With all of this considered, habitat could be expected to continue to decrease in effectiveness and size, under 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 continue. Sage-Grouse populations have been steadily declining since 2006-2007 in populations associated with the National Forest System lands, with cyclic trends in decline from a longer timeframe. With the above discussion about habitat in mind, it could be expected that the sage grouse population would continue to decrease. This trend, combined with the potential for West Nile, is likely to lead to additional reductions in the distribution of Sage-Grouse.

Alternative E

DIRECT AND INDIRECT IMPACTS

Recreation and Travel

New primary and secondary roads would avoid areas within 1.9 miles of the perimeter of occupied Sage-Grouse leks within Sage-Grouse PPH (Core) habitat areas. Other new roads would avoid areas within 0.6 miles of the perimeter of occupied Sage-Grouse leks within PPH (Core) habitat areas. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6 pm to 8 am from March 1 – May 15 on or within a six tenths (0.6) mile radius of the perimeter of occupied Sage-Grouse 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 dBA above ambient noise. Some recreation special uses would be allowed in PPH (Core).

Conservation measures primarily apply to PPH (Core) habitat only. Measures in PPH (Core) 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 PPH (Core) would limit disturbance and habitat loss within PPH (Core), but would allow existing conditions to continue in the remaining Sage-Grouse habitat.

Lands and Realty

Sage-Grouse habitat requirements would be used to prioritize parcels for exchange or acquisition within PPH (Core) core habitats. New projects within Sage-Grouse PPH (Core) habitats would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. Sage-Grouse PPH (Core) habitat areas would be managed as ROW avoidance areas for new ROW or SUA permits.

Again, most conservation actions are taken in PPH (Core) habitats, little or no new protections would occur in PGH (General) habitat. Even then some habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH (Core). Habitat changes could also occur because PPH (Core) can be exchanged to other ownership. Overall, impacts to Sage-Grouse and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range

Within Sage-Grouse core habitat, as appropriate, site specific Sage-Grouse 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 Sage-Grouse and its habitat.

Much of the direction for livestock management remains the same as the current management. Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for Sage-Grouse in PPH (Core) than alternatives A and D. Potential adverse effects to Sage-Grouse habitat (primarily in PGH (General) habitat) could include habitat fragmentation due to infra-structure 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% disturbance would be allowed within PPH (Core) habitat using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within Sage-Grouse PPH (Core) 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 1 location per 640 acres. Where existing leases exist in all Sage-Grouse habitat, stipulations for the protection of Sage-Grouse or their habitats could be added to Conditions of Approval (COAs) when approving exploration and development activities. All non-energy leasable and salable mineral activities would be considered in PPH (Core) habitats. The lack of conservation measures in sagebrush outside of PPH (Core) could lead to increased anthropogenic disturbance of sage-grouse habitat, off road vehicle use, increased traffic on NFS 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% disturbance would be allowed within PPH (Core) habitat using the DDTC. Within Sage-Grouse core habitat in northeast Wyoming, vegetation treatments in nesting and wintering habitats that would reduce sagebrush canopy to less than 15% would not be conducted unless it could be shown to be beneficial to sage grouse. Habitat restoration would be prioritized to rehabilitate PPH (core) habitat first. Fuels treatments in PPH (Core) would be designed with an emphasis on protecting existing sagebrush ecosystems and enhancing as well as protecting future sagebrush ecosystems. Following wildfire, burned lands would be treated as disturbed pending an implementation management plan with trend data showing the area was returning to functional sage grouse habitat. Multiple tools would be considered for fuels reduction and analyze in NEPA compliance documentation before electing to implement prescribed fire in PPH (Core) habitat areas. Also within PPH (Core) 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, PPH (Core) habitat would be placed immediately after firefighter and public safety to conserve the habitat.

Fire and fuel management again focuses primarily on PPH (Core) habitat for additional conservation management, leaving the remaining Sage-Grouse habitat to management similar to Alternative A. These conservation measures would make this alternative more beneficial than alternatives A or D.

Cumulative Effects

This alternative focuses of conservation practices primarily within the PPH (Core) habitat and relies primarily on the current management to manage the remaining PGH (General) habitat. Table 1 depicts NFS acreage on each unit and designated Greater Sage-Grouse core habitat acres.

Table 6: TBNG Acreage and Designated GSG Core Habitat Acres.

Unit	Core Habitat Acres	General Habitat Acres	Occupied Habitat Acres (Outside Core and General)	Total Acres of Mapped Sage Grouse Habitat*
Bridger-Teton National Forest	5,933	262,018	60,584	328,535
Medicine Bow National Forest	4,564	22,915	0	27,479
Thunder Basin National Grassland	217,768	336,096	0	553,864

Total Acres	228,265	621,029	60,584	909,878
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The conservation measures included in this Alternative are limited to PPH (Core) habitat, and with this only representing a small percentage of the Sage-Grouse habitat within each unit, they are not expected to be sufficient to create an adequate change in Sage-Grouse habitat across the planning units. With implementation of this Alternative energy development, wildfire, road development and increased noise would still work together in the PGH (General) habitat to continue to fragment and reduce suitable, effective Sage-Grouse habitat.

With all of this considered, habitat could be expected to continue to decrease in effectiveness and size, under this alternative.

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 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 analyzed generally and collectively 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 Greater Sage-Grouse, the effects would generally be similar to effects on GRSG.

Northern Goshawk (*Accipiter gentilis*)

Distribution

Goshawk is a R2 and R4 Sensitive Species and a MIS for the Medicine Bow National Forest (MB) that overlap with some sage-grouse habitat on the Bridger-Teton National Forest (BT). Northern goshawks are holarctic, 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

Goshawk is highly associated with late seral lodgepole pine, mixed lodgepole/aspen, and aspen forest for nesting and is associated with a variety of age classes and shrub stands for prey species (Squires and Ruggiero 1996, Kennedy 2003). The goshawk captures a wide variety of prey and is classified as a prey generalist (Kennedy 2003). Goshawks do use late-successional forests for foraging, but also take prey associated with both early and late-successional forests, 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 that populations are declining, increasing, or stationary (Kennedy 2003).

The primary threat to goshawk populations is alteration of its 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, potential 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 that is found from southern Canada, throughout the western U.S., and into northern and central Mexico. This hawk is a R2 Sensitive that overlaps with most sage grouse 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 (in Call 1985) estimated more than 800 pairs of ferruginous hawks in the state. The ferruginous hawk breeds throughout most of Wyoming, excluding the northwestern corner, with the 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 Hawk. This information represents selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Collins, C.P. and T.D. Reynolds (2005). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/ferruginoushawk.pdf>

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, and foraging areas, and 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 Region 2 of the Forest Service, the U.S. Forest Service Region 2 conservation assessment for this species (Collins, C.P. and T.D. Reynolds (2005)) identified the following threats facing ferruginous hawks;

- 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.

Specifically in Wyoming, 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 overlaps with sage-grouse habitat on the MB and TBNG. Northern harriers are a wide ranging species with very large distributions. Some have large ranging seasonal migrations, occurring from North to South America. They are found across Wyoming and several have been documented on both the MB (February 2013 NRM Database) and TBNG (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 Natural Heritage Program because of its wide distribution across North America. However, historic and recent evidence suggest that the number of breeding harriers has declined across the species’ range. The greatest threats to northern harriers are loss of wetland and grassland habitats, and the effects of habitat fragmentation, primarily from agricultural production (Slater and Rock 2005).

Short-eared Owl (*Asio flammeus*)

The following is a habitat description of the Short-eared Owl. This information is selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Wiggins, D. (2004). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/shortearedowl.pdf> .

Distribution

The Short-eared owl is found throughout Canada and the U.S. 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 Region 2, there are so 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 Region 2, such habitat is typically composed of large (>500 ha) 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 that overlaps with sage-grouse habitat on the MB and TBNG. The loggerhead shrike is a widespread species in North America. Several have been documented on both the MB (February 2013 NRM Database) and TBNG (TBNG Wildlife Database).

Habitat Associations and Threats

The loggerhead shrike is a species that frequents open habitats such as 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 contractions in its range and declines in abundance have occurred in many areas of North America and in several different habitat types. 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 belli*)

The following is a habitat description of the Sage Sparrow. This information is selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Holmes,

J.A. and M.J. Johnson (2005). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/sagesparrow.pdf>

Distribution

Within Forest Service Region 2, 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, and northern Sonora, and 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 (Cеровski et al. 2001), the highest abundances are 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 that are 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 increased with increasing area of sagebrush patches and decreasing fragmentation.

Within its sagebrush shrub steppe breeding habitat, local (e.g., within-patch) components that have been 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 has 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 and also a R2 Sensitive Species that overlaps with sage-grouse 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. Brewer's sparrow is considered globally "secure" by the Natural Heritage Program 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 2005). 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). 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

This grouse is a R2 Sensitive Species that overlaps with a small area of sage-grouse habitat at the southwest edge of the MB 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 four percent occurring on lands administered by the Forest Service. There are 2 sharp-tailed leks on the MB that overlap with sage-grouse general habitat.

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, and northwestern Colorado and south-central Wyoming (Hoffman and Thomas 2007). Within the Rocky Mountain region, this grouse formerly occurred in as many as 22 counties in western Colorado and in 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.

Habitat Associations and Threats

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 that overlaps with a small amount of sage-grouse habitat on the MB. Bighorns were historically distributed from the Canadian provinces of British Columbia and Alberta south to Mexico. From the late 1800's through the mid-1900's, 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 bighorns 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 sage-grouse preliminary general habitat, 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 2 acres of the only colony on the MB overlap with sage-grouse habitat on the Forest. The white-tailed prairie dog historically occurred across 43-51 million acres of high altitude (6980 – 8,200 ft.) 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 ac 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.

The historical range of the white-tailed prairie dog 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

This pocket gopher is a R2 Sensitive Species with the possibility that some potential habitat overlaps with sage-grouse 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, 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 due to the extreme paucity of data. It is assumed to be rare and to have 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. This information represents selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Keinath (2004, October 29)). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/fringedmyotis.pdf> [12/5/06].

Distribution

This is a R2 Sensitive Species that overlaps sage-grouse habitat. *Myotis thysanodes* appear to be relatively rare rangewide. *Myotis thysanodes* is predominantly found in western North America, occurring from southern British Columbia, south through southern Mexico. It occurs west to the Pacific coast and east to the Rocky Mountains of Region 2, 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). *Myotis thysanodes thysanodes* occurs over most of Region 2, 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 Region 2. (Conservation Assessment)

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 Region 2, 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. (pg. 20) Suitable roosting sites are a critical habitat component, the availability of which can determine population sizes and distributions (Humphrey 1975, Kunz 1982). Throughout their range, this 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 Assessment).

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

The following is a habitat description of the Townsend's big-eared bat. This information is selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Gruver, J.C. and D.A. Keinath (2006, October 25)). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/townsendsbigearedbat.pdf> [12/5/06].

Distribution

Corynorhinus townsendii 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 Region 2, the most widespread distributions of *Corynorhinus townsendii* occur in Colorado and Wyoming. This is a R2 Sensitive Species that overlaps sage-grouse 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 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 prior to 1994. At least three maternity colonies have been identified: 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, each containing fewer than four individuals. (Conservation Assessment)

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: 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 U.S. Forest Service Region 2 conservation assessment for this species (Luce and Keinath 2007). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/spottedbat.pdf> [12/5/06].

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 Region 2, 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 ft.) in the mountains

Habitat Associations and Threats

These bats are solitary and roost in deciduous trees on sites generally open only from below, 3-4 meters above the ground. The hoary bat is highly 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 United States 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. Boreal toads overlap with some sage-grouse 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 (Baxter and Stone 1992), ranging in elevation from about 6,500 to 12,000 feet (WGFD 2005:438). 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 2005:438).

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 RD). 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 3 main habitat components; 1) shallow wetlands for breeding, 2) terrestrial habitats with vegetative cover for foraging, and 3) burrows for winter hibernation (Loeffler 2001). Boreal toads have a low reproductive output.

Threats to boreal toads include: chytrid fungus *Batrachochytrium dendrobatidis*, acidification of wetlands, thinning of the ozone layer, timber harvesting that causes sedimentation, livestock grazing in and around riparian areas, pesticides and herbicides, and introduced species which prey on toads or create competition for resources or are vectors for pathogens (Keinath and McGee 2005). Any activity that alters mountain wetland habitats can affect boreal toad populations.

Alternative A - No Action

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. 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.

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. 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 of sagebrush associated species.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing. Potential effects on sagebrush 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 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 PPH 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 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.

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. 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 non-native 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 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. These cumulative effects are discussed 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. These 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 measures limits a few impacts on sagebrush associated species. Proposed management would have impacts on individuals of the sagebrush associated species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for 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.

Alternative B

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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

PPH 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 sage-grouse PPH and, therefore, a potential gain of some sagebrush habitat on the BT. 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, which also benefits sagebrush associated species.

Range Direct and Indirect Effects

The NTT alternative would adjust grazing direction in GRSG PPH in favor of GRSG; therefore, in favor of sagebrush associated species. Many livestock 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 sagebrush habitat. GRSG PPH accounts for <2% of the land cover in the Forests and 39% of the Grassland, so changes 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

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. This would affect very little habitat on the Forests but a substantial amount on the Grassland. This alternative would conserve this habitat now and into the future for GRSG and, consequently, for sagebrush associated species. Energy and mineral development could still occur the remaining sagebrush habitat. This alternative better conserves PPH, and therefore habitat for sagebrush associated species, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized, including a 3% disturbance limit. This would promote the conservation of mature sagebrush habitat and reduce disturbance to wildlife from fire in PPH. Consequently, there would be less early stage sagebrush communities for some species. 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 for 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. These cumulative effects are discussed 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 PPH, which is <1% to 39% of the sagebrush habitat across the Forest Service units. So, there would be benefits to individuals in PPH. Generally, activities in PGH 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 Service 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 PPH would reduce some impacts on sagebrush associated species. Proposed management would have impacts on individuals of the sagebrush associated species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for 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.

Alternative C

Recreation and Travel Direct and Indirect Effects

Conservation measure would be more beneficial to maintaining sagebrush habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 620,000 more acres of habitat than other alternatives. Habitat loss, fragmentation, and disturbance would be reduced on much of the sagebrush habitat. There could be greatly reduced disruption of nesting and birthing activities, abandonment of young, or temporary displacement.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for sagebrush associated species. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat. This alternative would promote the greatest distribution and highest density of sagebrush associated species.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH would retain the most herbaceous cover for animal or nest concealment, seed production, insect production, and prey production. These results would provide the greatest opportunity among alternatives for reduced predation and parasitism, and individual fitness in PPH.

Energy and Minerals Direct and Indirect Effects

Conservation measure would be more beneficial to sagebrush associated species and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 620,000 more acres of habitat than other alternatives. Habitat loss, fragmentation, and disturbance would be reduced. There could be greatly reduced disruption of nesting and birthing activities, abandonment of young, or temporary displacement. Measures such as the seasonal restriction on disturbance in nesting habitat in ADH would achieve these results.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would promote the conservation of mature sagebrush habitat and reduce disturbance to species from fire. This alternative would maintain more than 620,000 more acres of mature sagebrush. Consequently, there would be less early stage sagebrush communities for some species. In addition, habitat restoration would be a priority. This alternative conserves more sagebrush habitat with higher shrub canopy cover than all other alternatives.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in

sagebrush habitat. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat.

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 PPH and PGH would noticeably reduce impacts on sagebrush associated species. Proposed management would still have impacts on individuals of the sagebrush associated species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for 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.

Alternative D

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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 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% of the TBNG. Impacts on the Forests would be much smaller.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. GRSG PPH accounts for <2% of the land cover in the Forests and 39% of the Grassland, so changes 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% disturbance cap that does not exist in alternative A. 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 PPH could lead to increased disturbance, loss of habitat, or degradation of habitat.

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% disturbance cap in PPH. There could be more early succession herbaceous forage for some wildlife. 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 on PPH and the lack of measures in the remainder of sagebrush habitat would have detrimental impacts on sagebrush associated species.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in sagebrush habitat. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH, 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 would have impacts on individuals of the sagebrush associated species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a

trend toward federal listing” for 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.

Alternative E

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most sagebrush habitat, that habitat outside of PPH, except on TBNG. Measures in PPH would be slightly more restrictive 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 birthing, abandonment of young, or temporary displacement in PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some sagebrush habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on sagebrush habitat would be similar to but reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRS in PPH than alternatives A and D. These measures would also maintain sagebrush habitat quality within PPH. There could be areas of improved habitat for productive breeding, foraging, and cover for sagebrush associated species.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of habitat compared to alternatives A and D. This conservation would benefit > 620,000 acres of sagebrush habitat across the units.

Fire and Fuels Management Direct and Indirect Effects

Conservation measures would be more beneficial than alternatives A and D, considering a no disturbance limit and 9% disturbance limit for these alternatives, respectively. Treatment would be limited to 5% for this alternative. So, impacts on mature sagebrush habitat and sagebrush associated species would be reduced.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in

sagebrush habitat. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and fragmentation in PPH to 5%. This alternative also limits disturbing activities in PPH. Impacts are decreased compared to alternatives A and D. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >620,000 sagebrush habitat on these units. So, there would be less loss or fragmentation of mature sagebrush habitat. Generally, other activities in PGH and all activities in the remaining sagebrush habitat will occur as they do currently or could expand as existing direction allows. Overall impacts would be less impacting to sagebrush associated species than alternatives A and D. Impacts would be more than alternatives B and 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 E in PPH and, in some cases PGH, would reduce impacts on sagebrush associated species. Proposed management would have impacts on individuals of the sagebrush associated species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for 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.

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 analyzed generally and collectively 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 sixweeks fescue. Some upland sites also have high canopy covers of Plains prickly pear cactus and/or high densities of non-native 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 U.S. Forest Service Region 2 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 U.S. Forest Service Region 2 conservation assessment for this species (Stephens, R.M. and S.H. Anderson. (2005,)). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/swiftfox.pdf> [12/5/06].

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 shortgrass 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 shortgrass 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 shortgrass 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. Olson (2000) concluded that low-growing (<30 cm), 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 U.S. Forest Service Region 2 conservation assessment for this species (Sedgwick, J.A. (2006). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/longbilledcurlew.pdf>

Distribution

The distribution of long-billed curlew breeding populations is disjunct, corresponding to the now fragmented distribution of the shortgrass and mixed-grass prairies of the Great Plains, Great Basin, and intermontane valleys of the western United States and southwestern Canada. Long-billed curlews breed from southern British Columbia, Alberta, and Saskatchewan, south to northeastern New Mexico, central Nevada, and 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 United States 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 shortgrass 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 cm tall (often less than 10 cm), 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, the 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 U.S. Forest Service Region 2 conservation assessment for this species (McDonald, D., N.M. Korfanta, and S.J. Lantz. (2004). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/burrowingowl.pdf>

Distribution

Burrowing owls are distributed throughout western North America, 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 Thunder Basin National Grasslands 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 (*Calcarius ornatus*)

The following is a habitat description of the Chestnut-collared Longspur. This information is selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Sedgwick, J.A. (2004). On-line at <http://www.fs.fed.us/r2/projects/scp/assessments/chestnutcollaredlongspur.pdf>

Distribution

The distribution of chestnut-collared longspur breeding populations is disjunct, corresponding to the now fragmented distribution of the shortgrass 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 Region 2 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 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 shortgrass 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 shortgrass prairie, <20 to 30 cm 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 1986b). 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 shortgrass 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, shortgrass 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, have been attributed to land-use practices that destroy native prairie (Fairfield 1968, Oberholser 1974, Gollop 1978, McNicholl 1988, Hill and Gould 1997). Both over grazing 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 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 U.S. Forest Service Region 2 conservation assessment for this species (Sedgwick, J.A. (2004). On-line at:
<http://www.fs.fed.us/r2/projects/scp/assessments/mccownslongspur.pdf>

Distribution

The distribution of breeding populations is disjunct, corresponding to the now fragmented distribution of the shortgrass 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 1994a, Dechant et al. 1999). They winter in the southern U.S. 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 use grasslands with little litter (Felske 1971) and low vegetation cover (DuBois 1935, Creighton 1974), such as that provided by true native shortgrass prairie or heavily grazed mixed-grass prairie. McCown's 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 b, 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 5 cm 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 Region 2 (USDA 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 U.S. Forest Service Region 2 conservation assessment for this species (Dinsmore, S.J. (2003). On-line at:
<http://www.fs.fed.us/r2/projects/scp/assessments/mountainplover.pdf>

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 2001a), Arizona (U.S. Department of the Interior 1999a), 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 plovers are thought to winter in the Imperial Valley in southern California.

Habitat Associations and Threats

Mountain plovers are a disturbed-prairie or semidesert 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, 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 Region 2 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 plover can come into contact with numerous pesticides used to control insects, and that some of these may have unknown negative consequences for the plover.

Grasshopper Sparrow (*Ammodramus savannarum*)

The following is a habitat description of the Grasshopper Sparrow. This information is selected direct quotes from the U.S. Forest Service Region 2 conservation assessment for this species (Slater, G.L. (2004). On-line at:

<http://www.fs.fed.us/r2/projects/scp/assessments/grasshoppersparrow.pdf>

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 United States, 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 8 ha in size (Samson 1980, Herkert 1994b, Vickery et al. 1994, Helzer 1996). Minimum area requirements vary over the species' range. In Nebraska, grasshopper sparrows were found in fragments larger than 8 ha (Helzer 1996). Within open grasslands of suitable patch size, grasshopper sparrows prefer grasslands habitats of intermediate height (~30 cm) 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 lush areas with small amounts (<35 percent) of shrub or tall forbs. Besides native prairie, grasshopper sparrow breeding habitat also includes pasture, hayland, CRP fields, airports, and reclaimed surface mines (Whitmore 1980, Vickery 1996, Dechant et al. 2001). In Region 2, grasshopper sparrows are found in Wyoming in mixed- and northern shortgrass prairies and open sagebrush grasslands (Cerovski et al. 2001). Grasshopper sparrows avoid habitats where vegetation is less than 10 cm (Wiens 1973) and appear to prefer grass heights of ~30 cm 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 USDA Forest Service Region 2, 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 Region 2, 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 Region 2, 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 shortgrass prairies is a serious threat 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).

D. Plants

Astragalus barii, *Astragalus diversifolius* var. *diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, *Machaeranthera coloradensis*, *Symphyotrichum molle*, *Eriogonum exifolium*, and *Triteleia grandiflora* were grouped for this analysis due to the similar nature of the habitats occupied by these plants. Though species specific effects may differ slightly, potential impacts would be similar. The programmatic nature and landscape scale effects will be analyzed generally and collectively for this group of species. In addition, 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 Greater Sage-Grouse, the effects would generally be similar to effects on GRSG.

Astragalus barrii (Barr's milkvetch)

Distribution

This plant is a R2 Sensitive Species occurring on the Thunder Basin National Grassland. *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 *A. 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 of 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 non-native 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 an historical observation (1834) that was believed to occur on the BT. The historic location was thought to overlap current sage-grouse 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, 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 (4400-6620 ft.). In Wyoming, it grows in alkaline meadows at fringes of playa landscapes at 6500-6620 ft. (Heidel 2009). These alkaline meadows do not occur on the BT.

There are estimated to be about approximately 8000 plants of *Astragalus diversifolius* in Wyoming, covering an area of 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 sage-grouse 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

This 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 5850-9600 ft. (Heidel 2008). Average occurrences are extremely small and restricted in area, often with fewer than 20 plants in 1/2 acre of habitat. Only 5 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.

This 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.

Eriogonum exifolium (Dropleaf {slender leaved} buckwheat)

Distribution

This plant is a R2 Sensitive Species that overlaps sage-grouse 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 of the 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, right-of-way management, coal mining, exotic species invasion, effects of small population size, disease, declining pollinators, fire, global climate change, and pollution” (Anderson 2006).

Lesquerella paysonii (Payson’s bladderpod)

Distribution

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

Habitat Associations and Threats

This 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%. Populations also occur on talus slopes, disturbed roadsides, dried stream channels, rocky clearings within conifer forests, and travertine outcrops at 5500-10,600 feet (Heidel 2008a). Censused populations range in size from 10-1500 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. Overall, however, threats are low to most occurrences (Heidel 2008a).

Machaeranthera coloradoensis (Colorado tansy aster)

Distribution

This plant is a R2 Sensitive Species that overlaps some sage-grouse habitat on the MB. Colorado tansyaster is a regional endemic species with populations located in central, west-central, and southwestern Colorado and south-central Wyoming. Of the 33 occurrences of *M. coloradoensis*, 21 occurrences are on lands managed by the U.S. 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 ft. to 8,500 ft. 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.

Symphotrichum molle (Soft aster)

Distribution

This plant is a R4 Sensitive Species that overlaps sage-grouse 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

This 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 2 historical locations in Wyoming, 32 of which have been discovered or relocated since 1990. Many populations are locally abundant, 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.

Triteleia grandiflora (Largeflower Triteleia)

Distribution

This plant is a R2 Sensitive Species with habitat that might overlap sage-grouse habitat on the MB. Distribution of this species centers around the Pacific Northwest, with populations in Colorado (San Juan NF) and Wyoming (Medicine Bow NF) 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, *T. grandiflora* appears to have been a relatively common species within its range, sometimes locally abundant 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 non-native plant species throughout its range (Ladyman 2007).

Alternative A - No Action

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

loss or disturbance of habitat. 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. Some plant habitat could be traded to other ownership where there is greater potential for development for economic benefits in these areas. 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.

Range Direct and Indirect Effects

There would be no change in the numbers, timing, or method of livestock grazing. 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.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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 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, 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.

Fire and Fuels Management Direct and Indirect Effects

There would be few restrictions for fuels management in sagebrush. As such, 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.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, rights-of-way granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. These cumulative effects are discussed 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 5 resource areas 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. Therefore, this alternative "may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing" for *Astragalus barii*, *Astragalus diversifolius* var. *diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, *Machaeranthera coloradensis*, *Symphyotrichum molle*, *Eriogonum exifolium*, and *Triteleia grandiflora*.

Alternative B

Recreation and Travel Direct and Indirect Effects

There would be limited opportunities for road construction in PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH and Important Bird Areas could be designated as SIAs. These measures allow less habitat degradation or loss than Alternative A, retaining more sagebrush habitat and more undisturbed sagebrush habitat. Of course, these benefits would occur only on PPH, 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

PPH 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 sage-grouse PPH and, therefore, a potential gain of some 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 PPH, which also benefits these plant species.

Range Direct and Indirect Effects

The NTT alternative would adjust grazing direction in GRSG PPH in favor of GRSG. Many livestock 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 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 a few more restrictions that would protect habitat. GRSG PPH accounts for <2% of the land cover in the Forests and 39% 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

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. This would affect very little habitat on the Forests but a substantial amount on the Grassland. 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. This alternative better conserves PPH, and therefore habitat for sagebrush associated plant species, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the regeneration of shrubs on the 5593 acres of PPH. So, aspen would not be regenerated here. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the aspen population would be small to immeasurable.

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would promote the conservation of mature sagebrush habitat in PPH. Consequently, there would be less early stage sagebrush communities for some species. 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 for 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, rights-of-way granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. These cumulative effects are discussed 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 PPH, which is <1% to 39% of the sagebrush habitat across the Forest Service units. So, there would be benefits to individuals in PPH. 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 PGH 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 PPH would reduce some impacts on sagebrush associated plant species. Proposed management would have impacts on individuals of the sagebrush associated plant species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Astragalus barii*, *Astragalus diversifolius* var. *diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, *Machaeranthera coloradensis*, *Symphotrichum molle*, *Eriogonum exifolium*, and *Triteleia grandiflora*.

Alternative C

Recreation and Travel Direct and Indirect Effects

Conservation measure would be more beneficial to maintaining sagebrush habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 620,000 more acres of habitat than other 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. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for future loss of habitat from development.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH would promote the most cover and production of herbaceous plants within sagebrush. Improved plant health, growth, development, root storage, and seed set responses would also occur for sensitive plants. Still, PPH includes a very small portion of the Forests, <2%, so conservation measures would benefit a limited number of plants here. Since the Grassland is 39% PPH, 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 measure would be more beneficial to sagebrush associated plants than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 260,000 acres of sagebrush habitat on the Forests and Grassland. 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

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. Habitat restoration would be a priority. This would promote the conservation of mature sagebrush habitat in PPH for most sensitive species, >220,000 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 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, rights-of-way granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits habitat loss, fragmentation, and degradation in ADH, almost 850,000 acres of sagebrush habitat across the units. So, 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 would still have impacts on individuals of the sagebrush associated plant species. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Astragalus barii*, *Astragalus diversifolius* var. *diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, *Machaeranthera coloradensis*, *Symphotrichum molle*, *Eriogonum exifolium*, and *Triteleia grandiflora*.

Alternative D

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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. The potential changes in sagebrush habitat not covered by conservation measures would be very similar to but slightly less detrimental to sagebrush associated plants than alternative A.

Lands and Realty Direct and Indirect Effects

Surface disturbance and surface occupancy in PPH and connectivity habitat will be allowed > 0.25 miles from the 3 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% of the TBNG. Impacts on the Forests would be much smaller.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% disturbance limit. 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 PGH. *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. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is <1% of sagebrush habitat on the Forests, these conservation measures would have a very small benefit to sensitive plants. PPH is 39% 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. However, there is a 9% disturbance cap that does not exist in alternative A. The lack of conservation measures in sagebrush outside of PPH would allow increased disturbance, loss of habitat, or degradation of habitat. PPH is 39% 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% disturbance cap in PPH. 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 on PPH 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 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, rights-of-way granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH 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 would still have impacts on individuals of the sagebrush associated plant species in most sagebrush habitat. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Astragalus barii*, *Astragalus diversifolius* var. *diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, *Machaeranthera coloradensis*, *Symphyotrichum molle*, *Eriogonum exifolium*, and *Triteleia grandiflora*.

Alternative E

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would reduce disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive than alternatives A and D but less restrictive than alternatives B and C. There would be less habitat loss or degradation in PPH compared to alternatives A and D. 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

Some aspen habitat could be lost or degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on sagebrush and intermixed aspen would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for sagebrush associated sensitive plants within PPH. There could be more small areas of improvement with these measures.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit loss and degradation of sagebrush habitat compared to alternatives A and D. This conservation measure would benefit > 620,000 acres of sagebrush habitat for sensitive plants across the units. The reduced wind energy disturbance would not promote *Lesquerella paysonii* and *Astragalus paysonii* but these plants would benefit from reduced loss of habitat.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed in alternatives B and C and slightly less than Alternative D. These limited conservation measures on PPH 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 5 Resource Areas

There could be cumulative effects 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, rights-of-way granted, energy and mineral development, fire and fuels treatments, and range management in sagebrush habitat off the Forests and Grassland. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some loss of sagebrush habitat for sensitive plant species. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >620,000 acres of

sagebrush habitat across the 3 units. So, there would be less loss or degradation of habitat. 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, other activities in PGH and all activities in the remaining sagebrush habitat on the Forests and Grassland will occur as they do currently or could expand as existing direction allows. Overall, effects would be less impacting to sagebrush associated plant species than alternatives A and D.

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 E would reduce some impacts on sagebrush associated plant species, particularly in PPH. Proposed management would still have impacts on individuals of the sagebrush associated plant species in most sagebrush habitat. Therefore, this alternative “may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing” for *Astragalus barii*, *Astragalus diversifolius* var. *diversifolius*, *Astragalus paysonii*, *Lesquerella paysonii*, *Machaeranthera coloradensis*, *Symphyotrichum molle*, *Eriogonum exifolium*, and *Triteleia grandiflora*.

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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
Thunder Basin National Grassland Management Plan

December 13, 2013

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Management Indicator Species Evaluation

• INTRODUCTION

The purpose of this MIS evaluation is to identify the likely effects of management decisions associated with the Greater Sage-Grouse (GRSG) Planning Decision, specifically for the Bridger-Teton (BT) and Medicine Bow (MB) National Forests and Thunder Basin National Grassland (TBNG), on population trends for respective Management Indicator Species for each of these Planning Units.

The Analysis of Management Situation (AMS) for this sage-grouse 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,
- boreal chorus frog

• PROJECT HISTORY

Greater Sage-Grouse have emerged as a significant conservation concern over the last 10 years. The species is currently a candidate species for listing under the Endangered Species Act inferring that listing is “warranted, but precluded due to higher priorities” because of two primary factors: 1) the large-scale loss and fragmentation of habitats across the species range, and 2) a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to sage-grouse habitat are summarized in the listing decision. The two dominant threats are related to infrastructure associated with energy development in the eastern portion of the species range, and the conversion of sagebrush communities to annual grasslands associated resulting in large uncharacteristic wildfires in the western portion of the species range. The Bureau of Land Management (BLM) manages approximately half of the GRSG habitats, whereas the Forest Service manages approximately 8 percent of species habitat, with most of that occurring on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sagebrush habitats, of which about 7.5 million acres occur in the Intermountain Region. Most habitats on Forest Service administered lands contribute to summer brood-rearing habitats, although some Forests and Grasslands, such as TBNG, contribute important breeding, nesting, and winter habitat.

In 2011 and 2012, the United States Fish and Wildlife Service (FWS) submitted letters to the BLM and Forest Service recommending that the agencies amend Land Use Plans to provide adequate regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 National Forests viewed as “high priority” to ensure appropriate regulatory mechanisms. Following scoping and discussion the Forest Service added an additional 10 Forest Plans that would be considered for amendment. The Forest Service is participating in several joint Environmental Impact Statements (EISs) with the BLM to develop Records of Decision that will be used as a basis for amending Land Use Plans, including Forest Plans.

Since half of all GRSG habitat occurs on BLM-administered lands, the BLM is leading the effort to amend or revise land use plans, with the Forest Service as a cooperating agency. The purpose is to provide direction in land management plans that conserve and protect sage-grouse habitat and to provide assurances to the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for seven sage-grouse planning 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/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision.” The Forest Service is involved in five of these efforts (<http://fsweb.r4.fs.fed.us/unit/nr/sagegrouse/index.shtml>, Accessed December 19, 2012)

This Management Indicator Species report is prepared in support of the Wyoming 9 Plan EIS. The Bridger-Teton and Medicine Now National Forests and Thunder Basin National Grassland are the only Forest Service units in Wyoming planning to amend their Land and Resource Management Plans for the GRSG.

- **PURPOSE AND NEED**

The purpose of the Land and Resource Management Plan amendments for the GRSG is to identify and incorporate appropriate conservation measures to conserve, enhance, and/or restore sage-grouse habitat by reducing, eliminating, or minimizing threats to their habitat. The need to create this amendment arose when the inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The USFWS identified conservation measures within Land and Resource Management Plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the Land and Resource Management Plan amendments will focus on areas affected by threats to sage-grouse habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

- **DESCRIPTION OF THE ALTERNATIVES**

The BLM and Forest Service are developing a range of alternatives that are specifically structured to identify and incorporate appropriate conservation measures in Land Use Plans to conserve, enhance or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. There are currently five alternatives to consider under this analysis: Alternative A - No action, Alternative B, Alternative C, Alternative D, and Alternative E. A brief description of each of the alternatives is provided below. For a full description of the alternatives, as well as project design criteria, mitigation and monitoring requirements, please refer to chapter 2 of the EIS prepared for this project.

One of the key differences among the alternatives is the type of designated habitat applicable to each. Designated sage-grouse habitat is divided into two main categories - preliminary priority habitat (PPH) and preliminary general habitat (PGH). PPH is defined as areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. These areas include breeding, late brood-rearing and winter concentration areas.

PPH is the same as and often referred to as core habitat. PGH is defined as areas of occupied seasonal or year-round habitat outside of PPH. A third category of connectivity habitat, which provides linkage areas for GRSG, is also present. Within the document, all designated habitat (ADH) refers to all PPH (core), PGH, and connectivity habitat.

Alternative A: No-action

Under the no-action alternative the Land and Resource Management Plans would not be amended. The existing management direction set for sage-grouse and sagebrush habitat would continue.

New road construction would be allowed near leks, in PPH, and in PGH with few limitations. There are no specific limitations on upgrading roads. There are few limitations on recreation special uses.

Some Rights-of-way would be allowed in sage-grouse habitat for powerlines.

Mineral and energy development is allowed in most PPH and PGH with some limitations. Wind energy development is allowed in some PPH with some limitations. Disturbances from new facilities would be limited from 0.25 to 2 miles from active leks or nesting habitat. Disturbance of nesting habitat is prohibited on the Medicine Bow and Thunder Basin Grassland within 2 miles of leks. Some noise restrictions apply for the Medicine Bow and Thunder Basin Grassland.

Livestock grazing will retain herbaceous material to provide cover and forage for GRSG (MB). GRSG needs will be addressed in allotment management plans (BT). Livestock grazing will retain nesting cover within 2-3 miles of leks.

There are some limitations on shrub treatments in the Medicine Bow and Thunder Basin Plans. Treatments in winter range would be limited but permitted. Treated areas would be rested from grazing. Post treatment rehabilitation includes native plants or seed.

Alternative B:

All applicable and appropriate conservation measures that were developed in the NTT's 2011 report (Sage Grouse National Technical Team 2011) would be considered and incorporated into this alternative. These conservation measures would apply most often to GRSG PPH, less often to PGH, and, rarely, to connectivity habitat. There would be a 3% cap on disturbance in these areas.

Travel construction would be limited in PPH, minimum standards would be applied and there would be no upgrading of roads. Travel would be limited to existing roads. Recreation special use permits in PPH would only be allowed if they are deemed to have a neutral or beneficial effect on GRSG. All GRSG core habitat areas and Important Bird Areas could be designated as Special Interest Areas (SIA).

Rights-of-way would be excluded in PPH. The Forests and Grassland would aim to keep and acquire PPH.

PPH would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy buffer around leks. Exceptions and modifications to leases would not be considered in PPH. Geophysical exploration is prohibited in PPH with few exceptions. Most coal and non-energy mineral leasing is unsuitable in PPH. Wind energy development would be allowed but met towers are prohibited in PPH. There is a seasonal restriction on disturbance of nesting habitat in PPH. Noise restrictions are 10 dB above ambient during elk season.

Only light grazing is allowed in PPH in allotments not meeting standards. Grazing direction would be adjusted to improve management for GRSG. Planning efforts will identify grazing allotments where permanent retirement of grazing privileges is beneficial to GRSG. Water developments are authorized only when beneficial to upland and riparian GRSG habitat.

Wildfire/Fuels would aim to protect sagebrush habitats in PPH. No prescribed fire treatment is allowed in PPH in ≤ 12 " precipitation zone. Habitat restoration would be a priority, with a focus on native species. Treatments in sage-grouse winter range would be very limited. Fuels treatments in PPH would retain 15% sagebrush cover. Treatments would be rested from grazing for 2 growing seasons. Post treatment rehabilitation includes native plants.

Alternative C:

During scoping, conservation groups had the opportunity to submit suggestions on how to define PPH and PGH areas and developed their own conservation measures that would be applied to those areas (proposing more stringent management). All of the reasonable conservation measures across the sage grouse range have been consolidated into one alternative which each sub-region will analyze in detail. This alternative would apply to all designated GRSG habitat, including PPH, PGH, and connectivity habitat. There would be a 3% cap on disturbance in these areas.

Travel construction would be limited in all designated habitat and no new roads would be constructed within 4 miles of a lek or occupied habitat. Travel would be limited to existing roads. No road upgrading would be allowed in designated habitat. Recreation special use permits in PPH would only be allowed if they are deemed to have a neutral or beneficial effect on GRSG. Recreation would seasonally prohibit camping and non-motorized recreation within 4 miles of a lek. Designate SIAs for GRSG.

All designated habitat would be exclusion areas for rights-of-way and special use permits. The Forests and Grassland would aim to keep and acquire all designated habitat.

Wind and solar installations would not be allowed to be sited in designated habitat. All designated habitat would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy buffer around leks. Exceptions and modifications to leases would not be considered in PPH. Geophysical exploration is prohibited in PPH. Most coal and non-energy

mineral leasing is unsuitable in PPH. There is a seasonal restriction on disturbance in nesting habitat in all designated habitat. Noise restrictions are 10 dB above ambient during lek season.

PPH would be closed to livestock grazing. Grazing direction would be adjusted to improve management for GRSG on other habitat. Planning efforts will identify grazing allotments where permanent retirement of grazing privileges is beneficial to GRSG. No water developments are permitted within PPH or PGH.

Wildfire/Fuels would aim to protect and restore sagebrush habitats in PPH and PGH; areas would be closed to grazing after wildfire. No prescribed fire treatment is allowed in <12” precipitation zone in PPH or PGH. Treatments in sage-grouse winter range would be very limited. Post treatment rehabilitation will include native plants including sagebrush.

Alternative D:

In this alternative, sub-regions will have the opportunity to make changes to the recommendations from the NTT report and adjust habitat boundaries based on science, resource trade-offs, scoping comments, and internal staff expertise. In Wyoming, this alternative incorporates comments from Wyoming cooperators. Conservation measures would apply to GRSG PPH and PGH and, rarely, to connectivity habitat. There would be a 9% cap on disturbance in PPH.

New roads would not be constructed within 0.25 miles of a lek in PPH. Road upgrades would be allowed in PPH and PGH. Recreation special use permits in PPH would be allowed on a case by case basis. No GRSG SIAs would be designated.

Rights-of-way would permit new power lines in PPH within 2 identified transmission line corridors, near existing large transmission lines, or areas deemed to have minor impacts on GRSG. Other GRSG habitat would be available for Rights-of-way. The Forests and Grassland would aim to keep and acquire PPH. Exceptions and modifications to leases would be considered in PPH and PGH. Disruptive activities would be precluded within 0.25 miles of occupied leks in PPH or connectivity habitat.

New fluid mineral leases would be allowed. Geophysical exploration is not permitted. Coal and non-energy mineral leasing in PPH can be suitable with stipulations. Wind energy development would be prohibited in PGH unless there would be no decline in GRSG populations. There is a seasonal restriction on nesting habitat in PPH within 2 miles of a lek. Some noise restrictions apply for the Medicine Bow and Thunder Basin Grassland.

Grazing direction would be monitored to meet Wyoming land health standards and consider GRSG objectives in PPH. Water developments are authorized as needed for grazing in PPH.

Wildfire/Fuels treatments in sagebrush in PPH could occur up to a 9% disturbance threshold. Prescribed fire would not be limited in ≤ 12 " precipitation zone. Treatment in sage-grouse winter range would be permitted. Treated areas would not be rested from grazing. No rehabilitation is identified for prescribed fires or wild fires.

Alternative E:

This alternative generally applies to PPH with some measures also applying in PGH and connectivity habitat. This alternative includes elements from the BLM IM, the Governor's EO and the Alternative B in areas not addressed in Wyoming specific directives.

New primary and secondary roads would not be constructed within 1.9 miles of a lek in PPH. Other roads would not be constructed within 0.6 miles of a lek in PPH. Some road upgrades would be allowed in PPH. Recreation special use permits in PPH would be allowed unless impacts cannot be mitigated. No GRSG SIAs would be designated.

Rights-of-way would permit new power lines in PPH within 2 identified transmission line corridors, near existing large transmission lines, or areas deemed to have minor impacts on GRSG. Other GRSG habitat would be available for Rights-of-way. GRSG PPH could be sold or exchanged for economic benefits. Exceptions and modifications to leases would be considered in PPH and PGH. Disruptive activities would be precluded within 0.6 miles of occupied leks in PPH or connectivity habitat.

New fluid mineral leases would be allowed. Geophysical exploration is allowed within PPH when fragmentation does not occur. Coal and non-energy mineral leasing in PPH can be suitable with stipulations. Wind energy development would be prohibited in PGH unless there would be no decline in GRSG populations. There is a seasonal restriction on disturbance in nesting habitat in PPH. Noise restrictions would be developed over time.

Wyoming land health standards would be monitored to determine if grazing is a significant factor where unsatisfactory conditions exist and to determine adjustments. Water developments are authorized when beneficial to upland and riparian habitat in PPH.

Wildfire/Fuels treatments in sagebrush in PPH could occur up to a 5% disturbance threshold. Treatment in sage-grouse winter range would be allowed and subject to the 5% disturbance threshold. Prescribed fire would be very limited in ≤ 12 " precipitation zone. Treated areas will be rested from grazing for 2 growing seasons. Post treatment rehabilitation will include native plants.

- **ANALYSIS AREA**

The analysis area consists of areas of the Bridger-Teton National Forest (BT), Medicine Bow National Forest (MB), and Thunder Basin National Grassland (TBNG) that have been identified as Greater Sage-Grouse habitat.

Based on GIS analysis of the EIS planning area, the following table describes the number of acres on each Forest or Grassland, the number of acres of GRSG General and Core habitat on each Forest/Unit, and the percentage of the Forest considered occupied habitat. The data contained in the table below was taken from the May 2012 AMS for the Wyoming Sage-Grouse Land and Resource Management Plan Amendments.

	FORESTNAME	Forest Acres	General	Core	Total Occupied	% of Forest
WY	Bridger-Teton National Forest	3,420,442	262,018	5,933	267,951	8%
	Medicine Bow National Forest	1,083,558	22,915	4,564	27,479	3%
	Thunder Basin National Grassland	552,537	328,191	224,346	552,537	100%
	Total EIS Area	5,056,537	612,149	234,279	846,428	17%

Management Indicator Species for the Bridger-Teton National Forest, Medicine Bow National Forest, or Thunder Basin National Grassland.

The National Forest Management Act (NFMA) directs National Forests to identify Management Indicator Species (MIS). MIS are chosen as a representative of certain habitat conditions important to a variety of other species. MIS are generally presumed to be sensitive to habitat changes. By monitoring and assessing populations of MIS, managers can determine if management actions are affecting other species populations. According to the *Bridger-Teton National Forest Land and Resource Management Plan* (USDA Forest Service 1990), *Medicine Bow National Forest Land and Resource Management Plan* (USDA Forest Service 2003), and *the Thunder Basin National Grassland Land and Resource Management Plan* (USDA Forest Service 2001), MIS for these management units include 20 terrestrial, 8 aquatic wildlife species, and 3 plants.

MIS were reviewed to determine which are likely to be present or have habitat that overlaps with Preliminary Primary Habitat (PPH) or Preliminary General Habitat (PGH) for sage-grouse. Table 2 identifies species likely to be affected by implementation of one or more of the amendment alternatives.

The Analysis of Management Situation (AMS) for this sage-grouse 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, peregrine falcon and boreal chorus frog will not be analyzed as MIS in greater detail.

Table 2. Bridger-Teton (BT) and Medicine Bow (MB) National Forests and Thunder Basin National Grassland (TBNG) 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) <i>Haliaeetus leucocephalus</i>	(Formerly) Threatened or endangered species recovery	Y	N	No habitat within mapped PPH or PGH habitat. 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) <i>Accipiter gentiles</i>	Late seral lodgepole and aspen	N	N	No habitat within mapped PPH or PGH habitat. 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) <i>Falco peregrinus anatum</i>	(Formerly) Threatened or endangered species recovery	Incidental	Minor	Very little habitat within mapped PPH or PGH habitat. 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) <i>Centrocercus urophasianus</i>	Sagebrush quality	Y	Y	Greater Sage-Grouse is the species for which amendment is occurring. The species will be evaluated in more detail.
Plains sharp-tailed grouse (TBNG) <i>Tympanuchus phasianellus</i>	High structure grasslands	Y	Y	There are records of the species within PPH and PGH. 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) <i>Grus americana</i>	Threatened or endangered species recovery	N	N	No habitat within mapped PPH or PGH habitat. 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
Brewer's sparrow (BT) <i>Spizella breweri</i>	Sagebrush condition	Y	Y	There are records of the species within PPH and PGH. The alternatives propose some changes within species habitat to which Brewer's sparrow population could respond. The species will 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
Golden-crowned kinglet (MB) <i>Regulus satrapa</i>	Fragmentation within a forest stand	N	N	No habitat within mapped PPH or PGH habitat. 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) <i>Picoides tridactylus</i>	Snags, old forest, recent forest burns	N	N	No habitat within mapped PPH or PGH habitat. 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) <i>Melospiza lincolnii</i>	Riparian zone, herbivory in willow community	N	N	No habitat within mapped PPH or PGH habitat. 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) <i>Wilsonia pusilla</i>	Riparian zone, herbivory in willow community	N	N	No habitat within mapped PPH or PGH habitat. 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) <i>Ovis canadensis canadensis</i>	Harvested species, mountain meadow condition	N	N	No habitat within mapped PPH or PGH habitat. 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. The species will be evaluated in more detail.
Grizzly Bear (BT) <i>Ursus arctos horribilus</i>	Threatened or endangered species recovery	Y	Addressed in BA	Also a threatened Species. See analysis in BA.
Elk (BT) <i>Cervus elaphus nelsoni</i>	Harvested species	Y	Y	There are records of the species within PPH and PGH. The alternatives propose some changes within species habitat to which elk population could respond. The species will 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
Mule Deer (BT) <i>Odocoileus hemionus</i>	Harvested species	Y	Y	There are records of the species within PPH and PGH. 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) <i>Alces alces shirasi</i>	Harvested species	Y	Y	There are records of the species within PPH and PGH. 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) <i>Antilocarpa americana</i>	Harvested species	Y	Y	There are records of the species within PPH and PGH. 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) <i>Cynomys ludovicianus</i>	Low structure grasslands	Y	Y	There are records of the species within PPH and PGH. 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) <i>Martes americana origines</i>	Old growth forest/.	N	N	No habitat within mapped P;H 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
Snowshoe hare (MB) <i>Lepus americana</i>	Conifer habitats with dense understory	N	N	No habitat within mapped PPH or PGH 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
AMPHIBIANS				
Boreal Toad (BT) <i>Bufo boreas boreas</i>	Wetland condition	Y	Y	The species is likely to occur within PPH or PGH 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.

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
Boreal Chorus Frog (BT) <i>Pseudacris triseriata</i>	Wetland condition	Y	Minor	Minor habitat overlap with PPH or PGH 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) <i>Oncorhynchus clarki Utah</i>	Riparian condition	Y	N	No habitat overlap with mapped PPH or PGH 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
Colorado River cutthroat (BT) <i>Oncorhynchus clarki pleuriticus</i>	Riparian condition	Y	N	No habitat overlap with mapped PPH or PGH 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
Rainbow trout (BT/MB) <i>Oncorhynchus mykiss</i>	Riparian condition/water quality	Y	N	No habitat overlap with mapped PPH or PGH 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
Yellowstone/Snake River fine-spotted cutthroat (R4) <i>Oncorhynchus clarki spp.</i>	Riparian condition	Y	N	No habitat overlap with mapped PPH or PGH 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
Common trout (MB) <i>Salmo trutta (brown) Salvelinus fontinalis (brook)</i>	Water quality	Y	N	No habitat overlap with mapped PPH or PGH 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
PLANTS				

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
Shultz's milkvetch (BT) <i>Astragalus shultziorum</i>	Sensitive plant representative	N	N	No habitat within mapped PH or PGH 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
Boreal draba (BT) <i>Draba borealis</i>	Sensitive plant representative	N	N	No habitat within mapped PH or PGH 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
Aspen (BT) <i>Populus tremuloides</i>	Ecological indicator of Aspen Condition	Y	Y	Aspen occurs within PPH and PGH. 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.

- **MIS EVALUATIONS**

Greater Sage-Grouse (*Centrocercus urophasianus*)

A Management Indicator Species (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.” (Thunder Basin National Grassland Land and Resource Management Plan, December 2000). The sage grouse 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 also using this habitat include sage thrasher, Brewer’s sparrow, pronghorn and sage

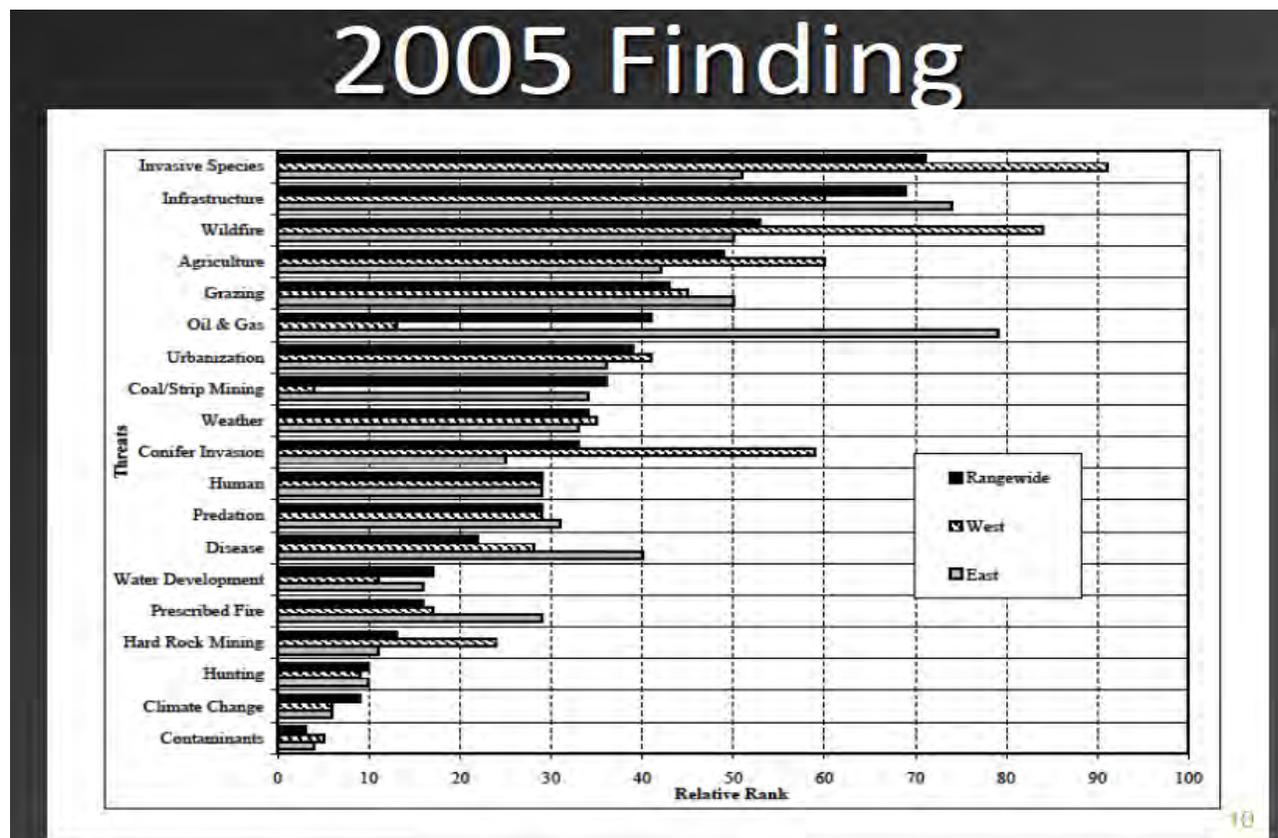
Distribution

The Sage-Grouse is an MIS species on the Thunder Basin National Grasslands. Sage-Grouse 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 sage brush as a component. Within Wyoming, Greater Sage-Grouse (GSG) habitats within National Forest System (NFS) lands to support Sage-Grouse population include the Medicine Bow National Forest (MBNF), Bridger-Teton National Forest (BTNF), and Thunder Basin National Grassland (TBNG). The WGF has divided the State of Wyoming into 6 Local Sage Grouse Working Group Areas for management and monitoring purposes. The Thunder Basin National Grassland falls within the Northeast Wyoming (NEWy) Sage-Grouse Working Group Area which encompasses 23,024 square miles (14,732,639 acres) in the northeast corner of Wyoming. While the TBNG makes up only 4% of the NEWy area, it provides over 25% of the Sage-Grouse habitat on federal public lands within this area. On Thunder Basin, where it is an MIS, there are approximately 553,864 acres of Sage-Grouse habitat.

Habitat Associations and Threats

This large grouse requires a variety of sagebrush structural stages to meet seasonal habitat requirements. Sagebrush is essential for sage grouse during all seasons of the year. This relationship is perhaps tightest in the late fall, winter, and early spring when sage grouse are dependent on sagebrush for both food and cover. During the spring and summer, succulent forbs and insects become important additional food sources. Sage grouse 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 Greater Sage Grouse Conservation Plan 2003).

Current threats to Sage-Grouse in Wyoming include conversion and fragmentation of sagebrush habitats through infrastructure development (including 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 U.S. Fish and Wildlife Service in 2005 as threats to sage grouse range-wide. For the purposes of the following table, Wyoming is considered a part of the eastern population.

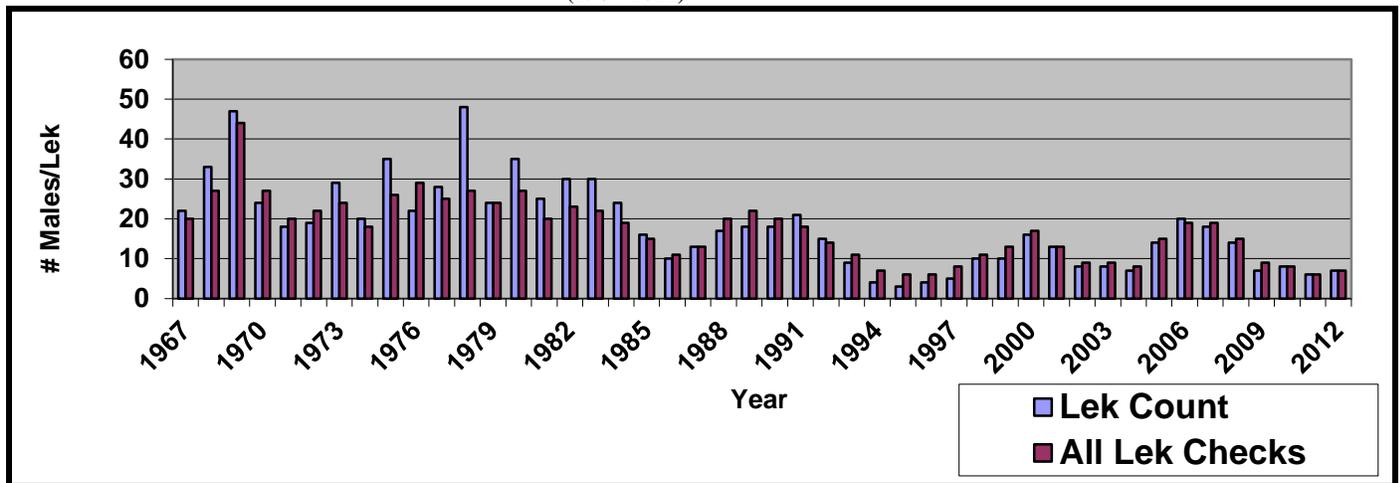


The Northeast Wyoming Working Group felt oil, gas, and coal bed natural gas (CBNG) development, weather, vegetation management, invasive plants, and parasites and diseases were the most important influences on the northeast Wyoming Sage-Grouse population.

Population Status and Trend

The Wyoming Game and Fish Department monitors sage grouse populations throughout the state including TBNG. They currently use the males/lek statistic to track population changes. This will indicate population fluctuations and is generally accepted as reflective of Sage-Grouse population’s dynamics, but 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 and, second, the “males per lek” trend for TBNG follows a similar pattern to that of the Northeast Wyoming Working Group Area. Figure 1 shows the average number of males/lek for lek counts and all lek monitoring combined from 1967 to 2012 for the Northeast Wyoming Local Working Group Area (NEW LWG). Using this information the regional trend suggests about a 10 year cycle of periodic highs and lows. Of concern, however, 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 Sage-Grouse population.

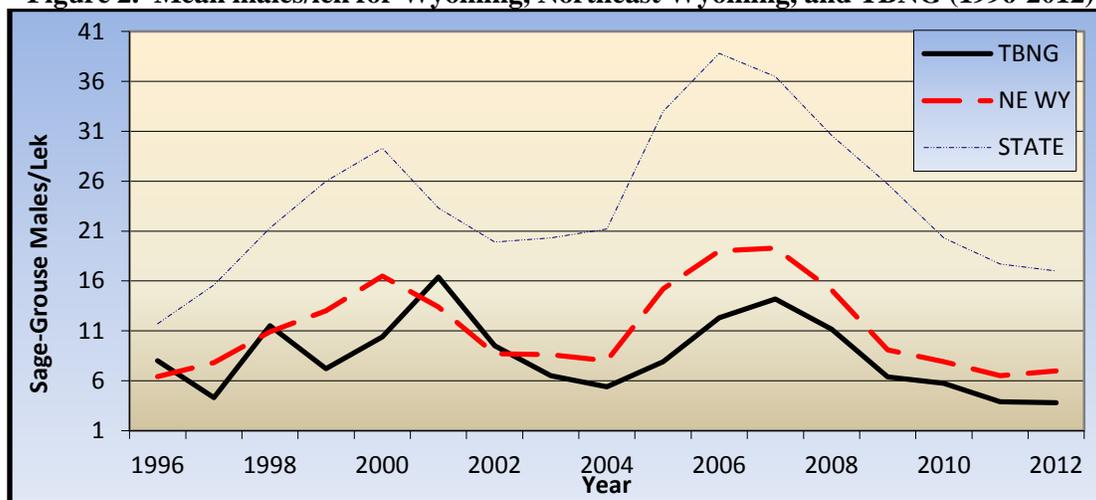
Figure 1. Northeast Wyoming Local Working Group Area Average Number Of Males/lek For lek Counts and all leks (1967-2012)



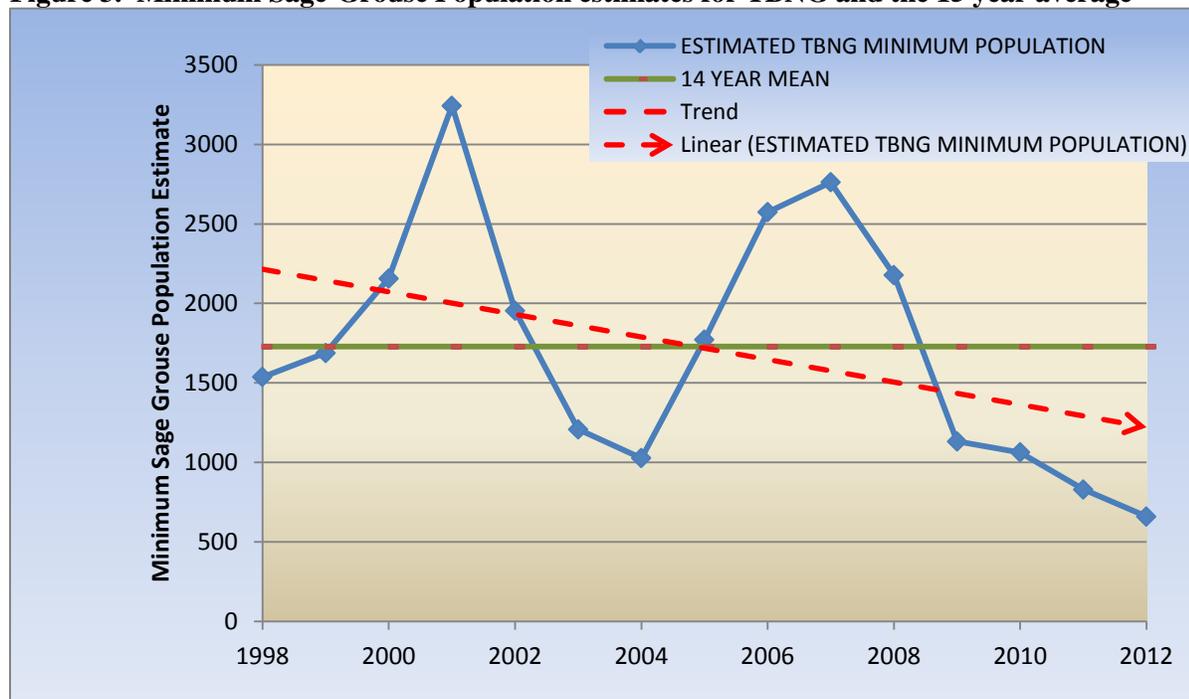
Source: Ne Wyoming Local Working Group Area, Draft Plan Addendum, January 18, 2013

Table 2 below illustrates the mean male attendance per lek at the state, Northeast Working Group Area, and Thunder Basin National Grassland. Of the 6 working groups, Northeast Wyoming has the lowest average male lek attendance in the state, averaging 7 males per active lek in 2012 compared to the statewide average of 17 males per active lek (Figure 2). Male lek attendance for the other working group areas ranged from 14 to 30 males per active lek. In 2012, the average males per lek on TBNG were 3.8.

Figure 2. Mean males/lek for Wyoming, Northeast Wyoming, and TBNG (1996-2012)



The most recent peak minimum estimated population of greater-Sage-Grouse on the TBNG was in 2007 at 2,762 birds. The population has been in a steady decline since then. The current (2012) population estimate is 660 birds. This is a loss of 2,102 birds, or a 76% reduction over the last 5 years. The current population estimate is the lowest it has been in 17 years (Figure 3).

Figure 3. Minimum Sage-Grouse Population estimates for TBNG and the 15 year average

Thunder Basin National Grassland is divided into 6 subunits called Geographic Areas for management purposes, and each Geographic Area has sage grouse as a Management Indicator Species. Currently on TBNG, Sage-Grouse lek attendance is stable or slightly declining in two geographic areas, steeply declining in three geographic areas, and one geographic areas no longer has active leks.

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel

There would be no changes to the current Thunder Basin National Grassland 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 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 Sage-Grouse. 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 Sage-Grouse (Holloran.2005). These disturbances can cause impacts to reproduction and survival (Blickley and Patricelli.2012). Under this alternative noise associated with traffic would not be moderated in sage 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. As a Region 2 Sensitive Species, sage grouse habitat acquisition may be emphasized, however, some Sage-Grouse 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.

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 Sage-Grouse. Potential adverse effects to Sage-Grouse habitat could include habitat fragmentation due to infra-structure 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 Greater Sage-Grouse habitat, energy development will continue to be an issue relevant to the conservation of Sage-Grouse. 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 NFS lands. These lands produced 22.2 percent of the entire nation's coal in 1997 and 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 Sage-Grouse 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 Sage-Grouse as noted by the Fish and Wildlife Service in the 2010 finding (75 FR 13910-14014):

Energy development is a significant risk to the Greater Sage-Grouse 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 Greater Sage-Grouse 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 Sage-Grouse 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 sage- grouse habitat, off road vehicle use, increased traffic on NFS 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% reduction (NE Wyoming Sage Grouse Conservation Plan; 2006). 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, averaging 19 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 5 of the 11 years had more than 2,500 acres burned each year. The dominant fuel types on TBNG are Sage-Grouse habitat (sagebrush and mixed-grass prairie), with lightning being the primary cause of wildfire (61%), and the railroad caused fires being the next most frequent cause (20%), the remaining wildfires are caused by a variety of other sources.

Impacts from wildfires include removal or loss of large tracts of sagebrush habitat, resulting in a direct loss of nests, as well as a loss of nesting habitat, hiding cover and winter range. Wildfire can also increase non-native 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, fire removes the vegetation, cheatgrass re-grows to denser conditions, and creates a fine fuel accumulation ready to burn again at a much reduced fire return interval (Davies et al, 2011).

Under this alternative the use of prescribed fire generally is to be 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 Sage-Grouse breeding, nesting, and winter range. These treatments impacts could result in removal or loss of up to 25% 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 to sage grouse (Braun 2006; Knick and Connelly 201; 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 resulting near total removal of sage brush 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 Sage-Grouse 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 Sage-Grouse 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% reduction (NE Wyoming Sage Grouse Conservation Plan; 2006). 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 5 of the 11 years. Energy development, wildfire, road development and increased noise have also all worked together to fragment and reduce suitable, effective Sage-Grouse habitat on the Thunder Basin National Grassland. These impacts and downward trend have occurred over the last 11 years under the operations of the current Land and Resource management plan (signed in 2002). With all of this considered, the Grassland wide habitat could be expected to continue to decrease in effectiveness and size, under this alternative.

Effects on Sage-Grouse Population Trends TBNG-wide

Sage-Grouse populations have been steadily declining on the TBNG since 2007 with cyclic trends declining since 1998. Many of the sage grouse leks also had less than 10 male in attendance per lek recorded for 2012. With the above discussion about habitat in mind, it could be expected that the grassland wide sage grouse 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 Sage-Grouse within Geographic Areas, and across the entire National Grassland.

Sage-Grouse 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, under 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 Sage-Grouse and sagebrush associated species habitat conservation.

Alternative B

Direct and Indirect Impacts

Recreation and Travel

In Priority Sage-Grouse habitats (PPH also known as Core Areas) new road construction would be limited to areas with less than 3% 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 to GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels (which are lower in this alternative (20-24 dBA) 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 (Core Habitat) 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 Sage-Grouse 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 Sage-Grouse needs in all Sage-Grouse 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 Sage-Grouse habitat could include habitat fragmentation due to infra-structure 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, fluid mineral leases. Existing leases would have a 4 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 to Sage-Grouse through a project design. Exceptions, waivers, and modifications to lease stipulations, (COAs), and terms and conditions (T&Cs) for Sage-Grouse would not be considered within Sage-Grouse priority habitat. Outside of PPH (Core), mineral development would be the same as Alternative A. This alternative better conserves PPH (Core) Sage-Grouse 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 Sage-Grouse 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% 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 Sage-Grouse Habitat Trends TBNG-wide

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

Effects on Sage-Grouse Population Trends TBNG-wide

Based upon the above habitat discussion and protections, the Sage-Grouse population would have a better chance of developing a stable or upward trend. Many of the documented stressors have been reduce in PGH (General Habitat), 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 sage grouse 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 Sage-Grouse 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 Sage-Grouse and their habitat than other alternatives. In this Alternative conservation measures are generally applied to both PPH (Core Habitat) and PGH (General Habitat). Sage-Grouse priority and general habitat areas would be managed as ROW exclusion areas for new Right Of Way or Special Use Authorization permits. New road construction would be prohibited within 4 miles of active Sage-Grouse leks, and avoided in PPH (Core) and PGH (General Habitat). Existing road management would be designed to maintain or improve both PPH (Core) and PGH (General Habitat). Road associated noise would be limited to less than 10 decibels above ambient levels (20-24 dBA). Camping and other non-motorized recreation would be seasonally prohibited within 4 miles of active Sage-Grouse 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 Sage-Grouse. No Sage-Grouse habitat in PPH (Core) would be exchanged away. The Forest Service (Forest Service) will strive to acquire important private lands in areas identified as Sage-Grouse Special Areas. Alternative C would

encourage consolidation and acquisition of Sage-Grouse habitat. This alternative would promote the greatest distribution and highest density of suitable Sage-Grouse habitat.

Range

Livestock grazing would be prohibited within Sage-Grouse PPH (Core). All new structural range developments and location of supplements would be avoided in both PPH (Core) and PGH (General Habitat) unless they can be shown to benefit Sage-Grouse. 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 Sage-Grouse. Post fire (both prescribed and wildfire) monitoring is required in all Sage-Grouse habitat to re-establish grazing. Within Sage-Grouse PPH (Core) and PGH (General Habitat), livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve Sage-Grouse 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 sage grouse leks (Beck and Mitchell .2000), and 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 Sage-Grouse habitat.

Energy and Minerals

No exceptions, waivers, and modifications to lease stipulations, Conditions of Approval (COAs), and terms and conditions (T&Cs) will be considered within Sage-Grouse PPH (Core) and PGH (General Habitat). Both sage-grouse PPH (Core) and PGH (General Habitat) 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 Sage-Grouse PPH (Core) or PGH (General Habitat). Oil and Gas Leasing would not be allowed in Sage-Grouse PPH (Core). Geophysical exploration would only be allowed in Sage-Grouse PPH (Core) and PGH (General Habitat) to obtain exploratory information for areas outside of and adjacent to PPH (Core) and PGH (General) sage-grouse habitat and would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by Sage-Grouse. Where existing leases exist in all Sage-Grouse habitat, stipulations for the protection of Sage-Grouse or their habitats could be added to Conditions of Approval (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. Sage grouse PPH (Core) areas would be closed to mineral material exploration, sales, and free use permits.

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

Fire and Fuels Management

Within all Sage-Grouse habitat, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all Sage-Grouse 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% within any sage grouse habitat and vegetation treatments in both habitats would be designed to create landscape patterns which most benefit sage-grouse. For all Sage-Grouse 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 Sage-Grouse habitat objectives. No fuels treatments would be allowed in known Sage-Grouse 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 Sage-Grouse habitat would utilize mowing of grass. In PPH (Core) habitat areas, fire suppression to conserve the Sage-Grouse habitat would be prioritized immediately after firefighter and public safety.

Prescribed fire in sagebrush would be very limited in all Sage-Grouse 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 Sage-Grouse 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 Sage-Grouse Habitat Trends TBNG-wide

This alternative provides habitat protections for both PPH (Core) and PGH (General) Sage-Grouse habitats. This represents the entire Sage-Grouse 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 to Sage-Grouse structural habitat conditions. With the increased emphasis on fire suppression, reduced energy development, noise restrictions, and livestock grazing limitations, overall Sage-Grouse 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 provides more suitable habitat than Alternatives A, B, D, and E.

Effects on Sage-Grouse Population Trends TBNG-wide

Based upon the above habitat discussion and protections, the Sage-Grouse population would have a good chance of developing a stable or upward trend. Many of the documented stressors

have been reduce or removed in much of the Sage-Grouse 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 sage grouse 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 Sage-Grouse 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% disturbance in PPH and 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 Sage-Grouse than alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PPH (Core) and connectivity habitat will be allowed > 0.25 miles from Sage-Grouse. This is closer than the disturbance allowed under the other alternatives except alternative A.

New rights-of way and special use authorizations in PPH (Core) would generally be excluded; those allowed would be subject to the 9% 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).

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 sage grouse habitat. As grazing permits are renewed in PPH (Core), sage grouse habitat objectives and management considerations could be incorporated. Up to 15% 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 infra-structure is essentially the same as Alternative A. Potential adverse effects to Sage-Grouse habitat could include habitat fragmentation due to infra-structure 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% disturbance cap that does not exist in alternative A. The lack of conservation measures in sagebrush outside of PPH (Core) could lead to increased anthropogenic disturbance of sage-grouse habitat, off road vehicle use, increased traffic on NFS 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% disturbance cap in PPH. This treatment would follow Wyoming Game and Fish Department Protocols for Treating Sagebrush to Benefit Sage-Grouse 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 Sage-Grouse breeding, nesting, and winter range. These limited conservation measures on PPH (Core) and the lack of measures in the remainder of Sage-Grouse habitat would have detrimental impacts on Sage-Grouse. 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 Sage-Grouse 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% of the Sage-Grouse habitat within TBNG, they are not expected to be sufficient to create a noticeable change in Sage-Grouse 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 Sage-Grouse habitat on the Thunder Basin National Grassland.

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

Effects on Sage-Grouse 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. Sage-Grouse populations have been steadily declining on the TBNG since 2007 with cyclic trends declining since 1998. Many of the sage grouse leks also had less than 10 male in attendance per lek recorded for 2012. With the above discussion about habitat in mind, it could be expected that the grassland wide sage grouse 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 Sage-Grouse within Geographic Areas, and across the entire National Grassland.

It is expected that this alternative will conserve more habitat for Sage-Grouse and sagebrush associated species habitat than Alternative A but conserves less than Alternative B, C, and E.

Alternative E

Direct and Indirect Impacts

Recreation and Travel

New primary and secondary roads would avoid areas within 1.9 miles of the perimeter of occupied Sage-Grouse leks within Sage-Grouse PPH (Core) habitat areas. Other new roads would avoid areas within 0.6 miles of the perimeter of occupied Sage-Grouse leks within PPH (Core) habitat areas. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6 pm to 8 am from March 1 – May 15 on or within a six tenths (0.6) mile radius of the perimeter of occupied Sage-Grouse 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 dBA above ambient noise. Some recreation special uses would be allowed in PPH (Core).

Conservation measures primarily apply to PPH (Core) habitat only. Measures in PPH (Core) 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 PPH (Core) would limit disturbance and habitat loss within PPH (Core), but would allow existing conditions to continue in the remaining Sage-Grouse habitat.

Lands and Realty

Sage-Grouse habitat requirements would be used to prioritize parcels for exchange or acquisition within PPH (Core) core habitats. New projects within Sage-Grouse PPH (Core) habitats would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. Sage-Grouse PPH (Core) habitat areas would be managed as ROW avoidance areas for new ROW or SUA permits.

Again, most conservation actions are taken in PPH (Core) habitats, little or no new protections would occur in PGH (General) habitat. Even then some habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH (Core). Habitat changes could also occur because PPH (Core) can be exchanged to other ownership. Overall, impacts to Sage-Grouse and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range

Within Sage-Grouse core habitat, as appropriate, site specific Sage-Grouse 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 Sage-Grouse and its habitat.

Much of the direction for livestock management remains the same as the current management. Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for Sage-Grouse in PPH (Core) than alternatives A and D. Potential adverse effects to Sage-Grouse habitat (primarily in PGH (General) habitat) could include habitat fragmentation due to infra-structure 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% disturbance would be allowed within PPH (Core) habitat using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within Sage-Grouse PPH (Core) 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 1 location per 640 acres. Where existing leases exist in all Sage-Grouse habitat, stipulations for the protection of Sage-Grouse or their habitats could be added to Conditions of Approval (COAs) when approving exploration and development activities. All non-energy leasable and salable mineral activities would be considered in PPH (Core) habitats. The lack of conservation measures in sagebrush outside of PPH (Core) could lead to increased anthropogenic disturbance of sage- grouse habitat, off road vehicle use, increased traffic on NFS 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% disturbance would be allowed within PPH (Core) habitat using the DDTC. Within Sage-Grouse core habitat in northeast Wyoming, vegetation treatments in nesting and wintering habitats that would reduce sagebrush canopy to less than 15% would not be conducted unless it could be shown to be beneficial to sage grouse. Habitat restoration would be prioritized to rehabilitate PPH (core) habitat first. Fuels treatments in PPH (Core) would be designed with an emphasis on protecting existing sagebrush ecosystems and enhancing as well as protecting future sagebrush ecosystems. Following wildfire, burned lands would be treated as disturbed pending an implementation management plan with trend data showing the area was returning to functional sage grouse habitat. Multiple tools would be considered for fuels reduction and analyze in NEPA compliance documentation before electing to implement prescribed fire in PPH (Core) habitat areas. Also within PPH (Core) 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, PPH (Core) habitat would be placed immediately after firefighter and public safety to conserve the habitat.

Fire and fuel management again focuses primarily on PPH (Core) habitat for additional conservation management, leaving the remaining Sage-Grouse 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 Sage-Grouse Habitat Trends TBNG-wide

This alternative focuses of conservation practices primarily within the PPH (Core) habitat and relies on the current management to manage the remaining PGH (General) habitat. Table 1 depicts NFS acreage on the TBNG and designated Greater Sage-Grouse core habitat acres. Of the over one-half million acres of NFS lands that comprise the TBNG, 217,768 acres (~39%) have been designated as PPH (Core) habitat.

Table 1: TBNG Acreage and Designated GSG Core Habitat Acres

Unit	Core Habitat Acres	General Habitat Acres	Total Acres of Sage Grouse Habitat
Thunder Basin National Grassland	217,768	336,096	553,864

The conservation measures included in this Alternative are limited to PPH (Core) habitat, and with this only representing 39% of the Sage-Grouse habitat within TBNG, they are not expected to be sufficient to create an adequate change in Sage-Grouse habitat across the planning unit (TBNG). With implementation of this Alternative energy development, wildfire, road development and increased noise would still work together in the PGH (General) habitat to continue to fragment and reduce suitable, effective Sage-Grouse habitat on the Thunder Basin National Grassland.

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

Effects on Sage-Grouse Population Trends TBNG-wide

With 61% of the suitable habitat on TBNG being managed under current management direction, it is reasonable to assume that the Sage-Grouse population trend would not change markedly from current conditions. While populations might stabilize, and possibly improve within the PPH (Core) habitat, that would only represent 39% of the potential population on TBNG. Sage-Grouse populations have been steadily declining on the TBNG since 2007 with cyclic trends declining since 1998. Many of the sage grouse leks also had less than 10 male in attendance per lek recorded for 2012. With the above discussion about habitat in mind, it could be expected that the grassland wide sage grouse 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 Sage-Grouse within Geographic Areas, and across the entire National Grassland.

It is expected that this alternative will conserve more habitat for Sage-Grouse and sagebrush associated species habitat than Alternative A and D, but conserves less than Alternative B, and C

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 2 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 4 Geographic Areas.

Habitat Associations and Threats

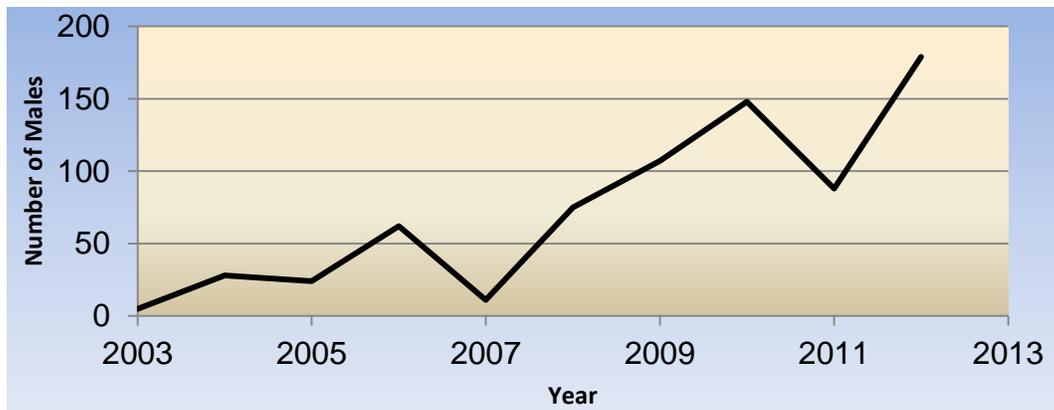
The plains sharp-tailed grouse was selected as a management indicator species on TBNG for the biological community most often found in grasslands with a diversity of structural stages, including an abundance of high structure grasslands. Quality nesting cover on mixed grasslands occurs where mid and/or 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. Individual patch sizes of quality nesting cover across pastures or range sites should be at least 160 acres in size.

On Thunder Basin National Grassland Sharp-tailed grouse habitat overlaps sage-grouse 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 annual monitoring and are primarily monitored by the U.S. Forest Service on Thunder Basin National Grassland. 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. There was a second decline again in 2011, but the 2012 counts show a recovery and improvement.

Figure 5. Total Male Sharp-tailed Grouse Observed on TBNG surface from 2003 thru 2012.



Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel

There would be no changes to the current Thunder Basin National Grassland 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 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 grouse. Under 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 Region 2 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 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 to sharp-tail grouse habitat could include habitat fragmentation due to infra-structure 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 2 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 NFS 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% reduction (NE Wyoming Sage Grouse Conservation Plan; 2006). 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 these 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 upon recent drought conditions it is expected that the overall habitat conditions on TBNG are in decline. With all of this considered, under this alternative the Grassland wide habitat could be expected to continue to decrease in effectiveness and size until moisture levels improve.

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 National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG Land and Resource Management Plan (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 sage-grouse habitats (PPH also known as Core Areas) new road construction would be limited to areas with less than 3% 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 to GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels (which are lower in this alternative (20-24 dBA) 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 sage-grouse 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 sage-grouse needs in all sage-grouse 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 infra-structure 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 impact 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, fluid mineral leases. Existing leases would have a 4 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 to sage-grouse through a project design. Exceptions, waivers, and modifications to lease stipulations, (COAs), and terms and conditions (T&Cs) for sage-grouse would not be considered within sage-grouse priority habitat. 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 sage-grouse 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% 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 habitat.

CUMULATIVE EFFECTS

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

Under 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 to 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 National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG Land and Resource Management Plan (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 (General Habitat). Sage-grouse priority and general habitat areas would be managed as ROW exclusion areas for new Right Of Way or Special Use Authorization permits. New road construction would be prohibited within 4 miles of active sage-grouse leks, and avoided in PPH (Core) and PGH (General Habitat). Existing road management would be designed to maintain or improve both PPH (Core) and PGH (General Habitat). Road associated noise would be limited to less than 10 decibels above ambient levels (20-24 dBA). Camping and other non-motorized recreation would be seasonally prohibited within 4 miles of active sage-grouse leks. There would be less disruption of sharp-tailed grouse habitat, breeding, and a reduction of road associated mortality.

Lands and Realty

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

Range

Livestock grazing would be prohibited within sage-grouse PPH (Core). All new structural range developments and location of supplements would be avoided in both PPH (Core) and PGH (General Habitat) unless they can be shown to benefit sage-grouse. 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 sage-grouse. Post fire (both prescribed and wildfire) monitoring is required in all sage-grouse habitat to re-establish grazing. Within sage-grouse PPH (Core) and PGH (General Habitat), livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve sage-grouse habitat objectives. Since sharp-tailed grouse generally thrive in ungrazed or 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, Conditions of Approval (COAs), and terms and conditions (T&Cs) will be considered within sage-grouse PPH (Core) and PGH (General Habitat). Both sage-grouse PPH (Core) and PGH (General Habitat) 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 sage-grouse PPH (Core) or PGH (General Habitat). Oil and Gas Leasing would not be allowed in sage-grouse PPH (Core). Geophysical exploration would only be allowed in sage-grouse PPH (Core) and PGH (General Habitat) to obtain exploratory information for areas outside of and adjacent to PPH (Core) and PGH (General) sage-grouse habitat and would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by sage-grouse. Where existing leases exist in all sage-grouse habitat, stipulations for the protection of sage-grouse or their habitats could be added to Conditions of Approval (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. Sage grouse PPH (Core) areas would be closed to mineral material exploration, sales, and free use permits.

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

Fire and Fuels Management

Within all sage-grouse habitat, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all sage-grouse 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% within any sage grouse habitat and vegetation treatments in both habitats would be designed to create landscape patterns which most benefit sage-grouse. For all sage-grouse 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 sage-grouse habitat objectives. No fuels treatments would be allowed in known sage-grouse 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 sage-grouse habitat would utilize mowing of grass. In PPH (Core) habitat areas, fire suppression to conserve the sage-grouse 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 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

Under 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 to 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 National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG Land and Resource Management Plan (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% 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 sage-grouse leks. New rights-of way and special use authorizations in PPH (Core) would generally be excluded; those allowed would be subject to the 9% 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 sage grouse habitat. As grazing permits are renewed in PPH (Core), sage grouse habitat objectives and management considerations could be incorporated. Up to 15% 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 infra-structure is essentially the same as Alternative A. With an expected move toward lighter grazing to enhance sage-grouse habitat and up to 15% of the PPH (Core) 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% disturbance cap that does not exist in alternative A. Since sharp-tailed grouse are only found in 2 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, but much of the Spring Creek GA falls into a designated PPH (Core) and therefore would be subject to the 9% 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 NFS 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% disturbance cap in PPH (Core). Treated areas would not be rested from grazing. Also, treatment is permitted in sage-grouse breeding, nesting, and winter range. In several cases, these prescribed burns have been designed to specifically improve sharp-tailed grouse habitat. Since these 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% disturbance, which could prevent increased habitat growth in some areas.

Cumulative Effects

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

Under this alternative sharp-tailed grouse habitat is expected to be maintained or improve slightly. The 9% 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 National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG Land and Resource Management Plan (LRMP) have demonstrated that they are sufficient to maintain viability across the planning unit.

Alternative E

Direct and Indirect Impacts

Recreation and Travel

New primary and secondary roads would avoid areas within 1.9 miles of the perimeter of occupied sage-grouse leks within sage-grouse PPH (Core) habitat areas. Other new roads would avoid areas within 0.6 miles of the perimeter of occupied sage-grouse leks within PPH (Core) habitat areas. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6 pm to 8 am from March 1 – May 15 on or within a six tenths (0.6) mile radius of the perimeter of occupied sage-grouse 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 dBA above ambient noise. Some recreation special uses would be allowed in PPH (Core).

Conservation measures primarily apply to PPH (Core) habitat only. Measures in PPH (Core) 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 PPH (Core) would limit disturbance and habitat loss within PPH (Core), but would allow existing conditions to continue in the remaining Sharp-tailed grouse habitat.

Lands and Realty

Sage-grouse habitat requirements would be used to prioritize parcels for exchange or acquisition within PPH (Core) core habitats. New projects within sage-grouse PPH (Core) habitats would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. Sage-grouse PPH (Core) habitat areas would be managed as ROW avoidance areas for new ROW or SUA permits.

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 sage-grouse habitat.

Range

Within sage-grouse core habitat, as appropriate, site specific sage-grouse 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 sage-grouse and its habitat.

Much of the direction for livestock management remains the same as the current management. In some cases, emphasizing sage-grouse habitat could de-emphasize sharp-tailed grouse habitat. For example, increased sagebrush retention would not be in the best interest for sharp-tailed grouse. Other impacts could include habitat fragmentation due to infra-structure 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% disturbance would be allowed within PPH (Core) habitat using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within sage-grouse PPH (Core) 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 1 location per 640 acres. Where existing leases exist in all sage-grouse habitat, stipulations for the protection of sage-grouse or their habitats could be added to Conditions of Approval (COAs) when approving exploration and development activities. All non-energy leasable and salable mineral activities would be considered in PPH (Core) habitats.

The lack of conservation measures in sagebrush outside of PPH (Core) could lead to increased anthropogenic disturbance of sharp-tailed grouse habitat, off road vehicle use, increased traffic on NFS 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

A maximum of 5% disturbance would be allowed within PPH (Core) habitat using the DDTC. Within sage-grouse core habitat in northeast Wyoming, vegetation treatments in nesting and wintering habitats that would reduce sagebrush canopy to less than 15% would not be conducted unless it could be shown to be beneficial to sage grouse. Habitat restoration would be prioritized to rehabilitate PPH (core) habitat first. Fuels treatments in PPH (Core) would be designed with an emphasis on protecting existing sagebrush ecosystems and enhancing as well as protecting future sagebrush ecosystems. Following wildfire, burned lands would be treated as disturbed pending an implementation management plan with trend data showing the area was returning to functional sage grouse habitat. Multiple tools would be considered for fuels reduction and analyze in NEPA compliance documentation before electing to implement prescribed fire in PPH (Core) habitat areas. Also within PPH (Core) 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, PPH (Core) habitat would be placed immediately after firefighter and public safety to conserve the habitat.

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 % disturbance cap could slow the establishment of new or expanded sharp-tailed habitat.

CUMULATIVE EFFECTS

Effects on Sharp-tailed Grouse Habitat Trends TBNG-wide

Under 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 to 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 National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG Land and Resource Management Plan (LRMP) have demonstrated that they are sufficient to maintain viability across the planning unit.

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

Distribution

Black-tailed prairie dogs (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.

Population Status and Trend

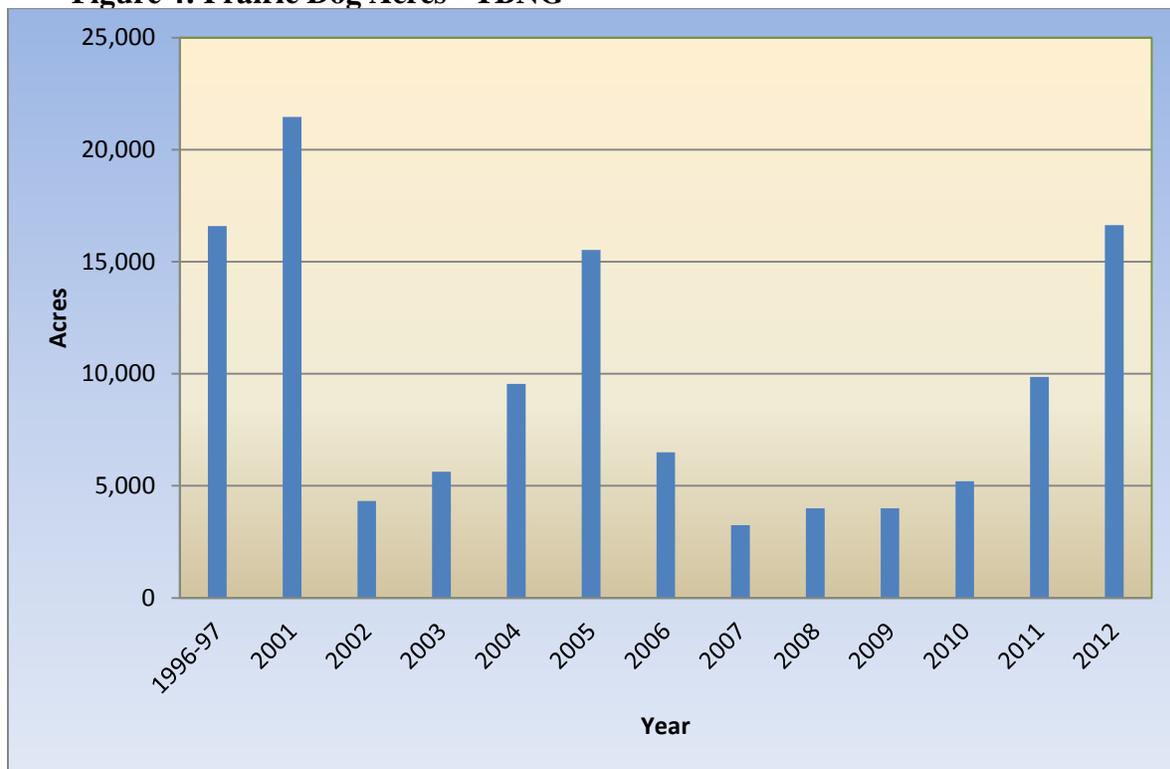
The black-tailed prairie dog is selected as a MIS on TBNG for low structure grasslands and the biological community associated with prairie dog colonies (Forest Service 2002, Appendix H). MIS for TBNG are identified by Geographic Area. In accordance with the Grassland Plan (Forest Service 2002), the black-tailed prairie dog is designated as the Management Indicator Species to be evaluated for 2 of the 6 Geographic Areas, however they occur in all 6 Geographic areas 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 will readily spread into recently disturbed areas. The area occupied by BTPDs has declined to approximately 2% 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% of their original range that prairie dogs still occupy, 1.5% occur on tribal lands, 0.33% occur on federal lands, and only .08% occur on private lands (Miller et al., 2007).

Estimated total active acres of prairie dog colonies within the TBNG from 1996-1997 and from 2001-2012 are illustrated in Figure 4. Colony acreages experienced a significant reduction from 1997 through 2000 due to plague outbreak. In 2006 the number of estimated acres of active prairie dogs fell to nearly the 2004 numbers due to continuing plague. All active prairie dog colonies on TBNG are mapped annually. The population for 2012 occupies 16,638 acres.

Black-tailed prairie dogs and Greater Sage-Grouse share some of the same habitats. Historically on TBNG sage-grouse have used prairie dog colonies for lekking and foraging habitat.

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 Thunder Basin National Grassland 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 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 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 Region 2 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 infra-structure 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 2006), a 63% reduction (NE Wyoming Sage Grouse Conservation Plan; 2006). This reduction has come about from a variety of activities including wildfire and prescribed burning.

Under 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 treatments impacts could result in removal or loss of up to 25% 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 a positive for improving their habitat.

Cumulative Effects

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

Under the Alternative A, black-tailed 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 Geographic Areas. The current LRMP has established the Management Area (MA) 3.63 where black-tailed 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 under 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 to 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.

Viability is defined in the National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Current management standards in the TBNG Land and Resource Management Plan (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 sage-grouse habitats (PPH also known as Core Areas) new road construction would be limited to areas with less than 3% 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 to GRSG. Road associated noise would be limited to less than 10 decibels above ambient levels (which are lower in this alternative (20-24 dBA) than Alternative A). All GRSG PPH and Important Bird Areas could be designated as SIAs. These restrictions would reduce the amount of growth of prairie dog habitat within the PPH (Core) habitats. Outside of PPH (Core) the management would continue similar to Alternative A, which encourages prairie dog growth.

Lands and Realty

PPH (Core Habitat) 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 sage-grouse PPH (Core). These conservation measures would be more impactful than conservation measures in Alternatives A, D, and E but less impactful than Alternative C.

Range

Alternative B would adjust grazing direction in GRSB 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 sage-grouse needs in all sage-grouse habitats. Outside of PPH (Core) the potential effects due to livestock grazing, vegetation disturbance, and range improvements would be the same as Alternative A. These restrictions would reduce the amount of growth of prairie dog habitat within the PPH (Core) habitats. Outside of PPH (Core) 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, fluid mineral leases. Existing leases would have a 4 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 to sage-grouse through a project design. Exceptions, waivers, and modifications to lease stipulations, (COAs), and terms and conditions (T&Cs) for sage-grouse would not be considered within sage-grouse priority habitat. Outside of PPH (Core), mineral development would be the same as Alternative A. These restrictions would reduce the amount of growth of prairie dog habitat within the PPH (Core) habitats. Outside of PPH (Core) 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 (Core) and fuels treatments would emphasize protecting existing sagebrush ecosystems. Suppression and habitat protection would be emphasized. In sage-grouse 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% disturbance limit. With the reduction of fire within sage-grouse PPH (Core), 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 (Core) the 3% disturbance limitation would limit anthropogenic impacts and thus reduce the disturbance factor that promotes prairie dog extinction. With the increased emphasis on fire suppression, reduced energy development, and livestock grazing modifications within PPH (Core), overall prairie dog habitat usability should remain stable with a potential for decreasing. Additional protections and directions for PGH (General habitat) will further habitat expansion this alternative. This alternative is more impactful to 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.

Viability is defined in the National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. With prairie dogs occurring in all Geographic Areas and with the current Prairie Dog Management strategy in place this Alternative it is expected to maintain a viable population of black-tailed 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 (Core Habitat) and PGH (General Habitat). Sage-grouse priority and general habitat areas would be managed as ROW exclusion areas for new Right Of Way or Special Use Authorization permits. New road construction would be prohibited within 4 miles of active sage-grouse leks, and avoided in PPH (Core) and PGH (General Habitat). Existing road management would be designed to maintain or improve both PPH (Core) and PGH (General Habitat). Camping and other non-motorized recreation would be seasonally prohibited within 4 miles of active sage-grouse 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 sage-grouse habitat in PPH (Core) would be exchanged away. The Forest Service (Forest Service) will strive to acquire important private lands in areas identified as Sage-Grouse Special Areas. Alternative C would encourage consolidation and acquisition of sage-grouse habitat. This alternative would promote the greatest distribution and highest density of high structure habitat. With the emphasis on sage-grouse habitat, exchanges to promote prairie dog habitat acquisition would most likely be reduced.

Range

Livestock grazing would be prohibited within sage-grouse PPH (Core). All new structural range developments and location of supplements would be avoided in both PPH (Core) and PGH (General Habitat) unless they can be shown to benefit sage-grouse. 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 sage-grouse.

The prohibition of livestock grazing in PPH (core) 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

No exceptions, waivers, and modifications to lease stipulations, Conditions of Approval (COAs), and terms and conditions (T&Cs) will be considered within sage-grouse PPH (Core) and PGH (General Habitat). Both sage-grouse PPH (Core) and PGH (General Habitat) 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 sage-grouse PPH (Core) or PGH (General Habitat). Oil and Gas Leasing would not be allowed in sage-grouse PPH (Core). Geophysical exploration would only be allowed in sage-grouse PPH (Core) and PGH (General Habitat) to obtain exploratory information for areas outside of and adjacent to PPH (Core) and PGH (General) sage-grouse habitat and would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by sage-grouse. Where existing leases exist in all sage-grouse habitat, stipulations for the protection of sage-grouse or their habitats could be added to Conditions of Approval (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. Sage grouse PPH (Core) areas would be closed to mineral material exploration, sales, and free use permits.

The above sage-grouse conservation measures are designed to reduce or eliminate ground disturbing activities associated with mineral development. These conservation measure would be applied to more sage-grouse habitat, in many cases both PPH (Core) and PGH (General). Black-tailed prairie dog habitat effectiveness would be reduced. Since nearly all of TBNG is in either PPH (Core) or PGH (General Habitat), many of these restrictions would be applied grassland wide.

Fire and Fuels Management

Within all sage-grouse habitat, fuels treatments would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems. Within all sage-grouse 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% within any sage grouse habitat and vegetation treatments in both habitats would be designed to create landscape patterns which most benefit sage-grouse. For all sage-grouse 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 sage-grouse habitat objectives. No fuels treatments would be allowed in known sage-grouse 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 sage-grouse habitat would utilize mowing of grass. In PPH (Core) habitat areas, fire suppression to conserve the sage-grouse 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 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. 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 (General habitat) will further habitat expansion this alternative. This alternative will likely have more effects to 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.

Viability is defined in the National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. With prairie dogs occurring in all Geographic Areas and with the current Prairie Dog Management strategy in place this Alternative it is expected to maintain a viable population of black-tailed 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 to sagebrush than most other alternatives. Most measures are similar to alternative A, although alternative D has a 9% disturbance in PPH (Core) and does require consideration of sage-grouse 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 more detrimental to prairie dogs than alternative A.

Lands and Realty

Surface disturbance and surface occupancy in PPH (Core) and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Grassland. This is closer than the disturbance allowed under the other alternatives except alternative A.

New rights-of way and special use authorizations in PPH (Core) would generally be excluded; those allowed would be subject to the 9% 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 (Core).

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 sage grouse habitat. As grazing permits are renewed in PPH (Core), sage grouse habitat objectives and management considerations could be incorporated. Up to 15% 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 infra-structure is essentially the same as Alternative A. Potential adverse effects to prairie dog habitat would be limited. The loss of up to 15% of grazing within PPH (Core) would restrict the expansion of suitable prairie dog habitat. Habitat development due to infra-structure 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% disturbance cap that does not exist in alternative A. The lack of conservation measures in sagebrush outside of PPH (Core) 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. Under this alternative there would be few restrictions for fuels management in sagebrush. Treatment is restricted only by the 9% disturbance cap in PPH. Treated areas would not be rested from grazing. Also, treatment is permitted in sage-grouse 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 sage-grouse 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. Under the Alternative A, black-tailed 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 Geographic Areas. The current LRMP has established the Management Area (MA) 3.63 where black-tailed prairie dogs management is actively and intensively managed. The primary difference between Alternative A and D is the use of a 9% habitat disturbance cap on PPH (Core). Since PPH (Core) only makes up 39% of the TBNG, 61% 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 under this alternative.

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

This alternative mirrors much of the management direction in Alternative A. Under the Alternative A, black-tailed 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 6 years, and is now occupying over 16,600 acres. The current management encourages the continued growth of prairie dogs across the TBNG.

Viability is defined in the National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. Since this Alternative mirrors the current management (Alternative A) and the standards in the TBNG Land and Resource Management Plan (LRMP) have demonstrated that they are sufficient to maintain viability across the planning unit and this Alternative mirrors most of that direction, it is expected that Alternative D is sufficient to maintain viability across the planning unit.

Alternative E

Direct and Indirect Impacts

Recreation and Travel

New primary and secondary roads would avoid areas within 1.9 miles of the perimeter of occupied sage-grouse leks within sage-grouse PPH (Core) habitat areas. Other new roads would avoid areas within 0.6 miles of the perimeter of occupied sage-grouse leks within PPH (Core) habitat areas. Road construction and re-construction would be completed only to the minimum construction needs. Disruptive activities are restricted from 6 pm to 8 am from March 1 – May 15 on or within a six tenths (0.6) mile radius of the perimeter of occupied sage-grouse 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 dBA above ambient noise. Some recreation special uses would be allowed in PPH (Core).

Conservation measures primarily apply to PPH (Core) habitat only. Measures in PPH (Core) 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 PPH (Core) would limit disturbance

and potential habitat growth associated with this disturbance within PPH (Core), but would allow existing conditions to continue in the remaining prairie dog habitat.

Lands and Realty

Sage-grouse habitat requirements would be used to prioritize parcels for exchange or acquisition within PPH (Core) core habitats. New projects within sage-grouse PPH (Core) habitats would include the proposed distribution and transmission lines in their DDCT as part of the proposed disturbance. Sage-grouse PPH (Core) habitat areas would be managed as ROW avoidance areas for new ROW or SUA permits.

Again, most conservation actions are taken in PPH (Core) habitats, little or no new protections would occur in PGH (General) habitat. This alternative would promote an increased distribution and density of high structure habitat in PPH (Core). With the emphasis on sage-grouse habitat, exchanges to promote prairie dog habitat acquisition would most likely be reduced.

Range

Within sage-grouse core habitat, as appropriate, site specific sage-grouse 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 sage-grouse and its habitat.

Much of the direction for livestock management remains the same as the current management. There would be no change in the numbers, timing, or method of livestock grazing on TBNG. Prairie dog habitat growth derived from livestock management under current conditions would most likely continue under this Alternative. Sagebrush fragmentation due to infra-structure 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 PPH (Core). 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

A maximum of 5% disturbance would be allowed within PPH (Core) habitat using the DDTC. A minimum lease size of 640 contiguous acres of federal mineral estate would be applied within sage-grouse PPH (Core) 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 1 location per 640 acres. Where existing leases exist in all sage-grouse habitat, stipulations for the protection of sage-grouse or their habitats could be added to Conditions of Approval (COAs) when approving exploration and development activities. All non-energy leasable and salable mineral activities would be considered in PPH (Core) habitats. The lack of conservation measures in sagebrush outside of PPH (Core) could lead to increased anthropogenic disturbance of sagebrush stands. Reduction of mineral development associated ground and vegetation disturbances inside of PPH (Core) would limit prairie dog colony growth.

Fire and Fuels Management

A maximum of 5% disturbance would be allowed within PPH (Core) habitat using the DDTC. Within sage-grouse core habitat in northeast Wyoming, vegetation treatments in nesting and

wintering habitats that would reduce sagebrush canopy to less than 15% would not be conducted unless it could be shown to be beneficial to sage grouse. Habitat restoration would be prioritized to rehabilitate PPH (core) habitat first. Fuels treatments in PPH (Core) would be designed with an emphasis on protecting existing sagebrush ecosystems and enhancing as well as protecting future sagebrush ecosystems. Following wildfire, burned lands would be treated as disturbed pending an implementation management plan with trend data showing the area was returning to functional sage grouse habitat. Multiple tools would be considered for fuels reduction and analyze in NEPA compliance documentation before electing to implement prescribed fire in PPH (Core) habitat areas. Also within PPH (Core) 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, PPH (Core) habitat would be placed immediately after firefighter and public safety to conserve the habitat.

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 within PPH (Core) 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 PPH (Core) the 5% disturbance limitation would limit anthropogenic impacts and thus reduce the disturbance factor that promotes prairie dog exaptation. With the increased emphasis on fire suppression, reduced energy development, and livestock grazing modifications within PPH (Core), overall prairie dog habitat usability should remain stable with a potential for decreasing within the PPH (Core). Outside of PPH (Core) 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 PPH (Core).

Viability is defined in the National Forest Management Act (NFMA), as maintaining abundance and distribution across the planning unit. With prairie dogs occurring in all Geographic Areas and with the current Prairie Dog Management strategy in place this Alternative it is expected to maintain a viable population of black-tailed 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 sage-grouse 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 (USDA 2009a). Loss and fragmentation of habitat due to agricultural, urban, suburban, energy, and road development also threaten the species.

Population Status and 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 (1 of 5 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 prior to Euro-American settlement (Holmes and Johnson 2005). In addition to the thousands of acres where nonnative grasses are now mixed with sagebrush, approximately 10% of native sagebrush steppe has now been completely replaced by invasive annuals or by intentionally seeded nonnative grasses. Another 10% 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% - 25% or greater (USDA 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, USDA (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 Forest 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 Bridger-Teton 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. 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. 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. Potential effects on 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 $\geq 25\%$ 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 Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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 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 Brewer's sparrow habitat could be treated. Impacts could include removing or losing large tracts of habitat due to prescribed or wildfire, losing nests, and increasing non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. These cumulative effects are discussed 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. This could allow substantial changes in Brewer's sparrow habitat quantity, quality, and ownership on sagebrush habitat on the Forest.

Currently, these potential habitat changes have not occurred and the Brewer's sparrow population trend on the Forest is stable to slightly declining. It appears that current sagebrush

habitat conditions can sustain this population. This trend is noticeably better than the rangewide 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 Forest 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH and Important Bird Areas could be designated as SIAs. These measures allow less habitat loss and disturbance than Alternative A, retaining more habitat for Brewer's sparrows across the Forest. There would be less disruption of nesting, less abandonment of young or temporary displacement.

Lands and Realty Direct and Indirect Effects

PPH 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 sage-grouse PPH and, therefore, a potential gain of some Brewer's sparrow habitat on the BT. 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, which also benefits Brewer's sparrow.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG; therefore, in favor of Brewer's sparrows. Many livestock 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 sparrow habitat. GRSG PPH accounts for less than 1% of the land cover of the BT, so any changes would be localized. There could be small pockets of improved areas for productive breeding, nesting, and brood rearing for Brewer's sparrow.

Energy and Minerals Direct and Indirect Effects

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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 the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PPH, and therefore Brewer's sparrow habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would promote the conservation of Brewer's sparrow habitat and reduce disturbance to sparrows associated with fire in PPH. 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 (USDA 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 PPH.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. These cumulative effects are discussed 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 PPH, which is <1% of the forest-wide Brewer's sparrow habitat. So, there would be benefits to individual sparrows but these would likely be too small to affect the forest-wide population trend. Generally, activities in PGH and the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) Brewer's sparrow habitat on the Forest. Therefore, overall impacts on Brewer's sparrow forest-wide population would be similar to Alternative A.

Currently, these potential habitat changes have not occurred and the Brewer's sparrow population trend on the Forest is stable to slightly declining. It appears that current habitat conditions can sustain this population. This trend is noticeably better than the rangewide decline observed in other BBS routes. Full use of conservation measures in alternative B in PPH could slow a forest-wide decline of Brewer's sparrow population if the remaining 99% of sagebrush on the Forest was managed to the limit of allowable disturbances.

Alternative C

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

Conservation measure would be more beneficial to Brewer's sparrows and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of sparrow habitat than other alternatives.

Habitat loss, fragmentation, and disturbance would be reduced on >60% of the forest-wide sparrow habitat. There could 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. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat. This alternative would promote the greatest distribution and highest density of Brewer's sparrows forest-wide.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH would retain the most herbaceous cover for nest concealment, seed production and insect production. These results would provide the greatest opportunity among alternatives for reduced nest predation and parasitism, and sparrow fitness in PPH. Since PPH is <1% 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 measure would be more beneficial to Brewer's sparrows and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of sparrow habitat than other alternatives. Habitat loss, fragmentation, and disturbance would be reduced on >60% of the forest-wide 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 in ADH would achieve these results.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would promote the conservation of Brewer's sparrow habitat and reduce disturbance to sparrows associated with fire. This alternative would maintain more than 255,000 more acres of sagebrush in a condition to support Brewer's sparrows by maintaining shrub canopy cover. 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 sagebrush habitat with higher shrub canopy cover than all other alternatives. As mentioned earlier, Brewer's sparrow abundance is higher in stands with $\geq 25\%$ canopy cover (Holmes and Johnson 2005).

Additional information from forest-wide monitoring (USDA 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 focus on preserving sagebrush cover in this alternative will continue to maintain more late succession habitat than occurred historically in PPH.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss, fragmentation, and disturbance in ADH, which is >60% of the forest-wide Brewer's sparrow habitat. So, 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 Forest 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% of habitat have not occurred and the Brewer's sparrow population trend on the Forest 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 PPH and PGH could slow any forest-wide decline of Brewer's sparrow population if the remaining 40% of sagebrush on the Forest 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% disturbance in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the disturbance allowed under the other alternatives except alternative A. This disturbance would affect <1% of the forest-wide Brewer's sparrow habitat. A few more sparrows could be disrupted, nests lost, or young abandoned.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is <1% 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% disturbance cap that does not exist in alternative A. 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 PPH 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% disturbance cap in PPH. Also, 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. Brewer sparrow abundance is higher in climax communities with $\geq 25\%$ cover than sites with less cover (Holmes and Johnson 2005) so reduced cover could result in lower sparrow abundance. These limited conservation measures on PPH and the lack of measures in the remainder of Brewer's sparrow habitat would have detrimental impacts on Brewer's sparrows.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH, which only conserves 1% 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 Forest is stable to slightly declining. It appears that current habitat conditions can sustain this population. This trend is noticeably better than the rangewide 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 cause a decline in the Forest Brewer's sparrow population trend.

Alternative E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most Brewer's sparrow habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive 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, abandonment of young, or temporary displacement in PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some Brewer's sparrow habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on Brewer's sparrows and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRS in PPH than alternatives A and D. These measures would also maintain habitat quality for Brewer's sparrows within PPH. There could be more small pockets of improved areas for productive breeding, nesting, and brood rearing for Brewer's sparrow.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of Brewer's sparrow habitat compared to alternatives A and D. This conservation would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

Conservation measures would be more beneficial than alternatives A and D, considering a no disturbance limit and 9% disturbance limit for these alternatives, respectively. Treatment would be limited to 5% for this alternative. So, impacts on sagebrush habitat and the Brewer's sparrows would be reduced.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. Brewer's sparrow habitat also occurs on private, state, and BLM-administered land adjacent to the Forest.

Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands. Cumulatively, however, there could be additional loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, range management, and fire and fuels management in Brewer's sparrow habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and fragmentation in PPH to 5%. This alternative also limits disturbing activities in PPH. Impacts are decreased compared to alternatives A and D. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 ($\pm 60\%$) of forest-wide sagebrush habitat. So, there would be less loss or fragmentation of Brewer's sparrow habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities could affect about 40% Brewer's sparrow habitat on the Forest. Overall impacts would be less impacting to Brewer's sparrow forest-wide population than alternatives A and D. Impacts would be more than alternatives B and C.

Currently, possible habitat changes have not occurred and the Brewer's sparrow population trend on the Forest is stable to slightly declining. It appears that current habitat conditions can sustain this population. This trend is noticeably better than the rangewide decline observed in other BBS routes. Full use of conservation measures in alternative E in PPH and, in some cases PGH, could slow any forest-wide decline of Brewer's sparrow population if the remaining 40% of sagebrush on the Forest 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 sage-grouse 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 provides elk habitat (USDA 2009). 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 (USDA 2009a).

Population Status and Trend

Elk harvest across Wyoming has averaged $\geq 20,000$ animals annually since 2002 and has increased slightly the last 3 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 feed grounds. The population trend for these elk herd units has been trending slightly downward but the elk population was above the Wyoming Game and Fish Department (WGFD) objectives by approximately 12% in 2005 for the herd units within the BT, and it remains above objectives in 2008 (USDA 2009). The slight downward trend on the Forest is due to harvest designed to reduce the population. The high elk numbers on the Forest 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 sage-grouse habitat are generally 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. USDA (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 (USDA 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 Bridger-Teton 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. 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. 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. 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 Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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. 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. Much elk habitat could be treated. 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 non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in elk habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

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 sagebrush habitat. Conversion to grass forage with fuels treatments would benefit elk. However, limited conservation in the other 4 resource areas could allow substantial changes in elk 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 elk winter and transition range on the Forest. 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 current sagebrush habitat conditions can sustain this population considering that 80% of the elk on the BT also rely on winter feedgrounds (USDA 2009). 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 impact on 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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 Forest. There would be less displacement, disruption of parturition, or reduced elk fitness in sagebrush habitat. Of course, these benefits would occur on <0.1% of Forest-wide elk habitat; so, they would not be noticed in the population.

Lands and Realty Direct and Indirect Effects

PPH 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 sage-grouse PPH and, therefore, a potential gain of some elk habitat on the BT. 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, which also benefits elk.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG; therefore, in favor of elk. Many livestock 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 PPH accounts for less than 1% 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

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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 remaining 425,000 acres of sagebrush habitat. This alternative better conserves PPH, and therefore elk habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the creation of grass foraging areas on the 5593 acres of PPH. So, this habitat could not be improved for elk foraging. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the elk population would be small to immeasurable.

Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in elk habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits disturbance in PPH, which is <0.5% of the forest-wide elk habitat. So, 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 PGH and the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) sagebrush habitat on the Forest. Therefore, overall impacts on the elk forest-wide population would be similar to Alternative A.

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% of the elk on the BT also rely on winter feedgrounds (USDA 2009). This abundance of

elk mimics the status of elk populations statewide. Full use of Alternative B 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 PPH habitat, 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 be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of elk habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ of the forest-wide elk habitat. There would be less disruption of wintering and parturition. There could be less reliance on elk feed grounds.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for elk sagebrush habitat. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH 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, PPH is $<0.5\%$ of forest-wide elk 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 elk and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of elk sagebrush habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ of the forest-wide elk habitat. There could be noticeably reduced disruption on winter and transition ranges, possibly leading to less reliance on feed grounds.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would limit the creation of grass foraging areas across $>255,000$ acres of sagebrush. So, this habitat could not be improved for elk foraging. This is $>60\%$ of the sagebrush habitat on the BT.

Lack of sagebrush treatment does not entice elk to leave feed grounds for native range. Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in elk habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss and disturbance in ADH, which is >60% of the forest-wide sagebrush habitat. So, 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 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 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% of the elk on the BT also rely on winter feedgrounds (USDA 2009). 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 to the elk population trend since measures would affect >60% of the 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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the disturbance allowed under the other alternatives except alternative A. This disturbance would affect <0.5% of the forest-wide elk habitat. A few more elk could be disrupted or a little habitat lost.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is 1% 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% disturbance cap in PPH that does not exist in alternative A. Therefore, these measures would benefit 5593 acres of elk sagebrush habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PPH, and therefore 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% disturbance cap in PPH. Also, treatment is permitted in GRSG breeding, nesting, and winter range. Impacts could include creating more grass forage for elk, benefitting survival of individuals. Results could make elk less reliant on winter feedgrounds .

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.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in elk habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH will allow some additional shrub treatments. Conversion to grass forage with fuels treatments would benefit elk. However, limited conservation in the other 4 resource areas could allow substantial changes in elk habitat quantity, quality, and ownership in sagebrush habitat on the Forest. Still, this alternative prevents more disturbance in these 4 areas than alternative A.

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% of the elk on the BT also rely on winter feedgrounds (USDA 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 PPH habitat, and elk are supported on winter feedgrounds.

Alternative E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most elk sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive 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 PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some elk habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on elk and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for elk within PPH. There could be more small pockets of improved areas for foraging for elk.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of elk sagebrush habitat compared to alternatives A and D. This conservation would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed in alternatives B and C. Impacts could include creating more grass forage for elk, benefitting survival of individuals. Results could make elk less reliant on winter feedgrounds.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in elk habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some additional shrub treatments. Conversion to grass forage with fuels treatments would benefit elk. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 (61%) of forest-wide sagebrush habitat. So, there would be less loss or disturbance of elk sagebrush habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities could affect about 80% of the elk habitat on the Forest. Overall, effects would be less impacting to the elk forest-wide population than alternatives A and D.

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% of the elk on the BT also rely on winter feedgrounds (USDA 2009). This abundance of elk mimics the status of elk populations statewide. Full use of Alternative E 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 PPH habitat, and elk are supported on winter feedgrounds.

Mule Deer (*Odocoileus hemionus*)

Distribution

Mule deer is a MIS for the BT that overlaps with sage-grouse habitat on the National Forest. 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 (USDA 2009).

Population Status and 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 5 mule deer herds. The mule deer population trend for the 5 herd units as a whole has been approximately stable since 2001; however, the total population remains below the state population objective (USDA 2009a). The population on the Forest 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 sage-grouse 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 Forest 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 (USDA 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. The amount of winter range off the Forest 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 but 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 Bridger-Teton 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. 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. 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. 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 Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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. 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 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. Impacts could include regenerating younger, more palatable shrub stands, benefitting survival of individuals. USDA (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 non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in deer habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

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. However, limited conservation in the other 4 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 Forest 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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 Forest. There would be less displacement, disruption of parturition, or reduced deer fitness in sagebrush habitat. Of course, these benefits would occur on <0.1% of Forest-wide deer habitat; so, they would not be noticed in the population.

Lands and Realty Direct and Indirect Effects

PPH 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 sage-grouse PPH and, therefore, a potential gain of some deer habitat on the BT. 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, which also benefits deer.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG; therefore, in favor of deer. Many livestock 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 PPH accounts for less than 1% of the land cover of the BT, so any changes

would be localized. There could be small pockets of improved areas of productive herbaceous foraging for deer.

Energy and Minerals Direct and Indirect Effects

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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 PPH, and therefore deer habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the regeneration of shrubs on the 5593 acres of PPH. So, this habitat could not be improved for mule deer foraging. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the mule deer population would be small to immeasurable.

Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects in addition to impacts described above. 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in deer habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits disturbance in PPH, which is <0.5% of the forest-wide deer habitat. So, 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 PGH and the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) sagebrush habitat on the Forest. Therefore, overall impacts on the deer forest-wide population would be similar to Alternative A.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the 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 PPH habitat.

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. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of deer habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ 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. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH would retain the most herbaceous forage to support deer on transition and winter ranges. This result would provide the greatest opportunity among alternatives for improved deer fitness. Still, PPH is $<0.5\%$ of forest-wide deer 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 deer and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of mule deer sagebrush habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ 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

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would limit the regeneration of shrubs across $>255,000$ acres of sagebrush. This is $>60\%$ of the sagebrush habitat on the BT. So, this habitat could not be improved for deer foraging.

Lack of sagebrush treatment would be detrimental to mule deer over the long term. Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects in addition to impacts described above. 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in deer habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss and disturbance in ADH, which is >60% of the forest-wide sagebrush habitat. So, 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 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 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 to the deer population trend since measures would affect >60% of the 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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the disturbance allowed under the other alternatives except alternative A. This disturbance would affect <0.5% of the forest-wide deer habitat. A few more deer could be disrupted or a little habitat lost.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is 1% 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% disturbance cap in PPH that does not exist in alternative A. Therefore, these measures would benefit 5593 acres of deer sagebrush habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PPH, and therefore deer 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% disturbance cap in PPH. Also, treatment is permitted in GRSG breeding, nesting, and winter range. Impacts could 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 a lack of cover.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in deer habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH 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 4 resource areas could allow substantial changes in deer habitat quantity, quality, and ownership in sagebrush habitat on the Forest. Still, this alternative prevents more disturbance in these 4 areas than alternative A.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the 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 D 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 PPH habitat.

Alternative E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most deer sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive 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 PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some deer habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on deer and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for deer within PPH. There could be more small pockets of improved areas for foraging for mule deer.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of deer sagebrush habitat compared to alternatives A and D. This conservation measure would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed in alternatives B and C. Impacts could include regenerating shrub stands for mule deer, benefitting survival of individuals.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects in addition to impacts described above. 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 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in deer habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some additional shrub treatments. Regeneration of shrub stands with fuels treatments would benefit deer. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 (61%) of forest-wide sagebrush habitat. So, there would be less loss or disturbance of deer sagebrush habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities could affect about 80% of the deer habitat on the Forest. Overall, effects would be less impacting to the mule deer forest-wide population than alternatives A and D.

Substantial changes to sagebrush habitat have not occurred and the deer population trend on the 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 E 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 usually limited to PPH habitat.

Moose (*Alces alces shiras*)

Distribution

Moose is a MIS for the BT that overlaps with some sage-grouse 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.

Factors, some of which are documented by research, contributing to the decline in moose numbers include decline in habitat conditions, predation, human disturbance during winter, and disease (USDA 2009). Typically habitat is the primary limiting factor of moose populations (USDA 2009).

Population Status and Trend

Annual moose harvest across Wyoming has declined consistently over the last 10 years. Harvest was 1160 in 2002 but was as low as 460 in 2011 (WGDF 2011), indicating declining populations.

The BT includes 5 moose herds. The moose population for these herds has been trending downward since 1998, and the total population remains below state population objectives (USDA 2009). 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 sage-grouse 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. USDA (2009) 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 (USDA 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 (USDA 2009a).

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current Bridger-Teton 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. 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. 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. Potential effects on moose 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 and shrub cover and browse for moose across the Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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. 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 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. Some moose habitat could be treated. Impacts could include regenerating younger, more palatable shrub stands and increasing herbaceous forage, benefitting survival of individuals. USDA (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, USDA (2009) 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 non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in moose habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

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 4 resource areas could allow substantial changes in moose 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 with some spring/summer/fall moose habitat on the Forest. 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 (USDA 2009). The moose population trend on the Forest 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 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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 Forest. There would be less displacement or reduction of moose fitness in sagebrush habitat. Of course, these benefits would occur on <0.1% of Forest-wide moose habitat; so, they would not be noticed in the population.

Lands and Realty Direct and Indirect Effects

PPH 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 sage-grouse PPH and, therefore, a potential gain of some moose habitat on the BT. 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, which also benefits moose.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG. Many livestock 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 a few more restrictions that would protect moose habitat. GRSG PPH accounts for less than 1% 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

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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. This alternative better conserves PPH, and therefore some moose habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the regeneration of shrubs on the 5593 acres of PPH. So, this habitat could not be improved for moose foraging. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the moose population would be small to immeasurable.

Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in moose habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits disturbance in PPH, which is <0.5% of the forest-wide moose habitat. So, 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 prohibit regeneration of shrub stands. Generally, activities in PGH and the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) sagebrush habitat on the 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 Forest is

declining but appears to be related to the reduced quality of more important habitats and other factors (USDA 2009). The moose population trend on the Forest is declining, which 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. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of moose habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ of the forest-wide moose habitat. There would be less disruption in spring/summer/fall habitat and improved chances of winter survival.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for moose sagebrush habitat. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH 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, PPH is $<0.5\%$ 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 measure would be more beneficial to moose and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of moose sagebrush habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ 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

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would limit the regeneration of shrubs across $>255,000$ acres of sagebrush. So, this habitat could not be improved for moose foraging. This is $>60\%$ 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 (USDA 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in moose habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss and disturbance in ADH, which is >60% of the forest-wide sagebrush habitat. So, 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 prohibit regeneration of shrub stands. Generally, activities in the remaining sagebrush habitat on the 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 Forest is declining but appears to be related to the reduced quality of more important habitats and other factors (USDA 2009). The moose population trend on the Forest mimics statewide trends. Management of sagebrush habitat is not likely to change this decline. Full use of Alternative C 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 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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the

disturbance allowed under the other alternatives except alternative A. This disturbance would affect <0.5% of the forest-wide moose habitat. A few more moose could be disrupted or a little habitat lost.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is 1% 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% disturbance cap in PPH that does not exist in alternative A. Therefore, these measures would benefit 5593 acres of moose sagebrush habitat. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PPH, 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% disturbance cap in PPH. 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 cover.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in moose habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH 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 4 resource areas could allow substantial changes in moose habitat quantity, quality, and ownership in sagebrush habitat on the Forest. Still, this alternative prevents more disturbance in these 4 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 Forest is declining but appears to be related to the reduced quality of more important habitats and other factors (USDA 2009). The population decline mimics statewide trends. Management of sagebrush habitat is not likely to change this decline. Full use of Alternative D 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 E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most moose sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive 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 in PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some moose habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on moose and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for moose within PPH especially where willow or aspen are inclusions within PPH. There could be more small areas of improvement in aspen, willow, riparian, and sagebrush for moose.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of moose sagebrush habitat compared to alternatives A and D. This conservation measure would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed in alternatives B and C. Impacts could include regenerating shrub stands for moose, benefitting survival of individuals.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in moose habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some additional shrub treatments. Conversion to early successional shrub stands with fuels treatments would benefit moose forage quality and diversity. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 (61%) of forest-wide sagebrush habitat. So, there would be less loss or disturbance of moose sagebrush habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities could affect about 80% of the moose habitat on the Forest. Overall, effects would be less impacting to the moose forest-wide population than alternatives A and D.

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 Forest is declining but appears to be related to the reduced quality of more important habitats and other factors (USDA 2009). The population decline mimics statewide trends. Management of sagebrush habitat is not likely to change this decline. Full use of Alternative E 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.

Pronghorn antelope (*Antilocapra americana*)

Distribution

Pronghorn antelope is a MIS for the BT that overlaps with sage-grouse 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 (USDA 2009). 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 or 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 and Trend

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 2 pronghorn herds. The population trend for these 2 herds has generally been stable and is near the state population objective (USDA 2009, 2009a). The Forest 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 sage-grouse habitat.

Livestock management 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 Forest has been permanently lost.

Some habitat conditions appear to be declining. There is an overrepresentation of late-seral shrublands on the BT (USDA 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 Forest 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 Bridger-Teton 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. 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. 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. 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 Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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. 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. Impacts could include regenerating younger, more palatable shrub stands, benefitting survival of individuals. USDA (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 non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in pronghorn habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

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. However, limited conservation in the other 4 resource areas could allow substantial changes in pronghorn 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 with pronghorn habitat on the Forest. Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the 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 conservation measures in GRSG habitat would have a small impact on the pronghorn population trend since pronghorn occur across all sagebrush on the BT (>430,000 acres) 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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 Forest. There would be less displacement, disruption, or reduced pronghorn fitness in sagebrush habitat. Of course, these benefits would occur on 1% of Forest-wide pronghorn habitat; so, they would not be noticed in the population.

Lands and Realty Direct and Indirect Effects

PPH 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 sage-grouse PPH and, therefore, a potential gain of some pronghorn habitat on the BT. 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, which also benefits pronghorn.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG; therefore, in favor of pronghorn. Many livestock 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 pronghorn habitat. GRSG PPH accounts for only 1% 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

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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. This alternative better conserves PPH, and therefore pronghorn habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the regeneration of shrubs on the 5593 acres of PPH. So, this habitat could not be improved for pronghorn foraging. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the pronghorn population would be small to immeasurable.

Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in pronghorn habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits disturbance in PPH, which is 1% of the forest-wide pronghorn habitat. So, there could be benefits to individual pronghorn 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 PGH and the remaining sagebrush habitat

on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) sagebrush habitat on the Forest. Therefore, overall impacts on the pronghorn forest-wide population would be similar to Alternative A.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the 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 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 PPH habitat.

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. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of pronghorn habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ 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. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH would retain the most herbaceous forage to support pronghorn. This result would provide the greatest opportunity among alternatives for improved pronghorn fitness. Still, PPH is 1% of forest-wide pronghorn 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 pronghorn and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more than 255,000 more acres of pronghorn sagebrush habitat than other alternatives. Habitat loss and disturbance would be reduced on $\pm 8\%$ 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

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would limit the regeneration of shrubs across >255,000 acres of sagebrush.

So, this habitat could not be improved for pronghorn foraging. This is >60% of the sagebrush habitat on the BT.

Lack of sagebrush treatment would be detrimental to pronghorn over the long term. Additional information from forest-wide monitoring (USDA 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in pronghorn habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss and disturbance in ADH, which is >60% of the forest-wide sagebrush habitat. So, 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. Generally, activities in the remaining sagebrush habitat on the 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 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 to the pronghorn population trend since measures would affect >60% of the 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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the disturbance allowed under the other alternatives except alternative A. This disturbance would affect 1% of the forest-wide pronghorn habitat. A few more pronghorn could be disrupted or a little habitat lost.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is 1% 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% disturbance cap in PPH that does not exist in alternative A. Therefore, these measures would benefit 5593 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 PPH, 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% disturbance cap in PPH. Also, treatment is permitted in GRSG breeding, nesting, and winter range. Impacts could include regenerating shrub stands for pronghorn, 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.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in pronghorn habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH will allow some additional shrub treatments. Conversion to early successional shrub stands with fuels treatments would benefit pronghorn forage quality and

diversity. However, limited conservation in the other 4 resource areas could allow substantial changes in pronghorn habitat quantity, quality, and ownership in sagebrush habitat on the Forest. Still, this alternative prevents more disturbance in these 4 areas than alternative A.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the 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 D conservation measures in GRSG habitat would have a small impact on the pronghorn population trend since the conservation measures are generally limited to PPH habitat.

Alternative E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most pronghorn sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive 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 PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some pronghorn habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on pronghorn and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for pronghorn within PPH. There could be more small pockets of improved areas for foraging for pronghorn.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of pronghorn sagebrush habitat compared to alternatives A and D. This conservation measure would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed

in alternatives B and C. Impacts could include regenerating shrub stands for pronghorn, benefitting survival of individuals.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in pronghorn habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some additional shrub treatments. Regeneration of shrub stands with fuels treatments would benefit pronghorn. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 ($\pm 60\%$) of forest-wide sagebrush habitat. So, there would be less loss or disturbance of pronghorn sagebrush habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities could affect about 40% of the pronghorn habitat on the Forest. Overall, effects would be less impacting to the pronghorn forest-wide population than alternatives A and D.

Substantial changes to sagebrush habitat have not occurred and the pronghorn population trend on the 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 E conservation measures in GRSG habitat would have a small impact on the pronghorn population trend since the conservation measures are usually limited to PPH 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 sage-grouse 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, ranging in elevation from about 6,500 to 12,000 feet (WGFD 2005:438).

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 3 main habitat components; 1) shallow wetlands for breeding, 2) terrestrial habitats with vegetative cover for

foraging, and 3) burrows for winter hibernation (Loeffler 2001). 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 and Trend

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 2005:438).

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 RD). 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 Forest 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 sage-grouse habitat.

Across the BT, condition of riparian areas and wetlands is variable. A Forest 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 sage-grouse 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 Bridger-Teton 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. 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. 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. 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 Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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. 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. 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 non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in boreal toad habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

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 4 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 Forest. 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 (USDA 2009). Boreal toads across the Forest 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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 Forest. 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

PPH 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 sage-grouse PPH and, therefore, a potential gain of some boreal toad habitat on the BT. 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, which also benefits boreal toad.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG. Many livestock 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 a few more restrictions that would protect boreal toad habitat. GRSG PPH accounts for less than 1% 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

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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. This alternative better conserves PPH, and therefore some boreal toad habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the regeneration of shrubs on the 5593 acres of PPH. This restriction would benefit retaining more boreal toad habitat. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the boreal toad population would be small to immeasurable.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in boreal toad habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits disturbance in PPH, which is <1% of the forest-wide boreal toad habitat. So, there could be benefits to individual boreal toad 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 PGH and the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) sagebrush habitat on the 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 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. Measures would be applied to PGH in addition to PPH. 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. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss or degradation of habitat.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH 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, PPH is <1% of forest-wide boreal toad habitat; benefits would occur to individuals and not be noticed across the population.

Energy and Minerals Direct and Indirect Effects

Conservation measure would be more beneficial to boreal toads and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures would benefit more acres of boreal toad sagebrush habitat than other alternatives. 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

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would limit the regeneration of shrubs across >255,000 acres of sagebrush. This restriction would benefit retaining more boreal toad habitat. Still, this is a small portion of Forest-wide toad habitat. Impacts to the boreal toad population would be small.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in boreal toad habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss and disturbance in ADH, which is >60% of the forest-wide sagebrush habitat. So, 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 ADH. Additionally, limits on sagebrush treatment will protect some toad habitat. Generally, activities in the remaining sagebrush habitat on the 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 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. However, if a new breeding site was discovered in ADH, then conservation measures could have a substantial benefit to the population.

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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the disturbance allowed under the other alternatives except alternative A. This disturbance would affect <1% of the forest-wide boreal toad habitat. A few more boreal toads could be disrupted or a little habitat lost.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is 1% 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% disturbance cap in PPH that does not exist in alternative A. Therefore, these measures could benefit boreal toad habitat within the 5593 acres of sagebrush. Energy and mineral development could still occur on the remaining 425,000 acres of sagebrush habitat. This alternative better conserves PPH, 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% disturbance cap in PPH. 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. 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in boreal toad habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH will allow some additional shrub treatments, degrading or eliminating toad habitat. Limited conservation in the other 4 resource areas could allow substantial changes in boreal toad habitat quantity and quality in sagebrush habitat on the Forest. These activities affect almost all (>99%) sagebrush habitat on the 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 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 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.

Alternative E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most boreal toad sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive than alternatives A and D but less restrictive than alternatives B and C. There would be less habitat loss or degradation, and less disruption in adult habitat in PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some boreal toad habitat could be lost, degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership.

Overall, impacts on boreal toads and sagebrush habitat would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for boreal toad within PPH especially where willow or aspen are inclusions within PPH. There could be more small areas of improvement in aspen, willow, riparian, and sagebrush for boreal toads.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit disturbance, loss, and degradation of boreal toad sagebrush habitat compared to alternatives A and D. This conservation measure would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed in alternatives B and C. Cover would be eliminated, reducing fitness of a few individuals.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss, degradation, or disturbance from recreation and travel, rights-of-way granted, energy and mineral development, and range management in boreal toad habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some additional shrub treatments, eliminating some toad habitat. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 (61%) of forest-wide sagebrush habitat. So, there would be less loss or disturbance of boreal toad sagebrush habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities could affect boreal toad habitat on the Forest. Overall, effects would be less impacting to the boreal toad forest-wide population than alternatives A and D.

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 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 E 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 sage-grouse habitat on the Forest. Aspen occupies only 5% of the BT and a much smaller amount overlaps with sage-grouse 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 (USDA 2009).

Population Status and Trend

In the State of Wyoming, 53% of the historic aspen had converted to another vegetation type. On some areas of the BT, aspen has declined by 32% (USDA 2009). Through continued plant succession, presumably with a continued lack of disturbance, it was predicted that there could be a 50% reduction of total acres of aspen over the next 20-30 years on the Forest. 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 sage-grouse.

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. USDA (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 (USDA 2009a).

Alternative A - No Action

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

There would be no changes to the current Bridger-Teton 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. 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. 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. 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 wild fires. Forest Plan standards and guidelines for grazing management usually provide sufficient cover and diversity for healthy aspen across the Forest.

Energy and Minerals Direct and Indirect Effects

Only a small percentage of PPH 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. 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. Some aspen habitat could be treated. Benefits would include regenerating younger, more vigorous aspen clones. USDA

(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, USDA (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 non-native or exotic grasses or weeds. This alternative does recommend that any necessary rehabilitation include native plants.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss from recreation and travel, rights-of-way granted, energy and mineral development, and range management in aspen habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

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 4 resource areas could allow substantial changes in aspen habitat quantity, quality, and ownership in sagebrush habitat on the Forest.

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 Forest. Substantial changes to sagebrush quantity have not occurred but the quality of aspen habitat has declined (USDA 2009). The aspen population trend on the Forest 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 PPH coupled with allowing only the minimum necessary road standard and no upgrading of current roads. 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. All GRSG PPH 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 Forest. Of course, these benefits would occur on only a small percentage of Forest-wide aspen.

Lands and Realty Direct and Indirect Effects

PPH 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 sage-grouse PPH and, therefore, a potential gain of some aspen habitat on the BT. 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, which also benefits aspen.

Range Direct and Indirect Effects

Alternative B would adjust grazing direction in GRSG PPH in favor of GRSG. Many livestock improvements could occur only if beneficial to upland or riparian habitat. Areas not meeting grazing standards will be only lightly grazed. These would benefit aspen. The potential effects due to livestock grazing and range improvements would be similar to Alternative A, except that Alternative B provides a few more restrictions that would protect aspen habitat. GRSG PPH accounts for less than 1% of the land cover of the BT, so any changes would be localized. There could be small areas of improvement in aspen.

Energy and Minerals Direct and Indirect Effects

PPH would be closed to new fluid mineral leases and existing leases would have a 4 mile no surface occupancy buffer around leks. Though there are only 3 known active leks and only 5933 acres of PPH 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. This alternative better conserves PPH, and therefore some aspen habitat, than alternatives A, D, and E and is equal to alternative C in PPH.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and suppression would be emphasized. This would limit the regeneration of shrubs on the 5593 acres of PPH. So, aspen would not be regenerated here. Still, this is only 1% of the sagebrush habitat on the BT. Impacts to the aspen population would be small to immeasurable.

Additional information from forest-wide monitoring (USDA 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 PPH.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be

additional habitat loss from recreation and travel, rights-of-way granted, energy and mineral development, and range management in aspen habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative B

This alternative limits disturbance in PPH, which intermingles with a very small portion of the forest-wide aspen habitat. So, 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 intermingled aspen stands. Generally, activities in PGH and the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. These activities affect almost all (>99%) sagebrush habitat on the 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 Forest is declining and is related to a lack of disturbances (USDA 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 B conservation measures in GRSG habitat would have a small impact on individual aspen clones but not the population since aspen occur 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. Measures would be applied to PGH in addition to PPH. These measures would limit habitat loss and benefit aspen where it is intermixed with sagebrush across more than 255,000 acres of PPH or PGH.

Lands and Realty Direct and Indirect Effects

Alternative C would have the most protective measures for sagebrush intermixed with aspen. ADH would be managed as an exclusion area for new ROW projects. Alternative C would encourage consolidation and acquisition of ADH, limiting the possibilities for loss of habitat.

Range Direct and Indirect Effects

The prohibition of livestock grazing in PPH 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, PPH includes a very small portion of forest-wide aspen habitat; benefits would occur to individual clones and not be noticed across the BT.

Energy and Minerals Direct and Indirect Effects

Conservation measure would be more beneficial to aspen and their habitat than other alternatives. Measures would be applied to PGH in addition to PPH. Therefore, these measures

would benefit more than 255,000 more acres of sagebrush where aspen can be intermingled. Habitat loss would be reduced on this portion of forest-wide aspen habitat.

Fire and Fuels Management Direct and Indirect Effects

Prescribed fire in sagebrush would be very limited in PPH and PGH and suppression would be emphasized. This would limit the regeneration of shrubs across >255,000 acres of sagebrush. This is >60% of the sagebrush habitat on the BT. So, aspen regeneration would also be prohibited in PPH and PGH.

Lack of sagebrush treatment would be detrimental to aspen over the long term. Additional information from forest-wide monitoring (USDA 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 PPH and PGH.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss from recreation and travel, rights-of-way granted, energy and mineral development, and range management in aspen habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative C

This alternative limits loss in ADH, which is >60% of the forest-wide sagebrush habitat. So, 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 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 intermixed with aspen on the BT. Aspen on the Forest is declining and is related to a lack of disturbances (USDA 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% disturbance cap in PPH and does require consideration of GRSG needs for recreation special uses in PPH. 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 PPH and connectivity habitat will be allowed > 0.25 miles from the 3 known leks and any new leks on the Forest. This is closer than the disturbance allowed under the other alternatives except alternative A. This disturbance would affect very little of the forest-wide aspen habitat. A few more aspen clones could be disrupted.

New rights-of way and special use authorizations in PPH would generally be excluded; those allowed would be subject to the 9% 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 Direct and Indirect Effects

Conservation measures are generally similar to alternative A. Many conservation measures of alternative D apply to sage-grouse habitat. A few slight differences include that this alternative recommends considering sage-grouse habitat objectives in permit renewals and changes in response to drought in PPH. Since PPH is 1% 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% disturbance cap in PPH that does not exist in alternative A. Therefore, these measures would benefit 5593 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 PPH, and therefore some aspen 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% disturbance cap in PPH. 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 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss from recreation and travel, rights-of-way granted, energy and mineral development, and range management in aspen habitat off the BT. These cumulative effects are discussed 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. This alternative does include a cap on disturbance in PPH while there is no similar limit in alternative A. The allowance of 9% disturbance in PPH will allow some additional shrub treatments. These could include aspen regeneration. However, limited conservation in the other 4 resource areas could allow substantial changes in aspen habitat quantity, quality, and ownership in sagebrush habitat on the Forest. Still, this alternative prevents more disturbance in these 4 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 Forest is declining and is related to a lack of disturbances (USDA 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 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.

Alternative E

Direct and Indirect Impacts

Recreation and Travel Direct and Indirect Effects

The restriction on road construction or upgrades near leks in PPH would limit disturbance and habitat loss. Some recreation special uses would be allowed in PPH. Conservation measures do not apply to most sagebrush habitat, that habitat outside of PPH. Measures in PPH would be slightly more restrictive than alternatives A and D but less restrictive than alternatives B and C. There would be less habitat loss or degradation in PPH compared to alternatives A and D.

Lands and Realty Direct and Indirect Effects

Some aspen habitat could be lost or degraded or disturbed since conservation measures would allow some limited powerlines, some lease changes, and activities within 0.6 miles of a lek in PPH. Habitat changes could also occur because PPH can be exchanged to other ownership. Overall, impacts on sagebrush and intermixed aspen would be similar to but slightly reduced compared to alternatives A and D.

Range Direct and Indirect Effects

Conservation measures place slightly more focus on incorporating measures to provide adequate habitat quality for GRSG in PPH than alternatives A and D. These measures would also maintain habitat quality for aspen within PPH where it is intermixed with sagebrush within PPH. There could be more small areas of improvement in aspen.

Energy and Minerals Direct and Indirect Effects

Conservation measures would have impacts similar to but more restrictive than alternatives A and D. The general prohibition of wind energy development in PGH, with exceptions, would limit loss and degradation of aspen in sagebrush habitat compared to alternatives A and D. This conservation measure would benefit > 260,000 acres ($\pm 60\%$) of sagebrush habitat on the BT.

Fire and Fuels Management Direct and Indirect Effects

There are a few restrictions for fuels management in sagebrush. Treatment is restricted by the 5% disturbance cap and a review of GRSG habitat needs in PPH. Treatment is permitted in GRSG breeding, nesting, and winter range. There are more treatment opportunities than allowed in alternatives B and C. Benefits could include regenerating aspen intermixed with sagebrush.

Cumulative Effects for 5 Resource Areas

There could be cumulative effects 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 Forest. Activities occurring in the 5 resource areas also occur on these ownerships. There are some existing conservation measures on these other lands, especially BLM. Cumulatively, however, there could be additional habitat loss from recreation and travel, rights-of-way granted, energy and mineral development, and range management in aspen habitat off the BT. These cumulative effects are discussed in Manier et al. (2013) and the EIS Chapter 4 for this GRSG amendment.

Summary of Alternative E

This alternative limits habitat loss and degradation in PPH to 5%. This alternative also limits disturbing activities in PPH. The allowance of 5% disturbance in PPH will allow some additional shrub treatments. These could include aspen regeneration. This alternative also limits some disturbances and habitat loss in PGH, such as wind energy development. PGH includes >260,000 (61%) of forest-wide sagebrush habitat. So, there would be less loss or degradation of intermixed aspen/sagebrush habitat forest-wide. Generally, other activities in PGH and all activities in the remaining sagebrush habitat on the Forest will occur as they do currently or could expand as existing direction allows. Overall, effects would be less impacting to aspen forest-wide than alternatives A and D.

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 Forest is declining and is related to a lack of disturbances (USDA 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 E 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.

CONCLUSION

There are no noticeable impacts to MIS on the Medicine Bow National Forest at the landscape level since Sage-Grouse habitat associated with this unit is scattered and generally on the periphery of the unit. However, several MIS for the Bridger-Teton National Forest and Thunder Basin National Grassland could potentially be impacted by the no action and action alternatives. When considering the potential for population-level impacts on MIS other than GRSG, across three planning areas, it is important to consider that PPH and PGH areas 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 National Forest Management Act 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." Management Indicator Species (MIS) is a concept adopted by the agency (1982 rule provision 219.19) to serve, in part, as a barometer for species viability at the Forest level. 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 by MIS species evaluated. The exceptions are those on the Medicine Bow National Forest where no noticeable impacts to MIS on the landscape level are expected. This is due to the fact that Sage-Grouse habitat associated with this unit is scattered and generally on the periphery of the unit.

Management Indicator Species

Thunder Basin National Grassland
<p>Greater Sage-Grouse Most of the Planning unit is Sage-Grouse habitat on TBNG. By design it is expected that this MIS will be affected by all alternatives, with the goal of improving its habitat.</p>
<p>Plains sharp-tailed grouse There are overlaps in Sage-Grouse and sharp-tailed grouse habitats and it is expected that all alternatives will influence some sharp-tailed grouse habitat and its management on TBNG</p>
<p>Black-tailed prairie dog There are overlaps in Sage-Grouse and prairie dog habitats and it is expected that all alternatives will influence prairie dog habitat and its management on TBNG</p>
Bridger-Teton National Forest
<p>Brewer's sparrow Approximately 63% of the sagebrush habitat on the Planning Unit is sage-grouse PPH or PGH. All alternatives could cause at least a small change in Brewer's sparrow population trend since conservation measures among alternatives do not affect the 37% of sagebrush habitat that is not also sage-grouse habitat.</p>
<p>Elk Almost all of the 3.4 million acres of the Planning Unit are habitat for elk. Since conservation measures affect <1% to 8% of the elk habitat among alternatives, the alternatives might cause no change to small changes in the elk population trend.</p>
<p>Mule deer Almost all of the 3.4 million acres of the Planning Unit are habitat for mule deer. Since conservation measures affect <1% to 8% of the mule deer habitat among alternatives, the alternatives might cause no change to small changes in the elk population trend.</p>
<p>Moose Nearly all of the 3.4 million acres of the Planning Unit are identified as some type of habitat for moose. However, sagebrush is generally not a significant component of moose habitat. Since conservation measures affect a small percentage of the moose habitat among alternatives, the alternatives are not likely to cause a change in the moose population trend.</p>
<p>Pronghorn Pronghorn habitat is primarily the 425,000 of sagebrush occurring on the Planning Unit. Approximately 63% of the sagebrush habitat on the Planning Unit is sage-grouse PPH or PGH. All alternatives could cause at least a small change in pronghorn population trend since conservation measures among alternatives do not affect the 37% of sagebrush habitat that is not also sage-grouse habitat.</p>
<p>Boreal toad The overwhelming majority of boreal toad habitat on the Planning Unit does not occur in sagebrush. None of the alternatives is expected to measurably affect boreal toad habitat. No change in boreal toad population trend is expected to occur.</p>
<p>Aspen Aspen occupies only 5% of the Planning Unit and a much smaller amount overlaps with sage-grouse habitat. None of the alternatives is expected to change the population trend for aspen</p>

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