
Appendix M

US Forest Service Biological Evaluation and
Management Indicator Species Report

**US Forest Service
Biological Evaluation and
Management Indicator Species Report**

for the

**Greater Sage-Grouse Conservation Effort to
Amend the Routt National Forest Plan**



May 15, 2015

Prepared by:

Bruce Davidson, Botanist
bldavidson@fs.fed.us

Kat Carsey, Botanist
kscarsey@fs.fed.us

Janet Moser, Wildlife Biologist
jmoser@fs.fed.us

Chris Colt, Wildlife Biologist
ccolt@fs.fed.us

TABLE OF CONTENTS

ACRONYMS	4
BIOLOGICAL EVALUATION	5
I. INTRODUCTION	5
II. PROJECT HISTORY	5
III. PURPOSE AND NEED	6
IV. DESCRIPTION OF THE ALTERNATIVES	7
V. ANALYSIS AREA	11
VI. FOREST SERVICE SENSITIVE SPECIES ON THE ROUTT NATIONAL FOREST	16
A. Greater sage-grouse (<i>Centrocercus urophasianus</i>)	27
B. Amphibians	30
C. Birds	31
D. Fish	33
E. Plants	34
VII. EFFECTS ANALYSIS FOR SENSITIVE SPECIES	39
A. Effects of Alternative A on GRSG	42
B. Effects of Alternative B on GRSG	44
C. Effects of Alternative C to Sensitive Animal Species including the GRSG	46
D. Effects of Alternative D to Sensitive Animal Species including the GRSG	48
E. Effects of The proposed plan on GRSG	50
F. Effects of Alternative A on Sensitive Animal Species	52
G. Effects of Alternative B on Sensitive Animal Species	54
H. Effects of Alternative C to Sensitive Animal Species	57
I. Effects of Alternative D to Sensitive Animal Species	59
J. Effects of The proposed plan on Sensitive Animal Species	61
K. General Effects of All Alternatives on Sensitive Plant Species	64
G. Effects of Alternative A on Sensitive Plant Species	67
L. Effects of Alternative B on Sensitive Plant Species	70
M. Effects of Alternative C on Sensitive Plant Species	72
N. Effects of Alternative D on Sensitive Plant Species	74
O. Effects of the proposed plan on Sensitive Plant Species	76
MANAGEMENT INDICATOR SPECIES REPORT	79
I. INTRODUCTION	79

II.	MIS EVALUATIONS	81
A.	Vesper sparrow (<i>Poocetes gramineus</i>)	81
B.	Colorado River cutthroat trout (<i>Oncorhynchus clarkii pleuriticus</i>)	90
C.	Brook trout (<i>Salvelinus fontinalis</i>).....	90
III.	CONCLUSION	98
IV.	CONTACTS.....	98
V.	LITERATURE CITED	98

ACRONYMS

ADH	all designated habitat
BBS	Breeding Bird Survey
BE	biological evaluation
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CMZ	Colorado Management Zone
COT	Conservation Objectives Team
CRCT	Colorado River cutthroat trout
CSTG	Columbian sharp-tailed grouse
EIS	environmental impact statement
FEIS	final environmental impact statement
FSM	Forest Service Manual
GHMA	general habitat management area
GRSG	greater sage-grouse
LCHMA	linkage/connectivity habitat management area
LMP	land management plan
LRMP	land and resource management plan
MIS	management indicator species
NSO	no surface occupancy
NTT	National Technical Team
PHMA	priority habitat management area
RNF	United States Forest Service, Routt National Forest
ROW	right-of-way
SUA	special use authorization
SRP	special recreation permit
USFWS	United States Fish and Wildlife Service

BIOLOGICAL EVALUATION

I. INTRODUCTION

This biological evaluation (BE), including management indicator species (MIS), was developed as the basis of the effects analysis for sensitive species and MIS identified by the US Forest Service, Routt National Forest (RNF). It provides a preliminary look at the effects of adding conservation direction to conserve greater sage-grouse (GRSG) and their habitats on the RNF.

This BE has been prepared following the standards set forth in Forest Service Manual (FSM) 2672.4. It is in compliance with 36 Code of Federal Regulations (CFR), Part 219.19 and 36 CFR, Part 241.1.

This analysis is framed around two primary sections:

1. Region 2 species designated by the Regional Forester as sensitive species, including GRSG
2. Management indicator species

This report provides a framework and preliminary analysis of the anticipated effects on these conservation priority species occurring in the RNF.

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

II. PROJECT HISTORY

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, implying that listing is "warranted, but precluded due to higher priorities" because of two primary factors: the large-scale loss and fragmentation of habitats across the species range, and a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to GRSG habitat 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, resulting in large uncharacteristic wildfires in the western portion of the species' range.

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

In 2011 and 2012, the United States Fish and Wildlife Service (USFWS) submitted letters to the BLM and Forest Service recommending that the agencies amend land management plans (LMPs) to provide adequate regulatory mechanisms in the form of management direction specific 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 LMPs, including Forest Plans (<http://fsweb.r4.fs.fed.us/unit/nr/sagegrouse/index.shtml>).

Because the BLM administers most occupied GRSG habitat remaining on federal lands, that agency is leading the effort to amend or revise LMPs, with the Forest Service as a cooperating agency. The purpose is to provide direction in LMPs that conserve and protect GRSG habitat and to assure the USFWS that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for the following GRSG planning subregions:

- Eastern Montana and portions of North and South Dakota
- Idaho and southwest Montana
- Oregon
- Wyoming
- Northwest Colorado
- Utah
- 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.

III. PURPOSE AND NEED

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

IV. DESCRIPTION OF THE ALTERNATIVES

A range of alternatives were developed that are specifically structured to identify and incorporate appropriate conservation measures in the LMP to conserve, enhance, or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. There are five alternatives to consider under this analysis. A brief description of each of the alternatives is provided below. For a full description of the alternatives, please refer to Chapter 2 of the final EIS (FEIS).

The planning area includes priority habitat management areas (PHMA¹), general habitat management areas (GHMA²), linkage/connectivity habitat management areas (LCHMA³), and additional lands not designated as PHMA, GHMA, or LCHMA. Collectively, PHMA, GHMA, and LCHMA are referred to as All Designated Habitat (ADH).

The Draft EIS evaluates restricting disturbance based on maximums called caps in three of the alternatives. Additional actions or projects would generally not be approved if a disturbance cap for a particular management zone had been reached; this includes the Colorado Management Zone (CMZ). GRSG populations would be monitored and evaluated by management zone.

Table 1. Disturbance Type Caps Under Each Alternative

Disturbance Type	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Anthropogenic	None	3% cap on PHMA habitat	3% cap on ADH	5% cap on ecological sites that support sagebrush	3% cap in PHMA
Total disturbance	None	Manage or restore priority areas so that at least 70% of the land cover provides adequate sagebrush habitat to meet GRSG	None	Less than 30%, to include all loss of sagebrush from all causes, including anthropogenic, disturbance, wildfire, plowed field	In PHMA, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with 10-30% sagebrush canopy cover

¹Areas identified by the Forest Service, in coordination with respective state wildlife agencies, as having the highest conservation value to maintaining sustainable GRSG populations. These areas include breeding, late brood-rearing, and winter concentration areas.

²Areas identified by the Forest Service, in coordination with respective state wildlife agencies, as those outside of priority and sagebrush focal management areas and occupied by GRSG seasonally or year-round.

³Areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and to maintain ecological processes.

Disturbance Type	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
		needs		agriculture, and vegetation treatments	

Alternative A: No Action

Under the No Action Alternative the RNF LRMP would not be amended. The existing management direction for species conservation would continue to guide Forest Plan implementation.

Alternative B

Conservation measures developed by the National Technical Team (NTT) and summarized in the 2011 Sage-Grouse NTT Report are the foundation for Alternative B (Sage-Grouse National Technical Team 2011). These conservation measures would apply only to GRSG PHMA. There would be a 3 percent cap on disturbance in these areas. Additional details about this alternative are as follows:

- Travel construction would be limited in PHMA, minimum standards would be applied, and there would be no road upgrades
- Recreation special use permits in PHMA would be allowed only if they were deemed to have no effect on GRSG
- Rights-of-way (ROWs) would be excluded in PHMA; the RNF would aim to keep and acquire PHMA.
- Grazing direction would be adjusted to improve management for GRSG
- PHMA would be closed to new fluid minerals leases; existing leases would have a 4-mile no surface occupancy (NSO) buffer around leks
- Wildfire/fuels would aim to protect sagebrush habitats in PHMA
- Habitat restoration would be a priority, with a focus on native species

Alternative C

This alternative would expand many of the conservation measures under Alternative B to all designated GRSG habitat, including PHMA, GHMA and linkage areas. There would be a 3 percent cap on disturbance in these areas, and PHMA would be closed to livestock grazing. Additional details about this alternative are as follows

- Travel construction would be limited in ADH, and no new roads would be constructed within 4 miles of a lek or occupied habitat
- Recreation would seasonally prohibit camping and nonmotorized recreation within 4 miles of a lek
- ADH would be exclusion areas for ROWs and special use permits

- The RNF would aim to keep and acquire ADH
- Wind and solar installations would not be allowed in designated habitat
- ADH would be closed to new fluid minerals leases; existing leases would have a 4-mile NSO buffer around leks
- Wildfire/fuels would aim to protect and restore sagebrush habitats; areas would be closed to grazing after wildfire
- All PHMA would be designated as Zoological Areas in the RNF, a status similar to areas of critical environmental concern on BLM-administered lands

Alternative D

This alternative is very similar to Alternative B, the NTT alternative. It would be applied to sagebrush ecological sites in PHMA. Fluid mineral surface occupancy would be prohibited in ADH within a minimum of 4 miles from active leks and there would be a 5 percent cap on disturbance in these areas. Additional details about this alternative are as follows:

- Travel construction would be limited in PHMA, with a disturbance exception allowing the RNF to exceed the 5 percent cap if GRSG populations were doing well
- Recreation special use permits that do not adversely affect GRSG would be allowed
- ROWs would be excluded in PHMA, with the exception of transmission lines
- Grazing direction would be adjusted to improvement management for GRSG in ADH
- PHMA would be designated as a NSO for new fluid minerals leases; existing leases would have seasonal conditional surface use
- Wildfire/fuels would aim to protect sagebrush habitats in ADH
- Habitat restoration would be a priority, with a focus on native species

Proposed Plan Amendment

The proposed plan incorporates the following GRSG goals: Conserve, enhance, and restore the sagebrush ecosystem on which GRSG populations depend in an effort to maintain or increase their abundance and distribution, in cooperation with other conservation partners. For the full details of each agency's proposed plan, please refer to Chapter 2 of the FEIS.

The Proposed RNF LRMP Amendment seeks to allocate resources between competing human interests and land uses and the conservation of natural resource values, including GRSG habitat. At the same time, it would sustain and enhance ecological integrity across the landscape, including plant, wildlife, and fish habitat.

The proposed plan amendment incorporates adjustments made in response to public comments on the Draft LRMP Amendment, as well as cooperating agency input. Conservation measures under the proposed plan amendment are focused on PHMAs and GHMAs, as well as active leks (regardless of which type of habitat the active lek is in).

The Proposed RNF LRMP Amendment would manage discrete anthropogenic disturbances so they would be limited to less than 3 percent of PHMA in a biologically significant unit (CMZ). See Chapter 2 of FEIS for full details on disturbance caps.

The proposed plan incorporates the following GRSG goals: Conserve, enhance, and restore the sagebrush ecosystem on which GRSG populations depend in an effort to maintain or increase their abundance and distribution, in cooperation with other conservation partners. For the full details of the proposed plan, please refer to Chapter 2 of the FEIS.

This alternative would expand many of the conservation measures in Alternative B to ADH. There would be a 3 percent cap on disturbance in PHMA. Other details about this alternative are as follows:

- No new leasing of unleased fluid minerals within 1 mile from active leks in ADH
- NSO in PHMA and within 2miles of active leks in GHMA
- For leased fluid minerals, within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded
- All PHMA and GHMA would be avoidance areas for Forest Service special use authorization (SUA) permits
- No new roads or aboveground structures would be authorized within 1 mile of an active lek
- Wind energy and industrial solar development would be excluded in PHMA and avoided in GHMA
- PHMAs would be closed to new mineral sales and new nonenergy mineral leases

For a detailed description of each program area under this alternative see Chapter 2 of the FEIS.

Comparison of Alternatives

Table 2. Comparative Summary of Alternatives

Resource or Resource Use	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan
GRSG Habitat Areas (BLM/Forest Service surface and federal mineral estate, including coal)					
PHMA	0	1,576,900	1,576,900	1,576,900	5,000
GHMA	0	1,134,800	1,134,800	1,134,800	15,000
Linkage/connectivity	0	181,900	181,900	181,900	0
Resource Uses					
Livestock Grazing					
Acres closed to all classes of livestock grazing, including outlying areas	0	0	1,751,600	0	0
Comprehensive Travel and Transportation Management					
Open to cross-country motorized travel	202,600	202,600	202,600	202,600	0
Closed to motorized travel	52,600	52,600	52,600	52,600	0
Lands and Realty					
ROW exclusion areas	25,600	926,800	1,751,600	0	0

Resource or Resource Use	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan
ROW avoidance areas	127,600	0	0	930,500	20,000
ROW avoidance areas for large transmission lines (greater than 230 kilovolts)	0	0	0	68,000	0
ROW exclusion areas for large transmission lines (greater than 230 kilovolts)	0	0	0	881,000	0
ROW avoidance areas for large transmission lines (greater than 100 kilovolts)					All PHMA and GHMA are avoidance areas
Recommend for withdrawal (federal minerals in PHMA)	0	1,576,900	1,576,900	0	0
Coal					
Unsuitable for surface mining and operations	1,670,800	1,576,900	1,576,900	Criteria applied to 1,576,900 acres	Criteria applied to 5,000 acres
Fluid Mineral Leasing (including oil shale and uranium)					
Closed to fluid mineral leasing	100,200	1,347,400	2,473,000	100,200	0
Open to leasing, subject to NSO-BLM surface/federal minerals	350,300	350,300	350,300	1,347,400	5,000
Locatable Minerals, Mineral Materials, and Nonenergy Solid Leasable Minerals					
Closed to mineral materials sales	104,200	926,800	926,800	200	5,000
Closed to nonenergy mineral leasing	11,200	926,800	926,800	11,200	5,000

V. ANALYSIS AREA

In the analysis area, the management direction proposed in the action alternatives would apply to designated GRSG habitats (PHMA, GHMA, and linkage areas) in northwestern Colorado that have been identified (Figure 1); however, there are no areas designated as linkage areas in the RNF. There are a total of 12,501 acres of identified GRSG habitat on the RNF, approximately 1 percent of the whole RNF. Of the 12,501 acres of identified habitat in the RNF, 1,571 acres are PHMA (13 percent) and 10,930 acres are GHMA (87 percent). Each of the three Ranger Districts in the RNF contain GRSG habitat. The Hahns Peak/Bears Ears District contains 9,982 acres, the Yampa District contains 1,262 acres, and the Parks District contains 1,257 acres (Table 3). The Yampa and Parks Districts are the only Ranger Districts with identified PHMA, whereas the Hahns Peak/Bears Ears District contains most of the habitat, but it is all classified as GHMA (Table 3). State and private land inholdings also occur in the RNF boundary and include GRSG habitat, as described in Table 3. The breakdown of vegetation cover types in the RNF by GRSG CMZ are described in Table 4.

Table 3. GRSG Habitat by Ranger District and Habitat Type in the RNF

Ranger District	Surface Landownership	GRSG Habitat Type	Acres
Hahns Peak-Bears Ears	National Forest System	GHMA	9,982
Hahns Peak-Bears Ears	Private inholding	GHMA	1,150
Hahns Peak-Bears Ears	State inholding	GHMA	649
Hahns Peak-Bears Ears Total			11,781
Parks	National Forest System	GHMA	285
Parks	National Forest System	PHMA	972
Parks Total			1,257
Yampa	National Forest System	GHMA	663
Yampa	National Forest System	PHMA	599
Yampa	Private inholding	GHMA	1,179
Yampa	Private inholding	PHMA	1,363
Yampa	State inholding	GHMA	507
Yampa	State inholding	PHMA	6
Yampa Total			4,316
Grand Total			17,354

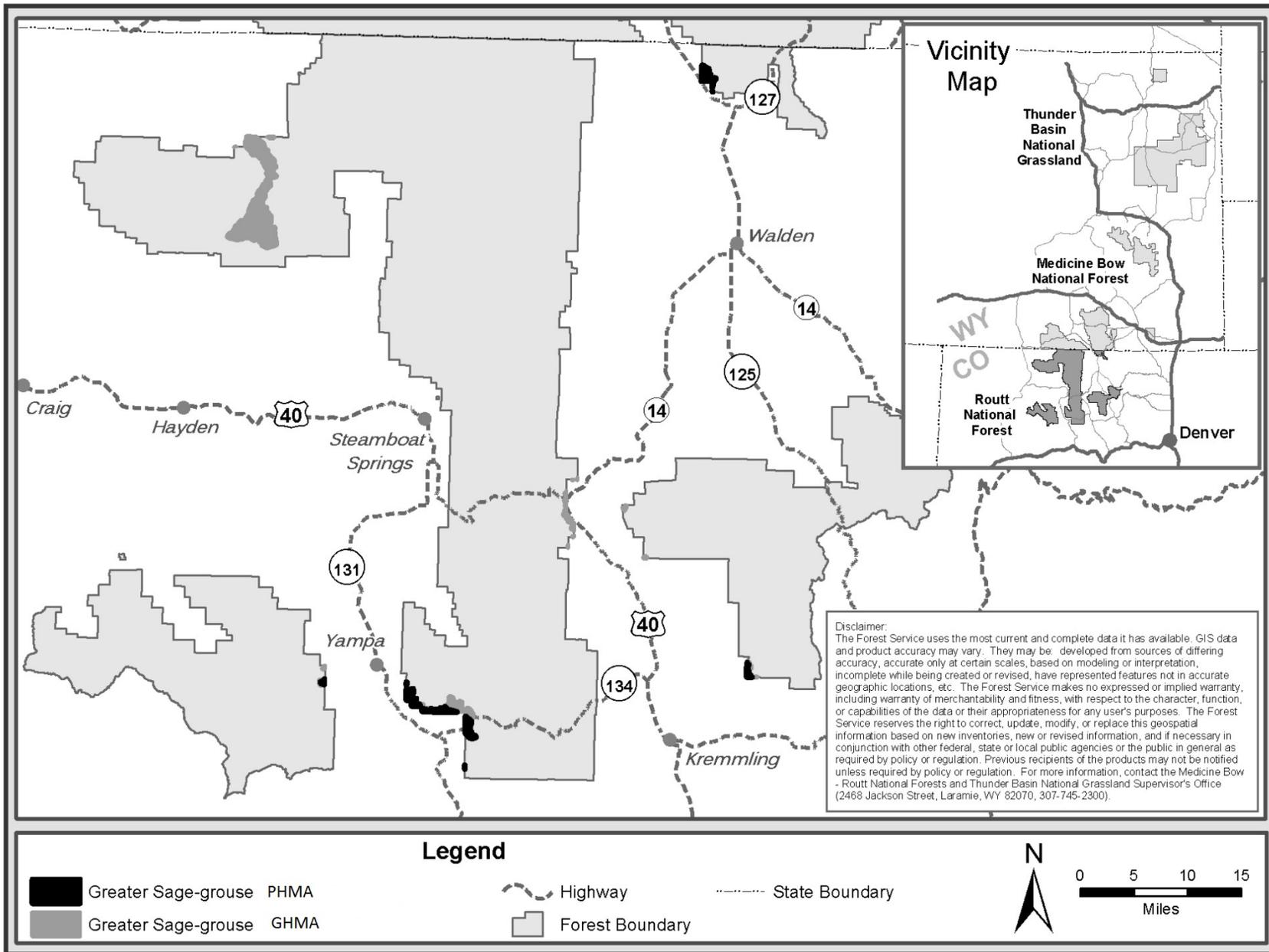


Figure 1. Locations of Greater Sage-Grouse habitat management areas in the RNF.

Table 4. GRSG Designated habitat by Cover Type for Each Management Zone

GRSG CMZ	GRSG Habitat type	Vegetation Cover type Source: FSveg database	Acres
Zone 07	GHMA	Forb, grass, sagebrush	7,969
Zone 07	GHMA	Grass—riparian	190
Zone 07	GHMA	Shrub	56
Zone 07	GHMA	Shrub—willow	625
Zone 07	GHMA	Tree—aspens	1,011
Zone 07	GHMA	Tree—lodgepole pine	21
Zone 07	GHMA	Tree—spruce-fir	58
Zone 07 Total			9,930
Zone 11	PHMA	Forb, grass, sagebrush	681
Zone 11	PHMA	Grass—riparian	41
Zone 11	PHMA	Shrub	22
Zone 11	PHMA	Shrub—willow	2
Zone 11	PHMA	Tree—aspens	6
Zone 11	PHMA	Tree—Douglas-fir	14
Zone 11 Total			766
Zone 13	GHMA	Forb, grass, sagebrush	533
Zone 13	GHMA	Shrub	58
Zone 13	GHMA	Shrub—willow	7
Zone 13	GHMA	Tree—aspens	158
Zone 13	GHMA	Tree—lodgepole pine	13
Zone 13	GHMA	Tree—spruce-fir	4
Zone 13	PHMA	Forb, shrub	161
Zone 13	PHMA	Tree—aspens	43

GRSG CMZ	GRSG Habitat type	Vegetation Cover type Source: FSveg database	Acres
Zone 13	PHMA	Tree—spruce-fir	2
Zone 13 Total			980
Zone 14	GHMA	Forb, grass, sagebrush	139
Zone 14	GHMA	Shrub	42
Zone 14	GHMA	Shrub—willow	24
Zone 14	GHMA	Tree—aspens	20
Zone 14	PHMA	Forb, grass, sagebrush	529
Zone 14	PHMA	Shrub—willow	20
Zone 14	PHMA	Tree—aspens	21
Zone 14	PHMA	Tree—lodgepole pine	3
Zone 14 Total			825

VI. FOREST SERVICE SENSITIVE SPECIES ON THE ROUTT NATIONAL FOREST

Forest Service policy requires that a review of programs and activities, through a BE, be conducted to determine their potential effect on threatened and endangered species, species proposed for listing, and sensitive species (FSM 2670.3). This section provides a preliminary analysis that will be used to develop the BE specific to sensitive species that will be prepared for this project, which will be included with the FEIS.

The purpose of a BE for this planning project is to analyze and determine the likely effects of the alternatives associated with the GRSG planning on Forest Service sensitive species (FSM 2670.31-2670.32), including the GRSG, for the RNF.

Sensitive species in Region 2 are listed on the Regional Forester's sensitive species list and are composed of plants, birds, mammals, amphibians, reptiles, fish, and invertebrates. The Forest Service conducted a review for Region 2 sensitive species that may occur or be affected by the plan amendment FEIS and the subsequent RNF plan amendment for the GRSG. Existing occurrence information, as well as known or potential habitat, was reviewed by searching the Natural Resource Management database. Sources of information contained in this database include Forest Service records and files, the Colorado Natural Heritage Program, Colorado Parks and Wildlife information, and published research.

Table 5 is a list of species designated by the Regional Forester as sensitive and identified for consideration in the RNF. All of the species in Table 5 were considered in this analysis and were compared to the five criteria listed below. Criteria 1-4 are used to identify species that would likely experience no impact from an action alternative and could therefore be eliminated from more detailed analysis. Criterion 5 indicates that the species should be carried forward for more analysis to clarify the potential effects. The criteria are as follows:

1. Suitable habitat or elevation range does not exist for these species in the GRSG ADH in the RNF.
2. The type or intensity of the activity in the proposed action is expected to have no impact on these species or their habitat.
3. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic, or opportunistic visitors to the ADH, but no affiliation or dependence on these habitats has been shown.
4. The associated conservation design or mitigations eliminate any potential for impact on the species.
5. The coarse filter evaluation has not resulted in a preliminary indication that the alternatives are clearly likely to result in no impact; therefore the species will be carried forward for a more detailed analysis.

Species in Table 6 are likely to occur in or near the analysis area, or with potential habitat in or near the analysis area that may be affected (negatively or positively, directly, indirectly, or cumulatively) by an action alternative were it carried forward and a more detailed analysis of the project effects were subsequently conducted.

Table 5. Forest Service Region 2 Sensitive Species Occurring or Potentially Occurring in the RNF That May be Influenced by an Action Alternative⁴

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
AMPHIBIANS						
Boreal toad	<i>Anaxyrus boreas boreas</i>	Wetlands at elevations from 7,400 to 11,800 feet	Y	Y	5	Detailed analysis below.
Northern leopard frog	<i>Lithobates pipiens</i>	Cooler climates, broad use of uplands and wetlands	Y	Y	5	Detailed analysis below.
Wood frog	<i>L. sylvatica</i>	Wide range of aquatic and moist habitats	Y	Y	5	Detailed analysis below.
BIRDS						
American peregrine falcon	<i>Falco peregrinus anatum</i>	Nests on cliffs with a wide view, low disturbance, and abundance of prey	N	N	1, 2	No impact
Bald eagle	<i>Haliaeetus leucocephalus</i>	Generally aquatic habitats and prefers fish for prey	N	N	1, 2, 3	No impact
Black swift	<i>Cypseloides niger</i>	Nests on cliffs near waterfalls	N	N	1, 2	No impact
Boreal owl	<i>Aegolius funereus</i>	Mature to late-successional	N	N	1, 2	No impact

⁴While candidate species have no formal status and protections under the Endangered Species Act, in the Rocky Mountain Region they are provided sensitive species status, and effects on candidate species are evaluated through the BE process.

⁵**Bold text** indicates the species is discussed in detail below.

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
		Engelmann spruce and subalpine fir above 9,000 feet				
Brewer's sparrow	<i>Spizella breweri</i>	Sagebrush-obligate that gleans insects and eats seeds	Y	Y	5	Detailed analysis below.
Columbian sharp-tailed grouse	<i>Tympanuchus phasianellus columbianus</i>	Sagebrush grasslands with forbs and insects for broods	Y	Y	5	Detailed analysis below.
Flammulated owl	<i>Otus flammeolus</i>	Forest owl that nests in cavities and caves from 6,000 to 10,000 feet	N	N	1, 2	No impact
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Sagebrush hills, with forbs and insects for broods below 8,400 feet	Y	Y	5	Detailed analysis below.
Lewis's woodpecker	<i>Melanerpes lewis</i>	Open ponderosa pine forest, open riparian woodlands dominated by cottonwood, and burned pine forests	N	N	1, 3	No impact
Loggerhead shrike	<i>Lanius ludovicianus</i>	Grasslands, shrublands, and agricultural lands	Y	Y	5	Detailed analysis below.
Northern goshawk	<i>Accipiter gentilis</i>	Mature forests, large trees on moderate slopes with open understories for breeding	N	N	1, 2	No impact
Northern harrier	<i>Circus cyaneus</i>	Wetlands or grasslands with tall dense vegetation and high residual cover	Y	Y	5	Detailed analysis below.

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
Olive-sided flycatcher	<i>Contopus cooperi</i>	Forest openings and edges	N	N	1, 2	No impact
Purple martin	<i>Progne subis</i>	Relatively large old growth aspen near standing or free-flowing water	Y	Y	1, 2	No impact
Sage sparrow	<i>Amphispiza bellii</i>	Shrublands dominated by big sagebrush with a perennial bunchgrass understory	Y	Y	5	Detailed analysis below.
White-tailed ptarmigan	<i>Lagopus leucurus</i>	Alpine ecosystems at or above treeline.	N	N	1, 2	No impact
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Open woodlands with an understory of dense vegetation, near water	N	N	1	No impact
FISH						
Mountain sucker	<i>Catostomus platyrhynchus</i>	Lotic waters, from small montane streams to large rivers	Y	Y	5	Detailed analysis below.
Roundtail chub	<i>Gila robusta</i>	Colorado River drainage	N	N	1, 2	No impact
Yellowstone cutthroat trout	<i>Oncorhynchus clarkii bouveri</i>	Found in diverse habitats from beaver ponds to high gradient cold water streams	N	N	1, 2	No impact
Colorado River cutthroat	<i>O. c. pleuriticus</i>	Cold, clean water environments in high elevation streams and lakes	Y	Y	5	Detailed analysis below.
INSECTS						
Hudsonian emerald	<i>Somatochlora hudsonica</i>	Deep sedge-bordered lakes and ponds	N	N	1, 3	No impact

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
MAMMALS						
North American wolverine	<i>Gulo gulo luscus</i>	Remote habitats in the conifer, subalpine, and tundra zones	N	N	2, 3	No impact
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Mature forest canopies and edges	N	N	1, 3	No impact
Spotted bat	<i>Euderma maculatum</i>	Cliffs and open and dense deciduous and coniferous forests, hay fields, deserts, marshes, riparian areas	N	N	1, 2	No impact
Hoary bat	<i>Lasiurus cinereus</i>	Woodland, mainly coniferous forests	N	N	1, 2	No impact
River otter	<i>Lontra canadensis</i>	Permanent water, of relatively high quality, and with an abundant food base of fish and crustaceans	N	N	1, 3	No impact
American marten	<i>Martes americana</i>	Mature and old-growth spruce-fir and lodgepole forests	N	N	1, 2, 3	No impact
Fringed myotis	<i>Myotis thysanodes</i>	Caves, mines, cliffs, abandoned buildings, and snags	N	N	1, 2	No impact
Rocky Mountain bighorn sheep	<i>Ovis canadensis canadensis</i>	Open or semi-open terrain with a mix of steep and gentle slopes, broken cliffs, rock outcrops, and canyons	N	N	1, 2	No impact
Pygmy shrew	<i>Sorex hoyi</i>	Forest conditions, from	N	N	1, 2, 3	No impact

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
		subalpine to boggy meadows, to willow thickets				
MOLLUSCS						
Rocky Mountain capshell	<i>Acroloxus coloradensis</i>	Cold mountain lakes and in very slow moving rivers	N	N	1, 2	No impact
PLANTS						
Sea pink	<i>Armeria maritima</i> spp. <i>sibirica</i>	Grassy tundra slopes, on wet, sandy, or spongy organic soils; 11,900 to 13,000 feet	N	N	1	No impact
Park Milkvetch	<i>Astragalus leptaleus</i>	Moist swales and meadows; 6,500 to 9,500 feet	Y	Y	5	Detailed analysis below.
Narrowleaf moonwort	<i>Botrychium lineare</i>	Disturbed sites, grassy slopes among medium height grasses, along edges of streamside forests, alpine areas and aspen forests; 7,900 to 11,000 feet	Y	Y	5	Detailed analysis below.
Paradox moonwort	<i>Botrychium paradoxum</i>	Grassy meadows, gravelly road sides, low herbaceous cover under small conifer saplings; probably at 5,000 to 9,000 feet	Y	Y	5	Detailed analysis below.
Lesser panicked sedge	<i>Carex diandra</i>	Wet meadows and subalpine willow carrs; 7,000 to 9,000 feet	Y	Y	5	Detailed analysis below.

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
Livid sedge	<i>C. livida</i>	Fens and wetlands; 9,000-10,000 ft.	N	N	1	No impact
Lesser yellow lady's slipper	<i>Cypripedium parviflorum</i>	Moist forests and aspen groves; 7,400 to 8,500 feet	Y	Y	5	Detailed analysis below.
Clawless draba	<i>Draba exunguiculata</i>	Alpine and subalpine on tundra, gravelly slopes or fell fields; 11,500 to 14,000 feet; central Colorado, including Chaffee, Clear Creek, Huerfano, and Park Counties	N	N	1	No impact
Gray's peak whitlowgrass	<i>D. grayana</i>	Alpine on rocky and gravelly slopes or fell fields, usually on granitic substrates; 12,000 to 14,000 feet	N	N	1	No impact
Roundleaf sundew	<i>Drosera rotundifolia</i>	Among sphagnum on the margins of ponds, fens, and floating peat mats; 9,100 to 9,800 feet	N	N	1	No impact
Elliptic spikerush	<i>Eleocharis elliptica</i>	Wetlands; widely distributed in North America but with few confirmed Colorado records	Y	Y	5	Detailed analysis below.
Dropleaf Buckwheat (slender leaved buckwheat)	<i>Eriogonum exilifolium</i>	Sagebrush flats; North and Middle Parks; 7,500 to 9,000 feet	Y	Y	5	Detailed analysis below.
Whitebristle cottongrass (altai)	<i>Eriophorum altaicum</i> var.	Alpine wetlands; 9500 to 14,000 feet	N	N	1	No impact

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
cottongrass)	<i>neogaeum</i>					
Slender cottongrass	<i>E. gracile</i>	Montane and subalpine wetlands, wet meadows and pond edges; 8,100 to 12,000 feet	Y	Y	5	Detailed analysis below.
Plains rough fescue (Hall's fescue)	<i>Festuca hallii</i>	Alpine and subalpine grasslands and meadows; 11,000 to 12,000 feet	N	N	1	No impact
Weber's scarlet gilia (rabbit ears gilia)	<i>Ipomopsis aggregata</i> ssp. <i>weberi</i>	Forb or shrub dominated montane meadows; 6,560 to 10,500 feet; a narrow endemic known from the Park Range	Y	Y	5	Detailed analysis below.
Simple bog sedge (Kobresia)	<i>Kobresia simpliciuscula</i>	Alpine areas, including tundra, fens, moist gravel, and glacial outwash	N	N	1	No impact
Colorado tansyaster	<i>Machaeranthera coloradoensis</i> var. <i>coloradensis</i>	Mountain parks, slopes, and rock outcrops and dry tundra; 8,500 to 12,500 feet	Y	Y	5	Detailed analysis below.
White adder's-mouth orchid	<i>Malaxis brachypoda</i>	Riparian areas, 7,200 to 8,000 feet	Y	Y	5	Detailed analysis below.
Weber's (Rocky Mountain) monkeyflower	<i>Mimulus gemmiparus</i>	Granitic seeps, slopes, and alluvium in open sites in spruce-fir and aspen forests; 8,500 to 10,500 feet	Y	Y	5	Detailed analysis below.
Kotzebue's grass of Parnassus	<i>Parnassia kotzebuei</i>	Alpine and subalpine, in wet rocky areas, among moss mats and	N	N	1	No impact

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
		along streamlets; 10,000 to 12,000 feet				
Harrington's beardtongue	<i>Penstemon harringtonii</i>	Known primarily from sagebrush communities, often on calcareous substrates; 6,400 to 9,400 feet	Y	Y	5	Detailed analysis below.
Rock cinquefoil (front range cinquefoil)	<i>Potentilla rupincola</i>	Cracks in granite rock outcrops: 6,500 to 10,900 feet	Y	Y	5	Detailed analysis below.
Ice cold buttercup	<i>Ranunculus karelinii</i> (= <i>R. gelidus</i> ssp. <i>grayi</i>)	Alpine slopes and summits among rocks and scree; 10,000 to 14,100 feet	N	N	1	No impact
Dwarf raspberry (nagoon berry)	<i>Rubus arcticus</i> var. <i>acaulis</i> (= <i>Cylactis arctica</i> ssp. <i>acaulis</i>)	Understory of spruce- and willow-dominated communities, boggy woods, and mountain meadows at 7,000 to 9,000 feet	Y	Y	5	Detailed analysis below.
Sageleaf willow (hoary willow)	<i>Salix candida</i>	Wetlands in willow carrs and mossy stream sides; 8,600 to 9,700 feet	Y	Y	5	Detailed analysis below.
Autumn willow	<i>Salix serissima</i>	Wetland areas including marshes, fens, and bogs; 7,800-10,200 ft.	Y	Y	5	Detailed analysis below.
Club spikemoss (northern spikemoss)	<i>Selaginella selaginoides</i>	Marshy areas and wet spruce forests; east side of the Park Range	Y	Y	5	Detailed analysis below.
Sphagnum	<i>Sphagnum angustifolium</i>	Peat bogs, conifer forests, and moist tundra areas	N	N	1	No impact

COMMON NAME ⁵	SCIENTIFIC NAME	HABITAT DESCRIPTION AND RANGE	KNOWN OR SUSPECTED TO OCCUR IN ADH?	SUITABLE HABITAT IN ADH?	EVALUATION CRITERIA	PRELIMINARY BIOLOGICAL DETERMINATION FOR THE FEIS
Baltic sphagnum	<i>S. balticum</i>	Fens among other moss, sedges, and willows; 9,000 to 10,000 feet	N	N	1	No impact
Largeflower triteleia	<i>Triteleia grandiflora</i>	Full sunlight to partial shade in meadows, grasslands, sagebrush, pinyon-juniper woodlands, aspen woodlands, pine forests, and scattered woodlands; 7,760 feet	Y	Y	5	Detailed analysis below.
Lesser bladderpod	<i>Utricularia minor</i>	Shallow water of subalpine ponds; 5,500\ to 9,000 feet	Y	Y	5	Detailed analysis below.
Selkirk's violet	<i>Viola selkirkii</i>	Forests from montane to subalpine; 6,000 to 9,100 feet	Y	Y	5	Detailed analysis below.

Table 6. Summary List of Regional Foresters Designated Sensitive Species

Common Name	Scientific Name	Habitat Affinity
AMPHIBIANS		
Boreal toad	<i>Anaxyrus boreas boreas</i>	WET, WST
Northern leopard frog	<i>Lithobates pipiens</i>	WET, WST
Wood frog	<i>L. sylvatica</i>	WET, WST
BIRDS		
Brewer's sparrow	<i>Spizella breweri</i>	MS, S
Columbian sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	MS, S
Greater sage-grouse	<i>Centrocercus urophasianus</i>	MS, S
Sage sparrow	<i>Amphispiza bellii</i>	MS, S
Loggerhead shrike	<i>Lanius ludovicianus</i>	MS, FM, RIP
Northern harrier	<i>Circus cyaneus</i>	MS, RIP, WET, GRA
FISH		
Mountain sucker	<i>Catostomus platyrhynchus</i>	WST
Colorado River cutthroat trout	<i>Oncorhynchus clarkii pleuriticus</i>	WST
PLANTS		
Park milkvetch	<i>Astragalus leptaleus</i>	Meadow
Narrow-leaved moonwort	<i>Botrychium lineare</i>	Meadow
Paradox moonwort	<i>B. paradoxum</i>	Meadow
Lesser panicled sedge	<i>Carex diandra</i>	Wetland
Lesser yellow lady's slipper	<i>Cypripedium parviflorum</i>	Forest (wet)
Elliptic spikerush	<i>Eleocharis elliptica</i>	Wetland
Dropleaf buckwheat	<i>Eriogonum exilifolium</i>	Shrubland (dry)
Slender cotton-grass	<i>Eriophorum gracile</i>	Wetland
Weber's scarlet-gilia	<i>Ipomopsis aggregata</i> ssp. <i>weberi</i>	Meadow
Colorado tansy aster	<i>Machaeranthera coloradoensis</i>	Dry Shrub
White adder's-mouth orchid	<i>Malaxis brachypoda</i>	Forest (wet)
Weber's monkey flower	<i>Mimulus gemmiparus</i>	Wetland
Harrington beardtongue	<i>Penstemon harringtonii</i>	Shrubland (dry)

Common Name	Scientific Name	Habitat Affinity
Rock cinquefoil	<i>Potentilla rupincola</i>	Rock outcrops
Dwarf raspberry	<i>Rubus arcticus</i> var. <i>acaulis</i>	Wetland Forest (wet)
Sageleaf willow	<i>Salix candida</i>	Wetland
Autumn willow	<i>S. serissima</i>	Wetland
Club spikemoss	<i>Selaginella selaginoides</i>	Wetland
Largeflower triteleia	<i>Triteleia grandiflora</i>	Meadow, Shrubland (dry)
Lesser bladderpod	<i>Utricularia minor</i>	Wetland (aquatic)
Selkirk violet	<i>Viola selkirkii</i>	Forest
Key: AQ = Aquatic; SF = Spruce-fir; LPP = Lodgepole pine; FM = Forest meadows; GRA = Grassland; MS = Mountain shrub; RIP = Riparian; S = Sagebrush; WAT = Water; WET = Marshes, shallow ponds; WST = Streams		

A. Greater sage-grouse (*Centrocercus urophasianus*)

The Routt National Forest includes high elevation mountain sagebrush (*A. t. pauciflora* var. *vaseyana*) communities that primarily function as late summer brood-rearing habitat for sage-grouse. These habitats are peripheral to the lower elevation sagebrush stands that provide winter, nesting and brood-rearing habitats on private and BLM lands. Sage-grouse habitats on the Forest consist of 12,501 acres of identified GRSG habitat on the RNF, approximately 1 percent of the RNF, comprised of 1,571 acres of PHMA (13 percent) and 10,930 acres are GHMA (87 percent) distributed within three areas on the RNF (Hahns Peak-Bears Ears, Parks and Yampa)(Table 3). State and private land inholdings also occur within the RNF boundary and include GRSG habitat. Vegetation cover types and their associated acres on the RNF are described in Table 4. General biological information on the status, distribution, threats, and trends for GRSG in the analysis area are described in the FEIS. This information is not repeated in this section except when specific elements are addressed to understand the status of GRSG under particular alternatives on the RNF.

In the analysis area, the management direction proposed in the action alternatives would apply to designated GRSG habitats (PHMA, GHMA, and linkage areas) in the RNF (Figure 1). There are no designated linkage areas in the RNF; however, there are approximately 12,501 acres of ADH, or approximately 1 percent of the RNF land area. Of the ADH in the RNF, 1,571 acres are PHMA (13 percent) and 10,930 acres are GHMA (87 percent).

Each of the three Ranger Districts in the RNF contain some GRSG habitat. The Hahns Peak/Bears Ears District contains the most, with 9,982 acres of GHMA; the Yampa District contains 1,262 acres, including both GHMA and PHMA; and the Parks District contains 1,257 acres of both GHMA and PHMA (Table 3).

State and private land inholdings also occur in the National Forest boundary and include GRSG habitat, as described in Table 2. The breakdown of vegetation cover types in the RNF by GRSG CMZ are described in Table 4.

There are no active GRSG leks in the RNF, but there is one historic lek in the Slater Park area of the Hahns Peak Bears Ears Ranger District. Sporadic observations of individual birds during the summer have been documented in the following areas of the RNF, as follows:

Near Forest Road 8 and Spronks Creek

- Near the Flat Tops Wilderness Area (CMZ 14)
- In Slater Park near a Columbian sharp-tailed grouse (CSTG) lek (CMZ 7)
- North of Toponas, near Forest Road 285 (CMZ 14) (December 2012 NRM Database)

The primary GRSG use of the RNF is in CMZs 11, 13, and 14 and is apparently used as summer brood-rearing habitat, whereas the RNF lands in CMZ 7 are only occasionally used and have not been recently documented to be used as breeding, brood-rearing, or wintering habitats. It is unlikely that GRSG habitats in the RNF provide winter habitats due to their higher elevation and the deeper winter snows.

The combined GRSG habitat (PHMA and GHMA) identified on the RNF is 0.4 percent of the FEIS area. GRSG habitat on the RNF is primarily composed of small areas that are peripheral to more extensive habitats in lower elevation areas not managed by the Forest Service. As a result of the peripheral nature of the habitat in the RNF, GRSG use is most likely limited to summer brood rearing. Due to the absence of active leks in the RNF, the absence of suitable wintering habitat, and the limited summer habitats available, the populations of GRSG that use the RNF (Populations in CMZs 7, 11, 13, and 14) are highly dependent on habitats managed under other landownerships for their continued survival. Although the contribution of NFS to GRSG habitats is minor when compared to the larger population area, they may be locally important during the late-summer brood rearing period.

The GRSG populations identified in this FEIS are analogous to subpopulations, defined as Priority Areas for Conservation (PACs), described in the Conservation Objectives Team (COT) report (USFWS 2013). These are slightly different, as the CMZs are limited to Colorado and some of the COT populations cross state lines. The four populations associated with the RNF are:

- CMZ 7 = COT Report NW Colorado population (PAC 9e)⁶
- CMZ 11 = COT Report North Park population (PAC 9d)
- CMZ 13 = COT Report Middle Park population (PAC 6)
- CMZ 14 = COT Report Eagle South Routt population (PAC 5)

Most habitat in the RNF is in close proximity to populations 9d and 9e. These populations are southern extensions of the much larger Wyoming Basin (PAC 9a) population and are well connected to that population, which has a high likelihood of persistence. Both 9d and 9e populations show a high likelihood of short- and long-term persistence as modeled by Garton et al. 2011 (cited in USFWS 2013) (Table 7). The Eagle South Routt population (CMZ 14/PAC 5) is small and isolated. The RNF contributes limited suitable sagebrush vegetation and therefore only a small amount of habitat to this population (1,262 acres of habitat [663 acres of GHMA and 599 acres of PHMA]). The small size and isolation of this population are factors that increase the challenge of long-term persistence, particularly if larger adjacent populations undergo contractions and become farther separated from this population. Similarly, the Middle Park population (CMZ 13/PAC 6) is also isolated and vulnerable to similar risks as the Eagle South Routt population. The RNF represents a small fraction of the suitable habitat for

⁶COT unit 9e includes CMZ 7 population, as well as several other CMZ populations.

these populations. Hence, the connectivity of these small isolated populations to larger adjacent populations is important to their persistence.

Table 7. GRSG populations in proximity of the RNF and modeled persistence estimates based on the COT Report (USFWS 2013, cf. Garton et al. 2011).

Population Area	<200 Males/500 Birds	Percent Chance of <50 birds/20 males in 2037	Percent Chance of <500 birds/200 males in 2037	Percent Chance of <50 birds/20 males in 2107	Percent Chance of <500 birds/200 males in 2107
Management Zone II—Wyoming Basin	Not Applicable	0.1	0.2	16.1	16.2
9d—North Park	No	0	0	9.9	10.7
9e—NWCO	No	0	0	9.9	10.7
5—Eagle South Routt	Yes	No Data	No Data	No Data	No Data
6—Middle Park	No	2.5	100	7.1	100

B. Amphibians

Amphibian species are associated with wetland areas that occur in the matrix of GRSG habitats (ADH) and thus could be influenced by management actions in these areas that change Forest Plan direction. There are three sensitive amphibian species that occur in these areas in the RNF: the boreal toad, northern leopard frog, and wood frog.

Boreal toad (*Anaxyrus boreas boreas*)

According to Keinath and McGee (2005), boreal toads were once widely distributed in Region 2 but have declined dramatically during the last 25 years. The overall range of the toad has contracted slightly, but its distribution in that range has been greatly reduced in the Rocky Mountain Region, geographically isolating some populations, thereby causing them to be more susceptible to local extirpation. Several boreal toad breeding sites have been documented in the RNF (Forest Service 2012). In GRSG habitat areas they are known to occur in the California Park and by Muddy Pass areas of the RNF.

Boreal toads are associated with a variety of habitats, including wetlands, forests, woodlands, sagebrush, meadows, and floodplains in the mountains and valleys. Usually they inhabit wetlands near ponds, lakes, reservoirs, rivers, and streams. They require three main habitat components: shallow wetlands for breeding, terrestrial habitats with vegetative cover for foraging, and burrows for hibernation (Loeffler 2001).

Threats to boreal toads are chytrid fungus (*Batrachochytrium dendrobatidis*), acidification of wetlands, sedimentation due to timber harvesting, livestock grazing/trampling in and around riparian areas, pesticides and herbicides, and introduced species that prey on toads, create competition for resources, or are vectors for pathogens (Keinath and McGee 2005). Any activity that affects suitable wetland habitats could affect boreal toad populations.

Northern leopard frog (*Lithobates pipiens*)

The northern leopard frog is a medium sized frog (2 to 3.5 inches snout-vent length), with brown or green background color, and two or three irregular rows of dark spots on the back (Conant and Collins 1991).

Northern leopard frogs have been found throughout much of Forest Service Region 2, including Colorado and the RNF. Despite this distribution there have been significant declines and localized extirpations. There have been numerous detections of northern leopard frogs in the RNF (Forest Service 2012); currently, the only part of the RNF where they have been documented in conjunction with designated GRSG habitat is in GHMA in the California Park area. Historically, they were likely found across the entire RNF, and additional surveys would probably lead to more detections of this species. They are also known to be present on private land next to the RNF, in small reservoirs and along the Yampa River.

Northern leopard frogs need a wide range of habitats close to each other, for example, wetland habitats with shallow quiet waters, upland areas in grassy meadows to feed, and the bottoms of flowing streams and ponds that are large enough to freeze so that they can overwinter (Smith and Keinath 2007).

Threats to the Northern leopard frog are habitat loss and fragmentation, fish stocking in fishless ponds that are critical to frog reproduction, disease introduction, livestock and wild ungulates, and water quality degradation from pesticides, acid rain, fertilizers, and other chemicals (Smith and Keinath 2007).

Wood frog (*Lithobates sylvaticus*)

The wood frog is a moderate sized frog (1.25 to 3.22 inches snout-vent length), with many color variations, including light tan to dark brown, olive, green, gray, and pink (Muths et al. 2005). Wood frogs use a wide range of aquatic and moist habitats, during both aquatic and terrestrial stages.

According to Muths et al. (2005), in Region 2 there are isolated relict populations of wood frogs. Numerous wood frogs have been documented in the RNF, but none in designated GRSG habitat (Forest Service 2012). The only sites with suitable habitat and potential for occurrence are in PHMA and GHMA on the Parks Ranger District north of Walden, near Muddy Pass and North Ryder Peak (CMZ zone 13).

Threats to wood frogs are habitat fragmentation and loss, wetlands and moist meadows degradation, drought, roads and human activity, and poor water quality from pollutants, such as herbicides, fire retardants and chemical road de-icers (Muths et al. 2005).

C. Birds

Brewer's sparrow (*Spizella breweri*)

The Brewer's sparrow is a small passerine that inhabits arid sagebrush communities. It is a shrub-nesting species that generally produces three to four eggs per nest and is capable of producing more than one brood in a nesting year. Brewer's sparrows primarily forage in shrubs, gleaning insects (Holmes and Johnson 2005a), and secondarily consume seeds from the ground. Brewer's sparrows are a common occurrence throughout Colorado and Wyoming; based on habitat, perhaps 50 percent of the population may occur on National Forest System lands in this area (Holmes and Johnson 2005). Breeding Bird Survey (BBS) data suggest that there has been a 2 percent decline in numbers since around 1970. Numerous Brewer's sparrows have been documented in the RNF, including in the analysis area in both GHMA and PHMA (Forest Service 2012).

Throughout their range, Brewer's sparrows are associated with landscapes dominated by big sagebrush (*Artemisia tridentata* spp.) and are considered to be a sagebrush-obligate species (Paige and Ritter 1999). They prefer sagebrush cover averaging 13 percent and not exceeding 50 percent and seem to be strongly influenced by landscape-level habitat changes; however, more research is needed in this area (Bock and Bock 1987; Braun et al. 1976; Rotenberry et al. 1999; Wiens and Rotenberry 1981). Minimum patch size and degree of isolation have not been determined, but some researchers have suggested that Brewer's sparrows are less likely to nest in isolated sagebrush stands smaller than 5 acres (Knick and Rotenberry 1995).

Habitat on National Forest System lands has remained relatively stable while habitat on private land has declined due to fragmentation from conversion to agriculture and housing development (Holmes and Johnson 2005). Threats to the Brewer's sparrow are wildland fire, nonnative plant invasion, livestock and wild ungulate grazing, and habitat manipulations.

Effects on GRSG as a result of management actions and direction are anticipated to be similar for Brewer's sparrow.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus*)

In Region 2, CSTG are found only in Colorado and Wyoming (Hoffman and Thomas 2007). Sixty-eight percent of the occupied habitat in the region is on private lands, with four percent on lands administered by the Forest Service on the Routt, Medicine Bow, and White River National Forests. The birds inhabit the transition zone between the arid sagebrush rangelands and the start of the aspen-conifer forests at elevations of 6,200 to 8,500 feet. There are two CSTG leks and four lek complexes in

the RNF (Forest Service 2012); all are in GHMA in the analysis area in the California Park and the Slater Park areas of the RNF. (A lek complex is a group of several small proximal leks that birds appear to move between.)

CSTG are associated with sagebrush habitat and can even be found in sagebrush that has been sprayed or burned and reseeded with nonnative grasses, as long as adequate cover is present. CSTG select habitats mostly based on structural characteristics of the vegetation, but species composition is also important. Lek location depends primarily on the proximity to suitable nesting and brood-rearing cover. Typically, leks are on elevated sites in open areas where the vegetation is short and sparse. Nests with more cover show greater success than nests with less cover (Schroeder and Baydack 2001). Brood habitats provide enough cover from predators and weather, while supplying the plant species that chicks and hens need to meet nutritional requirements. Flocks begin forming in the fall, and by winter CTSG move to riparian zones and patches of mountain shrubs. In the RNF, the primary winter cover is mountain shrub and aspen.

CTSG are sympatric with GRSG in ADH in the RNF and share similar threats. CTSG is anticipated to respond similarly to the GRSG as a result of the management guidance proposed across the alternatives.

Sage sparrow (*Amphispiza belli*)

The sage sparrow is a medium-sized passerine that breeds in sagebrush-steppe of the Intermountain West. According to Holmes and Johnson (2005b), in Region 2, the sage sparrow breeds in portions of western, central, and northwestern Wyoming and in western and south-central Colorado. They have been documented within 6.2 miles of the RNF but not actually in it (Forest Service 2012). Additionally, the Colorado Breeding Bird Atlas reports possible sage sparrow breeding in several survey blocks that overlap the RNF (Lambeth 1998).

The sage sparrow is a sagebrush obligate that prefers shrublands dominated by big sagebrush (*Artemisia tridentata* spp.) with a perennial bunchgrass understory (Holmes and Johnson 2005b). Landscape level attributes that are positively associated with sage sparrow density are high sagebrush cover, large patch size, spatially similar patches, low disturbance, and little fragmentation (Knick and Rotenberry 1995). Sage sparrows are ground-foraging omnivores, preying primarily on insects, spiders, seeds, small fruits, and succulent vegetation (Holmes and Johnson 2005b).

The effects on GRSG from management actions and direction are anticipated to be similar for sage sparrow.

Loggerhead shrike (*Lanius ludovicianus*)

The loggerhead shrike is a species that frequents open habitats, such as grasslands, shrublands, and agricultural lands. Important habitat requirements are scattered trees, shrubs, or low bushes for nesting substrate; elevated perches for hunting and courtship; foraging areas of open, short vegetation with some relatively bare areas; and thorny trees or barbed wire fences for impaling prey (Pruitt 2000).

The species appears to have suffered substantial population declines from historical levels across its range (Forest Service 2003). Wiggins (2005) suggests that loggerhead shrikes were historically common breeding birds in Region 2, although recent BBS data suggests long-term negative trends in breeding season abundance. In Colorado, loggerhead shrikes have historically been noted as common breeders statewide at lower elevations, but recent information suggests that they have patchy, uncommon distributions in western Colorado and are mostly associated with river valleys (Wiggins 2005). Several loggerhead shrikes have been documented in the RNF; however, none have been observed in areas with designated GRSG habitat (Forest Service 2012).

Northern harrier (*Circus cyaneus*)

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 nest 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. Northern harriers are a wide ranging species, with very large distributions. Some have long-ranging seasonal migrations, sometimes from North to South America. They are found in Colorado and have been documented in the analysis area (Forest Service 2012).

D. Fish

Mountain sucker (*Catostomus platyrhynchus*)

In Region 2, the mountain sucker occurs throughout Wyoming and in northwestern Colorado and western South Dakota. Mountain suckers have been documented in the RNF, including along multiple streams in GHMA in the California Park area of the Hahns Peak/Bears Ears Ranger District (Forest Service 2012).

Little information and data exist for the mountain sucker, especially Region 2 populations. They primarily occur in lotic waters, from small montane streams to large rivers (Simpson and Wallace 1982; Page and Burr 1991; Baxter and Stone 1995). Most commonly they are found in smaller headwater streams. They prefer clear, cold creeks and small to medium rivers.

Threats to mountain suckers are habitat loss due to stream impoundment, habitat degradation due to sedimentation, passage barrier construction, such as dams and culverts, and nonnative species introduction causing increased predation and competition (Belica and Nibbelink 2006).

Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*)

The Colorado River cutthroat trout (CRCT) range is colder headwaters of the Green and Colorado rivers, which include the Yampa River drainage in Colorado, Utah, and Wyoming (Young 1995). Recent work by Hirsch et al. (2006) estimates that CRCT occupy 13 percent and potentially up to 14 percent of their historical range in the mountainous regions of the Colorado River Basin identified by Behnke (1992).

CRCT have been documented in the RNF (Forest Service 2012). This includes two sites in the analysis area: along multiple streams in GHMA in the California Park area of the Hahns Peak/Bears Ears Ranger District and along one stream north of Toponas on the Yampa Ranger District. The Yampa River Basin has 53 conservation populations identified in 79 streams or 339 miles of stream and has the third highest number of conservation populations (Upper Green River Basin has 76 populations, ranked first, and Upper Colorado has 75 populations, ranked second).

CRCT thrive in cold, clean water environments in high elevation streams and lakes that have well-vegetated stream banks for cover and bank stability. The decline of CRCT is attributed to replacement by brown, rainbow, and brook trout, hybridization with rainbow trout, over-harvest, and habitat fragmentation or alteration from livestock overgrazing, logging, mining, and water diversions (Behnke 1992; Young 1995).

E. Plants

The following 21 Region 2 sensitive plant species are analyzed in greater detail for this Biological Evaluation: park milkvetch (*Astragalus leptaleus*), narrow-leaved and paradox moonworts (*Botrychium lineare*, *B. paradoxum*), lesser-panicled sedge (*Carex diandra*), lesser yellow lady's-slipper (*Cypripedium parviflorum*), elliptic sedge (*Carex elliptica*), dropleaf (slender leaved) buckwheat (*Eriogonum exifolium*), slender cottongrass (*Eriophorum gracile*), Weber's scarlet gilia (*Ipomopsis aggregata* ssp. *weberi*), Colorado tansyaster (*Machaeranthera coloradensis* var. *coloradensis*), white adder's-mouth orchid (*Malaxis brachypoda*), Weber's (Rocky Mountain) monkeyflower (*Mimulus gemmiparus*), Harrington beardtongue (*Penstemon harringtonii*), rock cinquefoil (*Potentilla rupicola*), dwarf raspberry (*Rubus arcticus* var. *acaulis*), sageleaf willow (hoary willow; *Salix candida*), autumn willow (*S. serissima*), club spikemoss (northern spikemoss; *Selaginella selaginoides*), largeflower triteleia (*Triteleia grandiflora*), lesser bladderwort (*Utricularia minor*), and Selkirk's violet (*Viola selkirkii*).

The programmatic nature and landscape-scale effects will be analyzed generally and collectively for this group of species. Although species-specific effects may differ slightly, potential impacts would be similar. In addition, the adverse impacts on these plant species are expected to be minor to negligible. This is because the purpose of this project is to amend the Forest and Grassland Plans to include regulatory mechanisms and conservation measures for sagebrush habitats and GRSG by minimizing anthropogenic disturbances on the landscape and because none of these species are known to occur in PHMA or GHMA. While none of the plant species analyzed are known to occur in the action area, potentially suitable habitat is suspected to occur.

Park milkvetch (*Astragalus leptaleus*)

Park milkvetch is a perennial herb that occurs in sedge-grass meadows, swales and hummocks, wetlands, aspen glades, and streamside willow communities between 6,500 and 9,500 feet. It is known from Idaho, Montana, Wyoming, and Colorado, from all the districts on the RNF. The species is more common in Colorado than in the other states. Threats to Park milkvetch are habitat loss and degradation from grazing, trampling, and nonnative species invasion (Ladyman 2006a; Spackman et al. 1997). The species is ranked as secure globally but imperiled in Colorado (G4S2). Potentially suitable habitat in the analysis area occurs in the riparian zones and small moist swales. This habitat is limited in the analysis area.

Narrow-leaved moonwort (*Botrychium lineare*)

Narrow-leaved moonwort is an inconspicuous perennial herb that occurs in a wide range of habitats, including grass and forb meadows, under trees in woods, on shelves of limestone cliffs, and among riparian transition vegetation associated with aspen. It is sometimes associated with previously disturbed ground. In Colorado it is found at elevations ranging from roughly 7,900 to 11,000 feet. Its distribution extends from Washington and Montana south to California and Colorado. Historic records include Quebec and Nebraska. The species is thought to be globally imperiled and critically imperiled in Colorado (G2/S1). It was previously a candidate for federal listing as an endangered or threatened species (66 Federal Register 30368). Threats are road maintenance and construction, mining, mine reclamation, trampling by hikers or all-terrain vehicles, over-collection, and alteration of soil and hydrological regimes (Beatty et al. 2003a).

Paradox moonwort (*B. paradoxum*)

Paradox moonwort is a perennial herb that inhabits mesic to wet subalpine meadows. Its distribution extends from southwestern Canada to Montana, Idaho, and Utah. Populations are small and widely scattered. Paradox moonwort is ranked G2 and S1 in Idaho and Utah; Montana ranks the species S2. This rank indicates that the species is considered imperiled globally and in Montana and is critically imperiled in Idaho and Utah; it is not currently ranked in Colorado. This plant is small, is easily overlooked, and may not produce aboveground structures every year. Threats to the species are similar to those faced by *B. lineare*: road maintenance and construction, mining, mine reclamation, trampling by hikers or all-terrain vehicles, over-collection, and alteration of soil and hydrological regimes.

Lesser panicked sedge (*Carex diandra*)

In Colorado, the most common habitats for lesser panicked sedge are montane and subalpine fens, particularly those formed in depressions, such as small kettles or other basins. The species may also be found in other cool, moist settings, such as wet meadows. Its distribution spans the northern half of the United States; it reaches its southernmost Rocky Mountain distribution in Colorado. It is known from Boulder, Grand, Jackson, and Larimer Counties at elevations ranging from 7,000 to 9,000 feet. The species is globally secure (ranked G5) but is considered critically imperiled in Colorado (ranked S1). Threats to the species and its habitat are hydrological alteration, timber harvesting, fire, roads and trails, off-road vehicles, peat extraction, livestock, recreation, exotic species, atmospheric deposition of pollution, and climate change (Gage and Cooper 2006).

Lesser yellow lady's-slipper (*Cypripedium parviflorum*)

A perennial orchid, it occurs in a variety of shaded, moist habitats, including aspen forests, white spruce/paper birch, paper birch/hazelnut, and ponderosa pine/Douglas-fir forests. It is found in rich humus and decaying leaf litter in wooded areas, rocky wooded hillsides on north- or east-facing slopes, on wooded loess river bluffs, and moist creek sides (Mergen 2006; Spackman et al. 1997). Although widespread, it is uncommon in most of its range. Populations are widely scattered in Colorado, where the species is known from ten counties (including Garfield, a small part of which is in the analysis area) at a narrow elevation range of 7,400 to 8,500 feet. Although the species is considered secure globally, it is considered imperiled in Colorado (G5/S2). Threats are habitat alteration (including conifer encroachment), overstory modification, soil and hydrological regime changes, land management activities, unauthorized recreation, and over-collection (Mergen 2006). The species is believed to be in decline due to habitat loss associated with residential development on private lands, over-collection, grazing, and logging (Mergen 2006). Potentially suitable habitat in the analysis area occurs in the riparian zones and small moist swales.

Elliptic spikerush (*Eleocharis elliptica*)

Elliptic spikerush is a perennial, mat-forming wetland species. In Colorado, it occurs in piedmont valleys, outwash mesas, and wet places in pine forests (Nellessen 2006). Primary threats are hydrologic changes (including water chemistry), grazing, nonnative species, and climate change. It is ranked as globally secure but critically imperiled in Wyoming (S1). It is not ranked in Colorado. Potentially suitable habitat in the project area is in the riparian zones and small moist swales. No population trend data are available (Nellessen 2006).

Dropleaf buckwheat (*Eriogonum exilifolium*)

Dropleaf buckwheat is a perennial herb that grows in sparsely vegetated habitats, such as barren hills or sagebrush flats of the mountain parks. It is a regional endemic known only from 26 occurrences in Wyoming and Colorado, although it may be locally abundant. In Colorado the plant has been found in North Park and Middle Park of Jackson and Grand Counties, at elevations ranging from 7,500 to 9,000 feet in scattered small areas of specific habitats. Individual occurrences range from groups of 30 plants to more than one million (Anderson 2006a). Global ranking for the species is G3 (vulnerable to extinction) and state ranking is S2 (imperiled). In the RNF, habitat for this species occurs at lower elevations near the boundaries with sagebrush.

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, the plant may be abundant where areas of suitable habitat are extensive since it is under-inventoried, and it is possible that occurrences remain to be discovered.

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

Slender cottongrass (*Eriophorum gracile*)

Slender cottongrass is a perennial sedge that grows in montane and subalpine wetlands, as well as wet meadows and pond edges. Distribution extends from Alaska, Canada, and the northern states south to California and Colorado. It reaches its southernmost Rocky Mountain distribution in Colorado where it is known from elevations of 8,100 to 12,000 feet. The known sites are widely scattered in Jackson, Las Animas, and Park Counties. The species is ranked secure globally (G5) but imperiled in Colorado (S2). In Region 2, slender cottongrass appears to be on a downward trend, as eight of the region’s 36 known sites have apparently been extirpated (Decker, Culver, and Anderson 2006). Potentially suitable habitat in the analysis area occurs but is extremely limited.

Weber’s scarlet gilia (*Ipomopsis aggregata* ssp. *weberi*)

Weber’s scarlet gilia is a perennial forb that grows in coarse-textured rocky or gravelly soils of open sites in montane shrub communities or coniferous forest. The subspecies is endemic to northern Colorado and southern Wyoming. Most populations occur around Rabbit Ears Pass near Steamboat Springs, in Routt County. Although the species is secure globally (G5, *Ipomopsis aggregata* is a common species), the subspecies *weberi* is imperiled globally and at the state level (Ladyman 2004). Threats are recreation, residential development, road construction, grazing (by both livestock and native ungulates), and invasive species. Stochastic events may also be a threat due to small population size. Most populations have not been monitored since their discovery, so trend data are unavailable.

Colorado tansy-aster (*Machaeranthera coloradoensis*)

Colorado tansy-aster is a perennial herb that inhabits mountain parks, slopes, rock outcrops, and dry tundra, at elevations ranging from 8,500 to 12,500 feet. The species is found only in Wyoming and Colorado. It is considered imperiled both globally (G2) and in Colorado (S2). No population trend is apparent, but 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 nonmotorized recreation, trail or road construction and maintenance, reservoir expansion, housing development, natural disturbance regime changes, domestic livestock, invasive species introduction, or small-scale mining. Lower elevation populations and those closest to roads and trails are likely at the most risk.

White adder's-mouth orchid (*Malaxis brachypoda*)

White adder's-mouth orchid occurs in mossy wet areas, shaded riparian areas, and riparian transition zones. It is disjunct and extremely rare in Region 2; the nearest occurrences to those in Colorado are in southern California and northern Minnesota (Anderson 2006b). In Colorado it is found at elevations between 7,000 and 9,080 feet. Globally, there is concern for its long-term viability (ranked G4Q), and it is considered critically imperiled (S1) in Colorado. *Malaxis brachypoda* has endangered, threatened, or other status in ten US states and one Canadian province. Population trend data are unknown, but extirpation of many of the historic populations suggests the species is declining (Anderson 2006b). In Colorado, the species is known mainly from the eastern part of the state.

Weber's (Rocky Mountain) monkeyflower (*Mimulus gemmiparus*)

Weber's monkeyflower is an annual herb found in granitic seeps, slopes, and alluvium in open sites in spruce-fir and aspen forests at 8,500 to 10,500 feet. The species is endemic to the mountains of central and northern Colorado, including Grand County. It is considered critically imperiled, both globally and in Colorado (ranked G1/S1). The primary threat to *Mimulus gemmiparus* is the small size of populations; a single disturbance could feasibly extirpate an occurrence. Activities that could impact an occurrence are recreation, nonnative plant species, trail and road construction and maintenance, wildfires, and forest management activities, such as logging, thinning, or prescribed fires (Beatty et al. 2003b). Population trend for this species is unknown.

Harrington beardtongue (*Penstemon harringtonii*)

Harrington beardtongue is a perennial herb endemic to Colorado. It is known primarily from sagebrush slopes at elevations from 6,400 to over 9,400 feet in Eagle, Garfield, Grand, Pitkin, Routt, and Summit Counties. The species is ranked G3/S3, indicating vulnerability throughout its range. Threats are habitat loss due to agricultural conversion or residential development, motorized recreation, nonnative plant species, domestic livestock and native ungulate grazing, oil and gas development, and climate change (Spackman-Panjabi and Anderson 2006). Cumulative impacts of these threats may be causing the populations to decline (Spackman-Panjabi and Anderson 2006) but the magnitude of the decline is unknown. Small stands of sagebrush at the lower elevation RNF boundaries are the primary potential habitat.

Rock cinquefoil (*Potentilla rupincola*)

Rock cinquefoil is a herbaceous species that occurs in granite outcrops at elevations between 6,500 feet and 10,900 feet in central and northern Colorado, including in Grand County. It is considered imperiled at both global (G2) and state (S2) levels. Threats are exotic species invasion, residential and commercial development, indirect effects of grazing, off-road and recreational vehicles, small population size, climate change, and pollution (Anderson 2004).

Dwarf raspberry (*Rubus arcticus* var. *acaulis*)

Dwarf raspberry is an herbaceous wetland species found in willow carrs and on mossy streambanks at elevations ranging from 8,600 to 9,700 feet. Associated species include shrubby cinquefoil, dwarf birch, diamondleaf willow, water sedge, and alpine meadow-rue. Distribution is circumboreal, ranging south in North America to Oregon, Colorado, Michigan, and Maine. In Colorado, the species is known from Grand, Jackson, and Park Counties. Dwarf raspberry is ranked G5/T5 indicating that the species and subspecies are secure globally, but the species is ranked S1 (critically imperiled) in both Colorado and Wyoming. Threats are habitat loss from recreational activities, livestock grazing, and natural resource extraction, such as for timber and peat. Activities such as water diversions or impoundment that reduce water availability and change habitat quality are also a threat. Other threats are recreation, forest management activities, nonnative plant invasion, and climate change. Finally, in Region 2 dwarf raspberry occurs in small and disjunct populations, leaving them vulnerable to stochastic events. The current population trend is unknown, but Ladyman (2006b) notes that several extirpations appear to have taken place; the species is now absent from the British Isles and Latvia, and it is now endangered in Estonia. Clearly, the species is vulnerable to extirpation, particularly in areas such as Region 2, where it is on the edge of its range and less common.

Sageleaf willow (hoary willow; *Salix candida*)

Sageleaf willow is found in pond and stream edges as well as in fens of the foothill and montane wetlands. Distribution spans the northern third of the western hemisphere. Its southernmost extent is Colorado, where it is found from 8,800 to 10,600 feet in Jackson, La Plata, Lake, Larimer, and Park Counties. Although sageleaf willow is considered secure globally (ranked G5), it is ranked critically imperiled (S1) in Colorado. Population trends are unknown (Decker 2006a). Seven populations (one historic) are known from the Medicine Bow National Forest, but none are known from the RNF (Decker 2006a).

Autumn willow (*Salix serissima*)

Autumn willow is a woody shrub of the willow family (Salicaceae) that grows in wetland areas including marshes, fens, and bogs. The species ranges from Canada to the northern United States. In the Rocky Mountains it is found in Montana, Wyoming, and Colorado, where it reaches its southernmost distribution. Here, autumn willow is known from Custer, Park, Larimer, and Routt Counties at elevations ranging from 7,800 to 10,200 feet. It is apparently secure globally (G4), but it is critically imperiled in Colorado (S1). Population trend data for this species are lacking (Decker 2006b).

Club spikemoss (northern spikemoss; *Selaginella selaginoides*)

Club spikemoss is an herbaceous, mat-forming perennial that grows in marshy areas and wet spruce forests and produces spores during July and August. Distribution is circumboreal, with the southern extent in the United States. It is known to occur in Wyoming, but reports of occurrences in Colorado could not be substantiated (Heidel and Handley 2006). The species is difficult to identify in the field, which may contribute to the lack of information on the species' distribution. Club spikemoss is ranked G5; in Wyoming it is considered critically imperiled (S1). In Colorado it is ranked as SRF (indicating a false report). Threats are hydrologic changes, grazing, timber harvest, invasive species, and climate warming. Although population trend data are lacking, some populations have been extirpated, and the species is vulnerable to decline (Heidel and Handley 2006).

Largeflower triteleia (*Triteleia grandiflora*)

Largeflower triteleia is a perennial forb of the lily family (Liliaceae). Distribution of this species centers around the Pacific Northwest, with populations in Colorado (San Juan National Forest, Montezuma County) and Wyoming (Medicine Bow National Forest) representing the southern- and eastern-most extents. In Colorado, the species is found in openings among *Pinus ponderosa* (ponderosa pine) and *Quercus gambelii* (Gambel oak) at approximately 7,800 feet. *Triteleia grandiflora* is considered globally secure (ranked G4) but critically imperiled (S1) in Colorado. Threats are habitat loss, fragmentation, and degradation caused by human recreation, livestock grazing, resource development (timber and mineral), and invasive nonnative plant species are potential threats to the long-term persistence of *Triteleia grandiflora* throughout its range, including Region 2. Long-term monitoring data are needed to determine population trends, but Ladyman (2007) notes that several populations have been extirpated and extant populations appear to be declining.

Lesser bladderwort (*Utricularia minor*)

Lesser bladderwort is an aquatic perennial herb that can occasionally become beached when water levels drop. The plants are insectivorous, with bladders acting as tiny insect traps. Although distribution is circumboreal, populations are very infrequent. In Colorado, the species is known from shallow water in subalpine ponds at 5,500 to 9,000 feet. There are two known populations on the RNF; neither occurs in the analysis area (Neid 2006). Although the species is considered globally secure (G5), it is considered imperiled to critically imperiled (S2) in Colorado. Threats are hydrologic impacts (water quality degradation and alteration of hydrologic regime), habitat loss, and invasive species (Neid 2006). Population trend data are lacking.

Selkirk's violet (*Viola selkirkii*)

Selkirk's violet is a perennial herb that inhabits cold mountain aspen forests, moist woods, and thickets. Although the species distribution is circumboreal, it occurs only in small disjunct populations (Hornbeck et al. 2003). In Colorado it is known from 8,500 to 9,100 feet elevation in Custer, Douglas, Fremont, and Larimer Counties. The species is considered secure globally, although there is some uncertainty about the ranking (G5). In Colorado it is critically imperiled (ranked S1). Threats to the species are recreation, nonnative plant species invasion, wildlife and livestock grazing and trampling, road and trail construction and maintenance, forest management activities, climate change, and stochastic events. Population trend data are lacking.

VII. EFFECTS ANALYSIS FOR SENSITIVE SPECIES

Greater Sage-Grouse as an Umbrella Species

GRSG populations require large landscapes and specific habitat conditions at broad scales to meet their seasonal life requisite requirements. Rowland et al. (2010) and Hanser and Knick (2006) provide evidence that GRSG habitats at broad scales have substantial overlap with habitats of other species similarly associated with sagebrush and sagebrush-steppe communities.

The plan amendment is specially designed to provide protections for GRSG and their habitats. Although individual species have specific habitat requirements at finer scales that differentiate their use of habitats, habitat protections for GRSG will benefit other species similarly dependent on these habitats. The structure of this biological evaluation reviews the efficacy of conservation and

management actions for GRSG, and then evaluates the adequacy of these protections for other sensitive species, including those associated with sagebrush habitats.

Viability Evaluation for Greater Sage-Grouse

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

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

(3) specifying guidelines for land management plans developed to achieve the goals of the Program which –

(B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, ...

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

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

All Forest Plans being considered for amendment to address GRSG conservation and recovery were developed under the 1982 planning regulations. This Biological Evaluation considers management guidance for GRSG on NFS lands in Colorado, and assesses the outcomes of five alternatives for amendment of plans for the Routt National Forest. As stated previously, NFS land managed on the Routt National Forest occur at an elevation and in ecological settings such that they support certain life history needs, but not others. As a result, GRSG use National Forest System lands for only a portion of the year (i.e. primarily for late summer brood-rearing habitat).

As outlined in the *FEIS and referenced in this Biological Evaluation*, the capability of NFS lands to support self-sustaining populations of GRSG is limited. The national forest contain relatively small areas of GRSG habitat, and habitat on NFS land only contributes to particular life cycle requisites.

Consequently, the assessment of whether habitat on NFS land is sufficient to maintain viable populations of GRSG must consider the contribution of habitat on NFS land to GRSG persistence

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

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

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

Threats by Population

The COT report (USFWS 2013) identifies potential threats for PACs in proximity to the RNF. The potential for these threats were further refined for GRSG habitats (PHMA and GHMA) occurring on the RNF. The alternatives in the FEIS are evaluated in light of these threats and their associated management actions. These are the basis for identifying and reviewing the effects of alternatives.

Table 8. Threats identified in the COT report for individual PACs potentially associated with management activities on the RNF (USFWS 2013)⁷.

COT Report Population Area	Isolated/Small Size	Sagebrush Elimination	Agriculture Conversion	Fire	Conifer Encroachment	Weeds/Invasive Species	Energy	Mining	Infrastructure	Grazing	Equids	Recreation	Urbanization
North Park—9d	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y
NWCO—9e	N	L	Y	Y	L	Y	Y	Y	Y	Y	L	Y	Y
Eagle South Routt—5	Y	L	Y	L	L	Y	Y	N	Y	Y	N	L	Y
Middle Park—6	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y
Threats to GRSG on the RNF	Y	L	N	L	L	L	N	N	N	Y	N	L	N

Key: Y =Yes; N = No; L = Likely; NWCO = Northwest Colorado

A. Effects of Alternative A on GRSG

Recreation and Travel

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management on the RNF. The management direction, and the associated outcomes would remain the same. Levels of recreation use and travel may increase with increasing human populations in the area, but the infrastructure associated with these activities would not change. Human uses associated with recreation and travel corridors may create the potential for increased negative effects. For GRSG, this could disrupt some stages of their life cycle, including nesting and brood rearing stages. It is difficult to speculate the extent of disturbance that may occur in the future under the current management.

Any direct negative effects currently experienced by GRSG under current recreation and travel management, from general disturbance to GRSG by humans from recreation would continue. Conversely, existing efforts and opportunities through travel management and recreation planning to reduce impacts to GRSG and their habitats would continue.

GRSG species may see the potential for greater negative impacts from Alternative A, compared to other alternatives, due to the reduced level of management direction for the protection of GRSG and their habitat. Garton et al. (2015) showed a significant decline in population under the current management strategy across the range of GRSG from 2007 to 2013. This was an expansion of their previous analysis (Garton et al. 2011).

Lands and Realty

Forest Service lands in the RNF would continue to be managed according to existing policy, regulation, and plan direction. Permitted ROWs would continue to produce construction, maintenance, and operation activities, based on the existing guidance in the Forest Plan. This may result in greater sagebrush habitat loss, fragmentation, temporary increases in road use, potential sedimentation or degradation of habitats for sensitive animal species, compared to an action alternative that has added direction in GRSG habitat areas for lands and realty management.

Under this alternative, there would be no changes to the current approach from exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. Though most proposed project proponents would strive to mitigate or minimize impacts to GRSG, this alternative would likely have the greatest potential for impact on GRSG. Alternative A has a greater potential for negative effects than an alternative with additional management direction, although this would likely be negligible to sensitive animal species that use a broader range of habitats on the RNF.

Range

Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing on the RNF from the existing Forest Plan. Under current management, GRSG, would be managed based on existing plan direction. Implementation of range decisions with existing plan direction has been determined to result in impacts on sensitive animal species. Alternative A has a greater potential for negative effects to GRSG, than an action alternative with additional management direction for the species.

Energy and Minerals

Energy and mineral development is not a major use in the RNF and is not a current threat in GRSG habitat for areas affected by the FEIS. Currently none of the PHMA in the RNF is leased. There has been a dramatic increase in energy development on adjacent private and BLM-administered lands and, although it is not a current issue in the RNF, this could change in the future. Under this alternative, the existing direction for energy and mineral development would remain the same. The existing plan with respect to energy development is somewhat dated and does not reflect the current approaches to energy development that are being used. Existing stipulations are limited to timing in most GRSG habitat areas. A small percentage of PHMA would remain closed to non-energy leasable mineral leasing, with the majority or remainder of ADH open to leasing (including expansion of new leases), with no cap on surface-disturbing activities. As such, this alternative would be expected to have the potential for the greatest amount of direct and indirect habitat loss, degradation, and habitat fragmentation for GRSG.

Fire and Fuels Management

Alternative A would have the fewest restrictions on impacts to GRSG for fuels management activities, which could result in a higher potential for impacts in sagebrush habitats. This alternative does not prioritize fire operations beyond what has already been determined in the fire management plans for the area. Potential impacts to GRSG may include increased loss of sagebrush habitat due to current

direction fire management. A lack of additional management direction for fuels management in sagebrush, is likely to result in a greater potential for impacts to GRSG.

Cumulative Effects—Alternative A

The cumulative effects from existing activities would generally maintain the current conditions on GRSG habitats and populations. GRSG would still occur on private, state, and BLM-administered land next to the RNF. Potential effects described above may also occur on adjacent lands with other ownership. There are some existing conservation measures on these other lands, especially those administered by the BLM. There could be additional population loss, habitat loss, or habitat degradation from recreation and travel, ROWs, energy and mineral development, fire and fuels treatments, range management, or other activities in sagebrush habitat off the RNF. In the RNF, the limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in the action alternatives. Under Alternative A, the direct and indirect effects in conjunction with the past, present, and reasonably foreseeable future actions and the likelihood of increasing future fires and predicted climate change may increase loss and fragmentation of the existing sagebrush habitat from wildfire, which could contribute to negative cumulative impacts on GRSG.

Summary of Alternative A

Under the No Action Alternative, current management actions would continue unchanged. The condition of GRSG populations would continue to reflect the effects of all past and current management activities, which based on Garton et al. (2011) and Garton et al. (2015) for the entire range of GRSG has been a significant downward trend. Direct effects on habitat under the current management regime would occur from wildland fire operations and fuels management, and livestock grazing. Potential indirect effects would occur from competition from invasive species and habitat fragmentation. These impacts could adversely impact individuals or populations or cause habitat fragmentation or loss.

Further, alternative A provides the least protection for GRSG habitats on the RNF. Existing conservation measures limit some but not all impacts to GRSG. Impacts on potentially suitable habitat would be possible. While some impact to GRSG is possible under alternative A, the amount would be limited based on the amount of habitat relative to the total amount of habitat used by GRSG in the area. Therefore, this alternative “**may adversely impact individuals, but not likely to result in a loss of viability in the analysis area, nor cause a trend toward federal listing**” for all terrestrial and aquatic species analyzed.

B. Effects of Alternative B on GRSG

Alternative B would place a 3 percent cap on disturbance in the PHMA, which accounts for approximately 13 percent of the analysis area. Outside the PHMA, activities would continue under current management.

Recreation and Travel

Under this alternative there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of roads. In addition, recreation use permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG. Therefore, additional impacts from new roads and their use would be limited. These standards and guidelines would limited road construction, resulting in less use, road density, recreational disturbance, and reduced likelihood

for vehicle-GRSG collisions. Therefore, GRSG on the RNF are likely to benefit from added the management under Alternative B, compared to Alternative A.

Since only a very small portion of the RNF is considered PHMA, the effects would likely be negligible to minor, but any management direction leading to conservation would have a positive effect.

The 3 percent cap on disturbance would reduce but not eliminate the potential direct and indirect effects described under Alternative A. Reductions in the level of disturbance could benefit individuals and populations of GRSG that occur in meadow or shrublands habitats, but it would not likely affect any species as a whole. Of course, benefits would occur only on PHMA, not across all habitats.

Lands and Realty

Under Alternative B, PHMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating protection for GRSG. The RNF would keep lands within PHMA. This would result in little to no degradation, fragmentation, and habitat loss for GRSG PHMA. These standards and guidelines would be more protective for GRSG than measures under Alternatives A and D, but less protective than under Alternative C. This represents a concerted effort to maximize connectivity and minimize sagebrush habitat fragmentation, thus indirectly benefiting GRSG and their habitats.

Range

Alternative B would adjust grazing direction in GRSG PHMA, which is less than 1 percent of the land cover of the RNF. The potential effects to GRSG from livestock grazing, vegetation disturbance, and range improvement projects is expected to be very similar under this alternative (Alternative B), as it would be under Alternative A, except there would be a few more restrictions to grazing in PHMA, thus benefiting GRSG. These objectives, particularly with respect to the habitat objectives, stocking adjustments, timing, and residual cover—would likely provide a minor but positive effect on habitat effectiveness and decrease disturbance for GRSG in PHMA.

The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to localized habitat improvements for GRSG, but are small with respect to the overall GRSG population.

Energy and Minerals

Under Alternative B, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. Direct impacts on wildlife habitats from construction and operation of energy or mineral facilities would be a similar impact for ROWs and could include direct habitat loss, fragmentation, and degradation.

Currently there are no known active GRSG leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, thereby improving conditions and limiting adverse impacts to GRSG. This alternative would minimize or eliminate the likelihood for adverse impacts to GRSG on PHMA on 1,968 acres.

Fire and Fuels Management

GRSG habitat, specifically PHMA, would have additional management direction designed to promote the protection of PHMA from wildfire and ensure that effects from fuels management are

accomplished in a manner that benefits or does not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. This would be a benefit to GRSG.

Cumulative Effects—Alternative B

Cumulative effects for Alternative B would be similar to those described for Alternative A. However, because this alternative places a 3 percent cap on new disturbance in the PHMA, the magnitude of impacts in addition to impacts from the past, present and reasonably foreseeably future actions could be less than that described for Alternative A. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analyzing site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push GRSG over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability for the RNF.

Summary of Alternative B

This alternative limits loss, fragmentation, and disturbance in PHMA to 3 percent of the area in PHMA areas and thus provides protections for GRSG habitats in these areas. Implementing the criteria would likely reduce, but not eliminate, direct and indirect effects on GRSG and their habitat. Generally, activities in GHMA and the remaining sagebrush habitat would occur as they do under existing management direction or could increase as existing direction allows. Overall, impacts would be less than those projected under Alternative A.

Existing conservation measures limit some, but not all impacts on GRSG. Therefore, it is determined that 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 GRSG on the RNF.

C. Effects of Alternative C to Sensitive Animal Species including the GRSG

This alternative would place a 3 percent disturbance cap in PHMA and GHMA (the entire 12,500-acre analysis area). Closure to grazing would further reduce disturbance in ADH (Refer to Chapter 2 in this document, and Tables 1 and 2)

Recreation and Travel

Under Alternative C, road and trail construction would be limited in ADH, and no new roads would be constructed within 4 miles of a lek or occupied habitat. Under this alternative, effects would be similar to those mentioned in Alternative B, except that they would apply to ADH and not just PHMA. This is the most restrictive alternative for recreation and travel.

There would be very few, if any negative effects from this alternative on GRSG on the RNF as a result of recreation- or travel-related projects. Therefore, current population trends are expected to stabilize or slightly improve over time.

Lands and Realty

Under this alternative, ADH would be exclusion areas for ROWs and special use permits. The RNF would keep and seek to acquire GRSG ADH where interest and opportunities exist. This would result in little to no degradation, fragmentation, or loss of GRSG habitat in all areas of ADH. Therefore this would have the most protective measures, thus benefiting GRSG in these areas.

Alternative C would have the most protective measures for all GRSG habitat. Under this alternative, ADH would be managed as an exclusion area for new ROW projects. In addition, Alternative C would

encourage consolidation of GRSG habitats, facilitating habitat conservation and management. This alternative would be expected to have the least negative impacts and most positive impacts for GRSG.

Range

This alternative would eliminate grazing in ADH. This accounts for approximately 1 percent of the land cover of the RNF. If grazing were removed in these areas, there would be reductions of impacts that result from livestock grazing. The direct effects of changes to vegetation condition due to grazing and the potential for trampling of individuals, nests, or chicks would be removed.

This management action would result in greater vegetation cover improving hiding cover and habitat quality for GRSG. Palatable forbs may increase, allowing insects to increase, which is an important protein source for GRSG chicks during brood rearing.

Energy and Minerals

Under this alternative, ADH would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. These protective measures would benefit GRSG within all designated habitats. Under this alternative, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Fire and Fuels Management

Alternative C would aim to protect and restore sagebrush habitats in all designated GRSG habitat using native seed post fire, with all burned areas closed to grazing post wildfire. Any reduction in wildfire near and around sagebrush habitats would likely benefit GRSG in the short term. Alternative C extends management direction throughout ADH, as opposed to just priority habitat in Alternative B, thus increasing the potential for retaining larger areas of sagebrush ecosystem in a condition more suitable for GRSG. This may improve opportunities for population expansion in the future. Under this alternative, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Cumulative Effects—Alternative C

Cumulative effects for Alternative C would be similar to those described for Alternatives A and B. Because this alternative limits the level of disturbance, the magnitude of cumulative impacts could be less than those for either Alternative A or B. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push GRSG populations over a threshold toward a federal listing; nor would it cause concerns for population loss or species viability issues from the Forest Service units under review.

Summary of Alternative C

This alternative limits habitat loss, fragmentation, and degradation in ADH across the analysis area, providing conservation for sensitive terrestrial and aquatic species and their habitats. The implementation of the criteria would reduce but not eliminate adverse direct and indirect effects to GRSG and their sagebrush habitat. Generally, activities in the sagebrush habitat outside. Overall, impacts would be less than those expected for all other alternatives.

Existing conservation measures limit some but not all impacts on terrestrial and aquatic sensitive species. Therefore the determination for 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 GRSG.

D. Effects of Alternative D to Sensitive Animal Species including the GRSG

Alternative D would apply a 5 percent disturbance cap in ecological sites that support sagebrush in PHMA, calculated in CMZs. Range management would aim to meet GRSG habitat objectives in ADH. Most protections from fire and fuels management activities would apply to ADH (

Refer to Chapter 2 in this document, and Tables 1 and 2)

Recreation and Travel

Under this alternative, the effects of most suggested management actions would be similar to Alternative B. The exception is that more flexibility or discretion would be given to the land management agency to allow route construction in PHMA, road improvements, and Special Recreation Permits (SRP) issuance if it were determined that these actions would not adversely affect GRSG or their habitat. Any new roads could be constructed to the highest standard and it would allow roads to be upgraded based on no adverse effect on GRSG. Seasonal closure areas in ADH would also be identified for GRSG.

Under this alternative, if populations and habitats are healthy or improving, it could permit disturbance above the 5 percent cap for the CMZ. Effects of this alternative allow for greater disturbance to sensitive species habitat, compared to Alternatives B or C, although distinctions and overall effects on recreation and travel are minor among the action alternatives and likely insignificant in the RNF due to the limited designated GRSG habitat.

Lands and Realty

Alternative D is very similar to Alternative B, with the major differences being no ROWs would be permitted in PHMA and the RNF would keep and seek to acquire lands in PHMA where interest and opportunity may enable acquisition. This would result in the potential for minimal impacts from lands and realty management in PHMA, but it could shift impacts to GHMA or other habitat types. In non-PHMA, permitted ROWs would likely have effects similar to those addressed in Alternative A.

Under Alternative D, PHMA would be managed as an avoidance area, but new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PHMA if the project would not adversely affect GRSG populations. PHMAs would be exclusion areas for large transmission lines (greater than 230 kilovolts), and 68,000 acres would be managed as avoidance areas for large transmission lines. This alternative would be more protective than Alternative A but less protective than Alternatives B and C for sensitive animal species using GRSG habitats. However, due to the extent of habitat on RNF, the effects would be similar to Alternatives B and C.

Range

The effects from Alternative D would be similar to Alternative B, but would be slightly more restrictive as GRSG habitat objectives in grazing allotments would be applied to ADH and not just PHMA. This alternative would have more management direction than Alternative A and B, resulting in a benefit to GRSG. However, this benefit would be less than that realized with Alternative C. Generally speaking, if GRSG habitat were taken into consideration before applying the management action, then GRSG would likely benefit from that protection or management action.

Under this alternative, vegetative composition and structure would be managed to be consistent with ecological site potential. Riparian areas and wet meadows would be managed for proper functioning condition and to maintain diverse species richness. New water developments would be authorized only after determining that GRSG would not be adversely impacted from habitat loss. In PHMAs sagebrush ecosites retain a minimum of 70 percent of the ecological sites capable of supporting 12 percent canopy cover of Wyoming sagebrush or 15 percent canopy cover of mountain sagebrush. Alternative D management would allow a total disturbance cap of less than 30 percent. New range improvement projects would be designed to enhance livestock distribution, timing, and use.

Energy and Minerals

Under this alternative, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks, similar to Alternative B. However, with some mineral development, this alternative would allow up to 5 percent disturbance in any CMZ. Direct effects would be similar to those under Alternative B. There could be a few more impacts if the disturbance allowance were increased from 3 percent to 5 percent. Therefore effects would be similar to those described under Alternative B and would be mostly positive.

Fire and Fuels Management

Alternative D is generally the same as Alternative B and much of Alternative C, except that it extends almost all the same protections across all ADH, not just PHMA. Alternative D would be the most restrictive of all the alternatives for fire and fuels management and therefore the most protective for GRSG. Alternative D would help reduce the local threats to ADH from fire, compared to Alternative A.

Under Alternative D, in PHMA, sagebrush would not be reduced to less than 15 percent unless a vegetation management objective required additional reduction. Seasonal restrictions would be applied for implementing treatments. Fire would not be used to treat sagebrush in areas of less than 12 inches of precipitation. Treated areas would be rested from livestock grazing for two full growing seasons unless vegetation recovery were to dictate otherwise. These standard and guidelines would protect and enhance GRSG habitat and benefit the species.

Cumulative Effects—Alternative D

Cumulative effects for Alternative D would be similar to those for Alternatives A and B. However, because Alternative D places a 5 percent cap on new disturbance in the PHMA, the magnitude of disturbance could be more than that described for Alternative B or the proposed plan amendment. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analyzing site-specific projects when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push GRSG over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability concern on the RNF

Summary of Alternative D

Alternative D has provisions that fall that provide protections that fall between those of Alternatives A and B. It includes a cap on disturbance in PHMA, while there is no similar limit under Alternative A. The allowance of 5 percent disturbance in PHMA would allow some additional habitat loss and degradation. Limited conservation in the remaining sagebrush habitat could allow changes in habitat quantity, quality, and ownership in sagebrush habitat on the units. None of the proposed conservation

measures is specific to sensitive plant species. Implementing the measures would likely reduce but not eliminate all direct and indirect effects on GRSG. Therefore the determination for 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 GRSG.

E. Effects of The proposed plan on GRSG

The proposed plan would apply a 3 percent disturbance cap to PHMA, calculated in a Biologically Significant Unit (the CMZ). The proposed plan expands many of the conservation measures in Alternative B to all designated GRSG habitat. Grazing use guidelines would be applied in each of the seasonal GRSG habitats, and other grazing guidelines would focus on protecting areas within 1.2 miles of active leks (regardless of which type of habitat the lek is in). Most protections from fire and fuels management activities would apply to ADH. (Refer to Chapter 2 in this document, and Tables 1 and 2).

Recreation and Travel

Under The proposed plan, there would be no new road or trail construction in PHMA or GHMA. No road or trail maintenance would be allowed within 2 miles of an active lek during lekking (March 1 to April 30). In addition, recreational use permits would be given in PHMA or GHMA only if there were a neutral or beneficial impact on GRSG.

There would be fewer impacts from this alternative relative to the effects of Alternative A. These positive impacts would be no new road or trail construction, road density, recreational disturbance, and opportunities for collisions and reduced indirect impacts on adjacent areas habitat disturbances. Therefore, GRSG are likely to benefit from added management direction under the proposed plan, compared to Alternative A. Further, these management directions are expected to provide benefits to GRSG from fewer disturbances and adverse impacts to their habitat.

Lands and Realty

Under the proposed plan, PHMA and GHMA would be managed as avoidance areas for new SUA projects. No new roads or aboveground structures would be authorized within 1 mile of an active lek. PHMAs and GHMAs would be managed as avoidance areas for high voltage transmission lines (greater than 100 kilovolts). In addition, The proposed plan would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating conservation of GRSG and other species that depend on sagebrush ecosystem. The RNF would keep its PHMA and would work to acquire more. This would result in little to no degradation, fragmentation, and loss of GRSG habitat. In non-PHMA, permitted ROWs would likely have effects similar to those under Alternative A. These conservation measures would be more protective than those under Alternatives A and D but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats, thus indirectly benefiting other sensitive species that use these habitats.

Range

The proposed plan would adjust grazing direction in GRSG PHMA, which is less than 1 percent of the land cover of the RNF. The potential effects of livestock grazing, vegetation disturbance, and range improvements are expected to be similar under the proposed plan as under Alternative A. The exception is that there would be a few more restrictions to grazing in PHMA, thus benefiting GRSG. These adjustments—timing, stocking rates, and residual cover—would likely provide a minor but positive effect on habitat effectiveness and would decrease the likelihood for trampling and disturbance for GRSG using areas in PHMA.

Energy and Minerals

Under the proposed plan amendment, no new leasing in ADH would be allowed within 1 mile of an active lek. There would be NSO in PHMA and within 2 miles of active leks in GHMA. A no activity buffer of 4 miles in active leks from March 1 to July 15 would be enforced. For wind and solar projects PHMA would be excluded and GHMA would be avoidance areas. PHMAs would be closed to new mineral materials sales and new nonenergy mineral leasing. NSO would be precluded on existing nonenergy leasable mineral leases within 2 miles of active leks in PHMAs. Presumably, the above protective measures would benefit GRSG. Direct impacts on GRSG habitat from constructing and operating energy or mineral facilities would be similar to the impact for SUAs and could include direct habitat loss, fragmentation, and degradation.

Though currently there are no known active GRSG leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, thereby improving conditions for GRSG. This alternative would minimize or eliminate the likelihood for impacts to GRSG 1,968 acres within the PHMA.

Fire and Fuels Management

Sage-grouse habitat, specifically PHMA, would have additional management direction designed to protect PHMA from wildfire and ensure that effects from fuels management benefit or do not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. This would be a benefit to GRSG.

Cumulative Effects—The proposed plan

Cumulative effects for the proposed plan would be similar to those described for Alternatives A and B. However, because the proposed plan places a 3 percent cap on new disturbance in the PHMA, the magnitude of cumulative impacts could be less than those described for Alternative A and the same for Alternative B. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push GRSG over a threshold toward a federal listing; nor would they cause concerns for population loss or concern over species viability on the RNF.

Summary of the proposed plan

This alternative has provisions that are more protective than those in Alternatives A and D, but less protective than alternatives B and C. The proposed plan does include a cap on disturbance in PHMA, while there is no similar limit under Alternative A. The allowance of 3 percent disturbance in PHMA will allow some additional habitat loss and degradation but not as much as Alternative D, which includes a 5 percent disturbance cap. Limited conservation in the remaining sagebrush habitat could allow changes in habitat quantity, quality, and ownership in sagebrush habitat on the units. Implementation of the measures would likely reduce but not eliminate direct and indirect effects on GRSG or their habitats. Existing conservation measures limit many, but not all impacts on GRSG. Therefore the determination for 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 GRSG.

F. Effects of Alternative A on Sensitive Animal Species

Recreation and Travel

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management on the RNF. The management direction, and the associated outcomes would remain the same. Levels of recreation use and travel may increase, but the infrastructure associated with these activities would not change. Human uses associated with recreation and travel corridors may create the potential for increased negative effects. For sagebrush-obligate birds, this could disrupt nesting and cause young abandonment or temporary displacement.

Any direct negative effects currently experienced by sensitive animal species under current recreation and travel management, such as siltation/sedimentation of ponds, wetlands, or streams, due to motor vehicle use, and general disturbance to sensitive species by humans from recreation would continue. Conversely, existing efforts and opportunities through travel management and recreation planning to reduce impacts to protect sensitive animal species and their habitats would continue.

Motorized travel would continue to degrade aquatic habitat in a small way. The condition of fish and amphibian populations and aquatic habitats across designated habitat would remain stable, reflecting the effects of all past and current management activities.

Sensitive animal species may see the potential for greater negative impacts from Alternative A, compared to other alternatives, due to the reduced level of management direction restrictions on activities that cause these effects. For sensitive species using a broader range of habitats in the RNF, changes in management direction are likely to be insignificant.

Lands and Realty

Forest Service lands in the RNF would continue to be managed according to existing policy, regulation, and plan direction. Permitted ROWs would continue to produce construction, maintenance, and operation activities, based on the existing guidance in the Forest Plan. This may result in greater habitat loss, fragmentation, temporary increases in road use, potential sedimentation or degradation of habitats for sensitive animal species, compared to an action alternative that has added direction in GRSG habitat areas for lands and realty management.

Under this alternative, there would be no changes to the current approach from exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. Though most proposed project proponents would strive to mitigate or minimize impacts, this alternative would likely have the greatest potential for impact on sensitive animal species. Alternative A has a greater potential for negative effects than an alternative with additional management direction, although this would likely be negligible to sensitive animal species that use a broader range of habitats on the RNF.

Please refer to the lands and realty section of the FEIS for additional information.

Range

Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing on the RNF from the existing Forest Plan. In addition, there would be no change to wild horse and burro management, which is not a current issue in the RNF.

Under current management, sensitive animal species, including amphibians, fish, and sensitive birds, would be managed based on existing plan direction. Implementation of range decisions with existing plan direction has been determined to result in impacts on sensitive animal species. It is likely that

these impacts may be reduced with an action alternative in GRSG habitats with the addition of additional management direction. Alternative A has a greater potential for negative effects, than an alternative with additional management direction, although this would likely be negligible to sensitive animal species that use a broader range of habitats on the RNF.

Please refer to the range section of the FEIS for additional information.

Energy and Minerals

Energy and mineral development is not a major use in the RNF and is not a current threat in GRSG habitat for areas affected by the FEIS. Currently none of the PHMA in the RNF is leased. There has been a dramatic increase in energy development on adjacent private and BLM-administered lands and, although it is not a current issue in the RNF, this could change in the next several years.

Under this alternative, the existing energy and mineral development direction would remain the same. This direction is somewhat dated and does not reflect the more current approaches to energy development that are being used. Existing stipulations are limited to timing in most grouse habitat areas. A small percentage of PHMA would remain closed to nonenergy leasable mineral leasing, with the majority or remainder of ADH open to leasing (including expansion of new leases), with no cap on surface-disturbing activities. As such, this alternative would be expected to have the potential for the greatest amount of direct and indirect habitat loss, degradation, and fragmentation for sensitive animal species and their habitats.

Though there are conservation measures and best management practices in place to minimize effects, the potential effects from development would be greater under Alternative A, since more areas would be available and there would be fewer restrictions.

Please refer to the energy and mineral section of the FEIS for additional and more detailed information on the effects of Alternative A.

Fire and Fuels Management

Alternative A would have the fewest restrictions for fuels management actions in areas with GRSG habitat, which could result in a higher potential for vegetation impacts in the sagebrush type. As this alternative does not prioritize fire operations beyond what has already been determined in the fire management plans for the area, potential impacts may include the potential for increased loss of sagebrush habitat due to current direction for fuels management. A lack of additional management direction for fuels management in sagebrush, is likely to result in a greater potential for impacts on animal species that use sagebrush habitats.

Please refer to the fire and fuels management section of the FEIS for additional information and more detailed information on the effects of Alternative A.

Cumulative Effects—Alternative A

The cumulative effects from existing activities would generally maintain the current conditions on sensitive animal habitats and populations. Sensitive terrestrial and aquatic species would still occur on private, state, and BLM-administered land next to the RNF. Potential effects described above may also occur on other ownerships. There are some existing conservation measures on these other lands, especially those administered by the BLM. There could be additional species loss, habitat loss, or degradation from recreation and travel, ROWs, energy and mineral development, fire and fuels treatments, range management, or other activities in sagebrush habitat off the RNF. In the RNF, the

limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, and E. Under Alternative A, the direct and indirect effects in conjunction with the past, present, and reasonably foreseeable future actions and the likelihood of increasing future fires and predicted climate change may increase loss and fragmentation of the existing sagebrush habitat from wildfire, which could contribute to negative cumulative impacts on sensitive species.

Summary of Alternative A

Under the No Action Alternative, current management actions would continue unchanged. The condition of sensitive species populations in GRSG designated habitat would continue to reflect the effects of all past and current management activities. Direct effects on habitat under the current management regime are wildland fire and livestock grazing and trampling. Potential indirect effects are competition from invasive species, habitat fragmentation, and hydrological conditions alteration. These impacts can kill individuals or populations or cause habitat fragmentation or loss.

Alternative A provides the least protection for GRSG habitats on the RNF. Existing conservation measures limit some but not all impacts on species. Impacts on potentially suitable habitat would be possible. Therefore the determination for this alternative “**may adversely impact individuals, but not likely to result in a loss of viability in the analysis area, nor cause a trend toward federal listing**” for all terrestrial and aquatic species analyzed.

G. Effects of Alternative B on Sensitive Animal Species

Alternative B would place a 3 percent cap on disturbance in the PHMA, which accounts for approximately 13 percent of the analysis area. Outside the PHMA, activities would continue under current management.

Recreation and Travel

Under this alternative there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of roads. In addition, recreation use permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG.

Conditions for sensitive animal species that use PHMA would improve, relative to effects of Alternative A. These positive impacts would be limited road construction, resulting in less use, road density, recreational disturbance, and opportunities for collisions and reduced indirect impacts on adjacent areas from sedimentation to wetland systems. Therefore sensitive animal species using these areas are likely to benefit from added the management under Alternative B, compared to Alternative A. Since only a very small portion of the RNF is considered PHMA, the effects would likely be minor to negligible, but any management direction leading to conservation would be a positive effect.

The 3 percent cap on disturbance would reduce but not eliminate the potential direct and indirect effects described under Alternative A. Reductions in the level of disturbance could benefit individuals and populations of species that occur in meadow or shrublands habitats, but it would not likely affect any species as a whole. Of course, benefits would occur only on PHMA, not across all habitats. Species using areas outside PHMA would still be subject to direct effects, as described for Alternative A.

Please refer to the recreation and travel section of the FEIS for additional information and more detailed information on the effects of Alternative B.

Lands and Realty

Under Alternative B, PHMA would be managed as an exclusion area and general habitat would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating conservation for GRSG and other species that depend on sagebrush ecosystem. The RNF would keep PHMA and would work to acquire more. This would result in little to no degradation, fragmentation, and loss of sensitive species habitat in GRSG PHMA, but this restriction may shift land and realty project focus to GRSG designated GHMA or other non-grouse habitat types. In areas other than PHMA, permitted ROWs would likely have effects similar to those addressed under Alternative A. These conservation measures would be more protective than conservation measures under Alternatives A and D, but less protective than under Alternative C. This represents a concerted effort to maximize connectivity and minimize sagebrush habitat fragmentation, thus indirectly benefiting other sensitive species that use these habitats.

Please refer to the lands and realty section of the FEIS for additional information and more detailed information on the effects of Alternative B.

Range

Alternative B would adjust grazing direction in GRSG PHMA, which is less than 1 percent of the land cover of the RNF. The potential effects due to livestock grazing, vegetation disturbance, and range improvements is expected to be very similar under Alternative B, as it would be under Alternative A, except there would be a few more restrictions to grazing in PHMA, thus benefiting sensitive animal species that use these habitat types. These adjustments—timing, stocking rates, and residual cover—would likely provide a minor but positive effect on habitat effectiveness and would decrease the likelihood for trampling and disturbance for sensitive animal species using areas in PHMA.

None of the sensitive amphibian species are known to occur in these areas, so there would likely be no change to sensitive amphibian species under Alternative B. This includes a very small proportion of the southern site in the analysis area where CRCT are known to occur. Mountain sucker are not found in the PHMA in the RNF. Even in the area where CRCT do occur, there would be no direct negative effects on the species from Alternative B. The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to small habitat improvements for populations of CRCT farther downstream by decreasing the amount of sediment deposited in waterways; however, these improvements would likely be so small as to not be measurable.

The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to localized habitat improvements; however, these improvements would likely be considered insignificant to sensitive species at the forest scale, particularly for those species that use a broader range of habitat types. Cumulative effects are anticipated to be similar to those of Alternative A.

Please refer to the rangeland management section of the FEIS for additional information and more detailed information on the effects of Alternative B.

Energy and Minerals

Under Alternative B, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. Presumably, the above protective measures would benefit those other sensitive animal species whose ranges or habitat are coincident with GRSG PHMA. This restriction could create impacts in other adjacent habitat types if there were interest in energy or

mineral development under the NSO. Direct impacts on wildlife habitats from construction and operation of energy or mineral facilities would be a similar impact for ROWs and could include direct habitat loss, fragmentation, and degradation.

Though currently there are no known active GRSG leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, thereby improving conditions for sensitive species that use areas mapped as PHMA (Brewer's sparrow, CSTG, and sage sparrow). There would likely be very minor indirect benefits to fish from protecting PHMA. This alternative may shift energy and mineral development to less desirable sagebrush or non-sagebrush habitat, there may be lingering effects of not protecting all sagebrush or ADH. This alternative would minimize or eliminate the likelihood for impacts on sensitive animal species using PHMA on 1,968 acres (delineated PHMA).

Please refer to the energy and minerals related section of the FEIS for additional information and more detailed information on the effects of Alternative B.

Fire and Fuels Management

GRSG habitat, specifically PHMA, would have additional management direction designed to promote the protection of PHMA from wildfire and ensure that effects from fuels management are accomplished in a manner that benefits or does not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. This would be a benefit to sensitive animal species that use PHMA habitats.

Please refer to the fire and fuels management related sections of the FEIS for additional information and more detailed information on the effects of Alternative B.

Cumulative Effects—Alternative B

Cumulative effects for Alternative B would be similar to those described for Alternative A. However, because this alternative places a 3 percent cap on new disturbance in the PHMA, the magnitude of cumulative impacts could be less than that described for Alternative A. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analyzing site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive plant species over a threshold to a federal listing; nor would they cause concerns for population loss or species viability issues for the Forest Service units under review.

Summary of Alternative B

This alternative limits loss, fragmentation, and disturbance in PHMA to 3 percent of the area in PHMA areas and thus provides protections for GRSG habitats in these areas. Implementing the criteria would likely reduce, but not eliminate, direct and indirect effects on sensitive terrestrial or aquatic species or their habitats in sagebrush communities. Generally, activities in GHMA and the remaining sagebrush habitat would occur as they do under existing management direction or could increase as existing direction allows. Overall, impacts would be less than those projected under Alternative A.

Existing conservation measures limit some, but not all impacts on terrestrial and aquatic sensitive species. Therefore the determination for 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 all terrestrial and aquatic species analyzed.

H. Effects of Alternative C to Sensitive Animal Species

This alternative would place a 3 percent disturbance cap in PHMA and GHMA (the entire 12,500-acre analysis area). Closure to grazing would further reduce disturbance in ADH (Refer to Chapter 2 in this document, and Tables 1 and 2)

Recreation and Travel

Under Alternative C, road and trail construction would be limited in ADH, and no new roads would be constructed within 4 miles of a lek or occupied habitat. Under this alternative, effects would be similar to those mentioned in Alternative B, except that they would apply to ADH and not just PHMA. This is the most restrictive alternative for recreation and travel.

There would be very few if any negative effects from this alternative on sensitive species occurring in ADH as a result of recreation- or travel-related projects. Amphibians in any of the delineated area mentioned above would largely be protected, and the impacts would likely be positive, such as reduced siltation/sedimentation of ponds, wetlands, or streams; slightly improved and likely largely undisturbed breeding and foraging habitat; and less disruption of normal life history activities by humans.

Therefore current population trends would stabilize or slightly improve over time.

Please refer to the recreation and travel management sections of the FEIS for additional information and more detailed information on the effects of Alternative C.

Lands and Realty

Under this alternative, ADH would be exclusion areas for ROWs and special use permits. The RNF would keep and seek to acquire GRSG ADH where interest and opportunities exist. This would result in little to no degradation, fragmentation, or loss of sensitive wildlife habitat in all areas of ADH. Therefore this would have the most protective measures, thus benefiting sensitive animal species in these areas.

Alternative C would have the most protective measures for all GRSG habitat. Under this alternative, ADH would be managed as an exclusion area for new ROW projects. In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat conservation and management. This alternative would be expected to have the least negative impacts and most positive impacts on wildlife species whose ranges overlap with GHMA and PHMA.

Maintaining continuous diverse sagebrush habitats would likely maintain good watershed and runoff patterns that sustain health of the land and the streams that bear fish.

Please refer to the lands and realty management sections of the FEIS for additional information and more detailed information on the effects of Alternative C.

Range

This alternative would eliminate grazing in ADH. This accounts for approximately 1 percent of the land cover of the RNF. If grazing were removed in these areas, there would be reductions of impacts that result from livestock grazing. The direct effects of changes to vegetation condition due to grazing and the potential for trampling of individuals, nests, or chicks, as well as the indirect effects of erosion and sedimentation from domestic livestock would be removed. Wild ungulates would still create some of these types of impacts, though to a lesser degree due to lower concentrations. This management action would result in greater vegetation cover improving hiding cover and habitat quality for sagebrush-associated species.

The positive effects of Alternative C on fish and amphibians would be even more pronounced than those described in Alternative B because all grazing would be terminated in ADH. Though this accounts for only 1 percent of the land cover of the RNF, the effects on fish downstream of these areas could be ameliorated by no cattle grazing in, near, and around riparian areas and streams in ADH. There would likely be no negative effects on fish by removing cattle from the system, but there would be substantial positive impacts of reduced sedimentation and turbidity, as well as overall riparian vegetative health and water quality. Under this alternative and based on potential positive impacts of removing grazing, CRCT may increase in population trends because of this species' limited distribution in the RNF.

There would be few if any negative effects on sensitive animal species under Alternative C with respect to range resources, but the potential for fire may increase due to increases in fine fuels.

Please refer to the rangeland management related sections of the FEIS for additional information and more detailed information on the effects of Alternative C.

Energy and Minerals

Under this alternative, ADH would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. Presumably, the protective measures would benefit those sensitive species whose ranges or habitat are coincident with all designated GRSG habitat or the buffer. Under this alternative, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Please refer to the energy and mineral management related sections of the FEIS for additional information and more detailed information on the effects of Alternative C.

Fire and Fuels Management

Alternative C would aim to protect and restore sagebrush habitats in all designated GRSG habitat using native seed post fire, with all burned areas closed to grazing post wildfire. Any reduction in wildfire near and around sagebrush habitats would likely benefit GRSG and other sensitive species in the short term. Alternative C extends management direction throughout ADH, as opposed to just priority habitat in Alternative B, thus increasing the potential for retaining larger areas of sagebrush ecosystem in a condition more suitable for GRSG. This may improve opportunities for population expansion in the future. Under this alternative, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Please refer to the fire and fuels management related sections of the FEIS for additional information and more detailed information on the effects of Alternative C.

Cumulative Effects—Alternative C

Cumulative effects for Alternative C would be similar to those described for Alternatives A and B. Because this alternative limits the level of disturbance, the magnitude of cumulative impacts could be less than those for either Alternative A or B. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive plant species over a threshold toward a federal listing; nor would it cause concerns for population loss or species viability issues from the Forest Service units under review.

Summary of Alternative C

This alternative limits habitat loss, fragmentation, and degradation in ADH across the analysis area, providing conservation for sensitive terrestrial and aquatic species and their habitats. The implementation of the criteria would reduce but not eliminate adverse direct and indirect effects on sensitive terrestrial or aquatic species or their habitats in sagebrush. Generally, activities in the sagebrush habitat outside ADH would occur as they do currently or could expand as existing direction allows. Overall, impacts would be less than those expected for all other alternatives.

Existing conservation measures limit some but not all impacts on terrestrial and aquatic sensitive species. Therefore the determination for 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 all terrestrial and aquatic species analyzed.

I. Effects of Alternative D to Sensitive Animal Species

Alternative D would apply a 5 percent disturbance cap in ecological sites that support sagebrush in PHMA, calculated in CMZs. Range management would aim to meet GRSG habitat objectives in ADH. Most protections from fire and fuels management activities would apply to ADH (

Refer to Chapter 2 in this document, and Tables 1 and 2)

Recreation and Travel

Under this alternative, the effects of most suggested management actions would be similar to Alternative B. The exception is that more flexibility or discretion would be given to the land management agency to allow route construction in PHMA, road improvements, and Special Recreation Permits (SRP) issuance if it were determined that these actions would not adversely affect GRSG or their habitat. Any new roads could be constructed to the highest standard and it would allow roads to be upgraded based on no adverse effect on GRSG. Seasonal closure areas in ADH would also be identified for GRSG.

Under this alternative, if populations and habitats are healthy or improving, it could permit disturbance above the 5 percent cap for the CMZ. Effects of this alternative allow for greater disturbance to sensitive species habitat, compared to Alternatives B or C, although distinctions and overall effects on recreation and travel are minor among the action alternatives and likely insignificant in the RNF due to the limited designated GRSG habitat.

Please refer to the recreation and travel management sections of the FEIS for additional and more detailed information on the effects of Alternative D.

Lands and Realty

Alternative D is very similar to Alternative B, with the major differences being no ROWs would be permitted in PHMA and the RNF would keep and seek to acquire lands in PHMA where interest and opportunity may enable acquisition. This would result in the potential for minimal impacts from lands and realty management in PHMA, but it could shift impacts to GHMA or other habitat types. In non-PHMA, permitted ROWs would likely have effects similar to those addressed in Alternative A.

Under Alternative D, PHMA would be managed as an avoidance area, but new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PHMA if the project would not adversely affect GRSG populations. PHMAs would be exclusion areas for large transmission lines (greater than 230 kilovolts), and 68,000 acres would be managed as avoidance areas for large

transmission lines. This alternative would be more protective than Alternative A but less protective than Alternatives B and C for sensitive animal species using GRSG habitats. However, due to the extent of habitat on RNF, the effects would be similar to Alternatives B and C.

Please refer to the lands and realty management related sections of the FEIS for additional and more detailed information on the effects of Alternative D.

Range

Alternative D would be similar to Alternative B but would be slightly more restrictive as GRSG habitat objectives in grazing allotments would be applied to ADH and not just PHMA. This alternative would have more management direction than Alternative A and B, resulting in a benefit to sensitive animal species, but this benefit would be less than that realized with Alternative C. Generally speaking, if GRSG habitat were taken into consideration before applying the management action, then GRSG and other sensitive animal species would likely benefit from that protection or management action.

Under this alternative, vegetative composition and structure would be managed to be consistent with ecological site potential. Riparian areas and wet meadows would be managed for proper functioning condition and to maintain diverse species richness. New water developments would be authorized only after determining that GRSG would not be adversely impacted from habitat loss. In PHMAs sagebrush ecosites retain a minimum of 70 percent of the ecological sites capable of supporting 12 percent canopy cover of Wyoming sagebrush or 15 percent canopy cover of mountain sagebrush. Alternative D management would allow a total disturbance cap of less than 30 percent. New range improvement projects would be designed to enhance livestock distribution, timing, and use.

Please refer to the rangeland management related sections of the FEIS for additional and more detailed information on the effects of Alternative D.

Energy and Minerals

Under this alternative, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks, similar to Alternative B. However, with some mineral development, this alternative would allow up to 5 percent disturbance in any CMZ. Direct effects would be similar to those under Alternative B. There could be a few more impacts if the disturbance allowance were increased from 3 percent to 5 percent. Therefore effects would be similar to those described under Alternative B and would be mostly positive.

Please refer to the energy and mineral management related sections of the FEIS for additional and more detailed information on the effects of Alternative D.

Fire and Fuels Management

Alternative D is generally the same as Alternative B and much of Alternative C, except that it extends almost all the same protections across all ADH, not just PHMA. Alternative D would be the most restrictive of all the alternatives for fire and fuels management and therefore the most protective for sensitive animal species. Alternative D would help reduce the local threats to ADH from fire, compared to Alternative A. This would be a benefit to sensitive animal species that use ADH habitats.

Under Alternative D, in PHMA, sagebrush would not be reduced to less than 15 percent unless a vegetation management objective required additional reduction. Seasonal restrictions would be applied for implementing treatments. Fire would not be used to treat sagebrush in areas of less than 12 inches

of precipitation. Treated areas would be rested from livestock grazing for two full growing seasons unless vegetation recovery were to dictate otherwise.

Please refer to the fire and fuels management related sections of the FEIS for additional and more detailed information on the effects of Alternative D.

Cumulative Effects—Alternative D

Cumulative effects for Alternative D would be similar to those for Alternatives A and B. However, because Alternative D places a 5 percent cap on new disturbance in the PHMA, the magnitude of disturbance could be more than that described for Alternative B or the proposed plan amendment. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analyzing site-specific projects when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive terrestrial or aquatic species over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability.

Summary of Alternative D

Alternative D has provisions that fall that provide protections that fall between those of Alternatives A and B. It includes a cap on disturbance in PHMA, while there is no similar limit under Alternative A. The allowance of 5 percent disturbance in PHMA would allow some additional habitat loss and degradation. Limited conservation in the remaining sagebrush habitat could allow changes in habitat quantity, quality, and ownership in sagebrush habitat on the units. None of the proposed conservation measures is specific to sensitive plant species.

Existing conservation measures limit some, but not all impacts on terrestrial and aquatic sensitive species. Therefore the determination for 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 all terrestrial and aquatic species analyzed.

J. Effects of The proposed plan on Sensitive Animal Species

The proposed plan would apply a 3 percent disturbance cap to PHMA, calculated in a Biologically Significant Unit (the CMZ). The proposed plan expands many of the conservation measures in Alternative B to all designated GRSG habitat. Grazing use guidelines would be applied in each of the seasonal GRSG habitats, and other grazing guidelines would focus on protecting areas within 1.2 miles of active leks (regardless of which type of habitat the lek is in). Most protections from fire and fuels management activities would apply to ADH. (Refer to Chapter 2 in this document, and Tables 1 and 2).

Recreation and Travel

Under The proposed plan, there would be no new road or trail construction in PHMA or GHMA. No road or trail maintenance would be allowed within 2 miles of an active lek during lekking (March 1 to April 30). In addition, recreational use permits would be given in PHMA or GHMA only if there were a neutral or beneficial impact on GRSG.

Sensitive animal species that use PHMA and GHMA, would improve relative to the effects of Alternative A. These positive impacts would be no new road or trail construction, road density, recreational disturbance, and opportunities for collisions and reduced indirect impacts on adjacent areas from sedimentation to wetland systems. Therefore sensitive animal species using these areas are likely to benefit from added management direction under The proposed plan, compared to Alternative

A. Since only a small portion of the RNF is considered PHMA, the effects would likely be minor to negligible, but any management direction leading to conservation would be a positive effect.

Please refer to the Recreation and Travel section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Lands and Realty

Under the proposed plan, PHMA and GHMA would be managed as avoidance areas for new SUA projects. No new roads or aboveground structures would be authorized within 1 mile of an active lek. PHMAs and GHMAs would be managed as avoidance areas for high voltage transmission lines (greater than 100 kilovolts). In addition, The proposed plan would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating conservation of GRSG and other species that depend on sagebrush ecosystem. The RNF would keep its PHMA and would work to acquire more. This would result in little to no degradation, fragmentation, and loss of sensitive species habitat in GRSG PHMA; however, this restriction may shift land and realty project focus to GRSG-designated GHMA or other non-grouse habitat types. In non-PHMA, permitted ROWs would likely have effects similar to those under Alternative A. These conservation measures would be more protective than those under Alternatives A and D but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats, thus indirectly benefiting other sensitive species that use these habitats.

Please refer to the lands and realty section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Range

The proposed plan would adjust grazing direction in GRSG PHMA, which is less than 1 percent of the land cover of the RNF. The potential effects of livestock grazing, vegetation disturbance, and range improvements are expected to be similar under The proposed plan as under Alternative A. The exception is that there would be a few more restrictions to grazing in PHMA, thus benefiting sensitive animal species that use these habitat types. These adjustments—timing, stocking rates, and residual cover—would likely provide a minor but positive effect on habitat effectiveness and would decrease the likelihood for trampling and disturbance for sensitive animal species using areas in PHMA.

Because none of the sensitive amphibian species are known to occur in these areas, there would likely be no change to sensitive amphibian species under The proposed plan. The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to small habitat improvements for populations of CRCT farther downstream by decreasing the amount of sediment deposited in waterways; however, these improvements would likely be so small as to not be measurable.

The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to localized habitat improvements; however, these improvements would likely be considered insignificant to sensitive species at the forest scale, particularly for those that use a broader range of habitat types. Cumulative effects are anticipated to be similar to Alternative A.

Please refer to the rangeland management related section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Energy and Minerals

Under the proposed plan amendment, no new leasing in ADH would be allowed within 1 mile of an active lek. There would be NSO in PHMA and within 2 miles of active leks in GHMA. A no activity buffer of 4 miles in active leks from March 1 to July 15 would be enforced. For wind and solar projects PHMA would be excluded and GHMA would be avoidance areas. PHMAs would be closed to new mineral materials sales and new nonenergy mineral leasing. NSO would be precluded on existing nonenergy leasable mineral leases within 2 miles of active leks in PHMAs. Presumably, the above protective measures would benefit those other sensitive animal species whose ranges or habitat are coincident with GRSG PHMA. This restriction could create impacts in adjacent habitat types if there were interest in energy or mineral development under the NSO. Direct impacts on wildlife habitats from constructing and operating energy or mineral facilities would be similar to the impact for SUAs and could include direct habitat loss, fragmentation, and degradation.

Though currently there are no known active GRSG leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, thereby improving conditions for sensitive species that use areas mapped as PHMA (Brewer's sparrow, CSTG, and sage sparrow). There would likely be very minor indirect benefits for fish by protecting PHMA. This alternative may shift energy and mineral development to less desirable sagebrush or non-sagebrush habitat, thus there may be lingering effects of not protecting all sagebrush or ADH. This alternative would minimize or eliminate the likelihood for impacts on sensitive animal species using PHMA on 1,968 acres (delineated PHMA).

Please refer to the energy and minerals related section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Fire and Fuels Management

Sage-grouse habitat, specifically PHMA, would have additional management direction designed to protect PHMA from wildfire and ensure that effects from fuels management benefit or do not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. This would be a benefit to sensitive animal species that use PHMA habitats.

Please refer to the fire and fuels management related sections of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Cumulative Effects—The proposed plan

Cumulative effects for the proposed plan would be similar to those described for Alternatives A and B. However, because the proposed plan places a 3 percent cap on new disturbance in the PHMA, the magnitude of cumulative impacts could be less than those described for Alternative A and the same for Alternative B. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive terrestrial or aquatic species over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability.

Summary of the proposed plan

This alternative has provisions that are more protective than those in Alternatives A and D, but less protective than alternatives B and C. The proposed plan does include a cap on disturbance in PHMA, while there is no similar limit under Alternative A. The allowance of 3 percent disturbance in PHMA

will allow some additional habitat loss and degradation but not as much as Alternative D, which includes a 5 percent disturbance cap. Limited conservation in the remaining sagebrush habitat could allow changes in habitat quantity, quality, and ownership in sagebrush habitat on the units. Implementation of the measures would likely reduce but not eliminate direct and indirect effects on sensitive terrestrial or aquatic species or their habitats in PHMA and some areas of ADH.

Existing conservation measures limit some but not all impacts on terrestrial and aquatic sensitive species. Therefore the determination for 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 all terrestrial and aquatic species analyzed.

K. General Effects of All Alternatives on Sensitive Plant Species

No Region 2 sensitive plants are known to occur in the action area; however, no plant surveys have been conducted specifically for this analysis. Where suitable habitat is available and surveys have not been conducted, species are assumed to be present, unless they are known to occur only in areas distant from the analysis area. Since the specific characteristics of suitable habitat for most rare species are not known, habitat is assumed to be suitable if it is of the same general type as known habitat. If, for example, the species occurs in fens, then all fen habitat is assumed to be suitable, unless it is obviously of the wrong type or at the wrong elevation for the species. This assumption likely overestimates the amount of suitable habitat. In many instances, a species may not occur in habitat that appears to be very similar to areas where it does occur. In those cases, there may be subtle differences that are not discernable without in-depth studies. In many cases it is likely that the available habitat in the analysis area is not suitable due to subtle differences from known habitat. Since that cannot be known for certain, the habitat is assumed to be suitable and the species are assumed to be present if surveys have not been conducted, unless otherwise noted.

Programmatic plans, such as the proposed RNF LRMP Amendment, allow but do not authorize or approve any site-specific projects or actions. They are much like zoning ordinances under which future decisions are made. Decisions at the LRMP level establish goals and objectives, identify the types of activities that are allowed or prohibited in specific areas, may specify management standards and minimum habitat condition goals either unit wide or for specific areas, and may establish a monitoring and evaluation program.

This BE does not analyze site-specific actions (e.g., ongoing and new roads or other disturbances or ongoing, new, or renewed permits). Effects determinations made in this document should not be assumed to relate to site-specific projects. In the future, during project-level environmental planning and analysis, site-specific actions will continue to be analyzed to identify possible effects on listed and R2 sensitive species. Site-specific analysis of such actions may identify potential effects on species even when this programmatic evaluation determines no effect. As part of any future project-level environmental analysis, specific conservation measures and strategies to alleviate any potential adverse effects may be developed as the details of the future proposed actions become available.

The analysis area occurs in parts of six counties in northwestern Colorado: Garfield, Grand, Jackson, Moffat, Rio Blanco, and Routt. Seven of the plant species analyzed in detail have not been found in those counties, in the RNF, or near the analysis area; they are as follows: elliptic spikerush, Colorado tansyaster, white adder’s-mouth orchid, salix candida, club spikemoss, largeflower triteleia, and Selkirk violet. Species that are not known in the counties in the analysis area or in the RNF are less likely to occur or have suitable habitat in PHMA or GHMA in the analysis area. Since known occurrences of these species are distant from the analysis area, it is likely that either habitat

requirements are not met in the analysis area or that the species have not been able to become established in the analysis area from the distant sites.

Direct Effects on Plant Species Evaluated

A reduction in potential direct effects on sensitive plants is the most likely result from the proposed amendment to the RNF LRMP, due to the restrictive nature of the conservation measures. No ground-disturbing actions are proposed that are not already authorized. Many potential disturbances in PHMA and GHMA may be prevented or reduced. Ongoing authorized uses would generally continue, with some changes intended to improve the ecological condition of sagebrush habitats.

Several of the sensitive plants need bare ground or open spaces to thrive, so they may benefit from some disturbance. Moonworts can grow in sparsely vegetated areas, typically in areas that have been disturbed up to 50 years in the past (Beatty et al. 2003). Other plants that often grow in sparse vegetation are dropleaf buckwheat, Weber's scarlet gilia, Harrington beardtongue, and rock cinquefoil. Some disturbance in the vicinity of these plants may have beneficial effects by opening the ground surface to colonization by those plants, but only if the adverse effects of disturbance, such as trampling, compaction, and invasive plant establishment or spread, are not greater than the beneficial effects.

The effects of grazing and trampling impacts on individuals, populations, and habitat quality depend on plant species biology (e.g., response to herbivory and tolerance of trampling), type of grazer (e.g., cattle, deer, elk, or sheep), timing of grazing (e.g., season), grazing intensity (e.g., stocking density), habitat type (e.g., meadow or forest), and site conditions (e.g., topography, moisture, or invasive plants; Beatty et al. 2003a).

Several studies on *Botrychium* species (moonworts), for instance, have found that the loss of aboveground biomass either through herbivory, fire, or plant collection seems to have no effect on the subsequent return of the plant the following year (Beatty et al. 2003a). Because nutrition may be supplied through interactions with mycorrhizal fungi, moonwort individuals may be more tolerant of removal of leaf tissue by herbivores or other disturbances. Removing the current year's growth may not affect future years' growth, unless the underground structures are damaged or the plant cannot reclaim significant energy. For this reason *Botrychium* species may be more likely to be damaged by trampling than by herbivory.

Timing of disturbance may result in direct effects on individuals and populations, but the nature of these effects varies. Some species are thought to overcompensate for lost biomass by producing additional seed-bearing stems, but effects on any given species may be variable. For example, early season grazing of *Ipomopsis aggregata* may (Paige 1992; Paige and Whitham 1987) or may not (Ladyman 2004; Bergelson and Crawley 1992) lead to overcompensation. Grazing can also delay plant phenology (Bergelson and Crawley 1992), and late season grazing of *Ipomopsis aggregata* consistently reduces performance of affected plants (Bergelson and Crawley 1992).

Dropleaf buckwheat, lesser panicled sedge, and Rocky Mountain monkeyflower are noted as being susceptible to fire. If undiscovered individuals of these species are present in the analysis area, they could be affected by wildland or prescribed fire under any of the alternatives. Although fire is not listed as a threat for other species, they could also be affected under any alternative. Intense fires that burn deeply into the ground could damage *mycorrhizae* associated with plants or the underground structures of moonworts.

Indirect Effects on Plant Species Evaluated

Indirect effects of management activities include increased soil compaction, erosion, and sedimentation (resulting from hoof action and motor vehicles), and introduction or spread of invasive species. These indirect effects can degrade habitat, which ultimately displaces individuals or populations of plant species. As authorized activities (such as grazing, mining, and recreation) continue, indirect effects may also continue to impact sensitive plants and their habitats.

Despite designs to avoid livestock concentration, livestock grazing can result in moderate to intense local ground disturbance. While detrimental to most species, this may be beneficial to others, at least when the disturbance is minimal, limited in space, or temporary. For example, *Botrychium* species are mostly found in areas that have been disturbed in the past and have begun to recover.

Invasive species often occur where habitats are disturbed. Some invasive species can be introduced and spread by forest management that disturb the ground surface. Invasive species can also alter composition of native plant communities, often displacing native plant species (Olson 1999).

Changes in plant community composition can alter animal use patterns (Olson 1999). If the community composition shifts to undesirable, unpalatable, or toxic species, animals are likely to avoid or abandon the area (Olson 1999; Zouhar 2003), which may increase grazing pressure on other plant communities. Invasive species presence can add to other disturbances and can change the mycorrhizal communities that are critical to some plant species (With 2002).

Ungulate grazing and browsing pressure may have substantial effects on vegetation dynamics (Randall and Walters 2011). By altering vegetation composition, the proposed activities may modify forage condition and quality, thus leading wild and domestic ungulates to change their foraging patterns.

Soil compaction could occur where any activities are concentrated (for example, mining activities, recreation activities, and livestock grazing). The negative effects of soil compaction have been documented by numerous authors and studies (Cochran and Brock 1985; Daddow and Warrington 1983). Effects occur when forces exerted on the soil (such as from the weight of machinery or large animals) reduce pore space, particularly macro pores that provide for air and water movement through soils (Adams and Froehlich 1981). Activities that compact soils and reduce pore space can affect both soil microorganisms and plants themselves.

The following are the existing conservation measures in the RNF LRMP which will benefit plants:

Existing Conservation Measures from the Routt National Forest Land and Resource Management Plan (Forest Service 1998)

Forest Goals and Objectives

Goal 1—Ecosystem management on the Routt National Forest shall provide for multiple-use outputs and the habitats and processes necessary to maintain the biological diversity found on the Forest.

Objectives

Maintain or create habitats suitable for a stable or increasing population of federally listed threatened and endangered species and Forest Service, Region 2 sensitive species for the Routt National Forest, including the Colorado River cutthroat trout.

Threatened, Endangered, Sensitive Species, and Wildlife Standards

Where newly discovered threatened, endangered, proposed, or sensitive species habitat is identified, conduct an analysis to determine if any adjustments in the forest plan are needed. Manage activities to avoid disturbance to sensitive species which would result in a trend toward Federal listing or loss of

population viability. The protection will vary depending on the species, potential for disturbance, topography, location of important habitat components, and other pertinent factors. Give special attention during breeding, young rearing, and other times which are critical to survival of both flora and fauna. Avoid disturbing threatened, endangered, and proposed species (both flora and fauna) during breeding, young rearing, or at other times critical to survival by closing areas to activities. Exceptions may occur when individuals are adapted to human activity, or the activities are not considered. In land adjustment activities, give priority to acquiring lands that contain habitat identified by Fish and Wildlife Service as necessary for recovery of federally listed threatened and endangered species.

Real Estate—Land Adjustments Standards

In land adjustment activities including land exchange, purchase, disposal, and donation, consider the following: b) Consider the effect of land adjustments on sensitive species habitat. Avoid land adjustments which could result in a trend toward federal listing or loss of population viability for any sensitive species. Ownership of sensitive species habitat can be conveyed if conveyance would not result in a trend toward federal listing or adversely impact the population viability of the species or if effects could be mitigated. c) Acquire lands that contain resource values identified during scoping as important in contributing toward national forest system resource management goals and objectives as stated in the forest plan. Examples include: wetlands, riparian areas, essential wildlife habitat, threatened or endangered species habitat, sensitive species habitat, significant cultural resources, timber lands, rangelands, or other areas.

Range Standards

1. Provide mitigation measures to protect national forest resources from animal damage control activities conducted by other governmental entities. Mitigation measures emphasize protection of public safety; threatened, endangered, or sensitive species; water quality; and other resource values.

G. Effects of Alternative A on Sensitive Plant Species

Recreation and Travel

There would be no changes to the current system of roads, transportation, or recreation management. There would be few seasonal restrictions on casual use, and some new roads would be permitted and existing roads would be upgraded. There are few restrictions on recreation special uses. In general, more acres and linear miles of travel routes and recreational use equate to a greater likelihood of loss or disturbance of habitat. Impacts are physical damage to individuals or habitat. Habitat fragmentation may disrupt plant-pollinator relationships. Growth, development, root storage, or seed set may be reduced or individual mortality might occur. There could be increased erosion, sedimentation, soil compaction, or invasive weed spread.

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-administered lands. Impacts on sensitive plants from such exchanges would be considered and mitigated in accordance with Forest Service policy (see Existing Conservation Measures section above). All National Forest System-administered lands would continue to be managed according to Forest Service policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operations that may result in habitat loss or disturbance. Other impacts may include new infestations of noxious or invasive weeds, physical damage or death to individuals, erosion, sedimentation, and soil compaction. Plant species that require

open areas or bare soils may benefit in some situations. Though most projects would attempt to mitigate or minimize impacts on R2 sensitive species, there could be loss of habitat.

Range

There would be no change in the numbers, timing, or method of livestock grazing. Potential effects on plant habitat could include site-specific overgrazing, structure and diversity of residual vegetation reduction from consumption, and rangeland habitat degradation due to trampling. Growth, development, root storage, and seed set may be reduced or individual plant mortality might occur. Other impacts are new infestations of noxious or invasive weeds, physical damage or erosion, sedimentation, and soil compaction. Species requiring disturbance could benefit from the disturbance but not the other impacts, such as plant loss, habitat loss, spread of invasive weeds, or soil compaction. The RNF LRMP and other range direction usually provide for sufficient cover and diversity for healthy plant habitat across the forest.

Energy and Minerals

Only a small percentage of PHMA would be closed to nonenergy leasable minerals. Although R2 sensitive species occurrences are generally protected from disturbance, some sensitive species habitat may be open to leasing, including new lease expansion. This alternative could allow habitat loss and degradation of sagebrush habitat. There could be physical damage or death to individual plants if undiscovered individuals occur in the energy and minerals activity areas. Other impacts may include new infestations of noxious or invasive weeds, physical damage, or erosion, sedimentation, and soil compaction. Species that depend on sparse vegetation conditions could benefit from the disturbance but not the other impacts, such as plant loss, habitat loss, spread of invasive weeds, or soil compaction.

Fire and Fuels Management

There would be few restrictions for fuels management in sagebrush. Therefore Alternative A could allow a large amount of habitat loss and sagebrush habitat degradation. There could be physical damage or death to any undiscovered individual plants. Other impacts may include new infestations of noxious or invasive weeds, physical damage, erosion, or sedimentation. Fire-adapted plant species and plant species that favor early successional habitats could benefit. However, species dependent on mature plant communities could be negatively affected by fire and associated changes in vegetation.

Additional impacts on sensitive plant species could result from the direct and indirect effects of fire suppression. The creation of fire lines could result in direct mortality to individual plants or negative impacts associated with alteration of their habitat through soil disturbance, alteration of hydrology, and promotion of the establishment or spread of invasive nonnative species.

Applying fire retardant can negatively impact some plant species by killing entire plants, burning shoots and leaves, and reducing germination rates (Bell et al. 2005). Fire retardant also can have fertilizing effects and promote the spread of invasive nonnative species (Bell et al. 2005). Longer term impacts on plant species could occur from fire suppression. Fire suppression may initially result in higher rates of pinyon-juniper encroachment in some areas. In the initial stages of encroachment (phase I), fuel loadings remain consistent with the sagebrush understory. As pinyon-juniper encroachment advances (Phases II and III) and the understory begins to thin, the depleted understory causes the stands to become resistant to wildfire and further alters fire return intervals. During years of high fire danger, the resulting heavy fuel loadings in these stands can contribute to larger-scale wildfire events and confound control efforts due to extreme fire behavior. Such high-severity fires can negatively impact native plant species by promoting the establishment of exotics (Hunter et al. 2006).

Although impacts from fire and fuels management could occur on any of the sensitive plants in Table 3, those for which fire has been identified as a major potential threat are dropleaf buckwheat, lesser panicled sedge, and Rocky Mountain monkeyflower.

Cumulative Effects on All Plant Species Evaluated

There could be cumulative effects in addition to the impacts described above. These plants occur on private, state, and BLM-administered land next to the RNF. Potential effects described above may also occur on other ownerships. There are some existing conservation measures on these other lands, especially those administered by the BLM. There could be additional plant and habitat loss, degradation, soil compaction, or invasive weed spread from recreation and travel, ROWs, energy and mineral development, fire and fuels treatments, range management, or other activities in sagebrush habitat outside the RNF.

On the RNF, the limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, and D. Under Alternative A, the direct and indirect effects in conjunction with the past, present, and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change may increase loss and fragmentation of the existing sagebrush habitat from wildfire, which could contribute to negative cumulative impacts on sensitive plants.

Summary of Alternative A

Under Alternative A, the No Action Alternative, current management actions would continue unchanged. The condition of terrestrial and aquatic plant populations in GRSG-designated habitat would continue to reflect the effects of all past and current management activities. Direct effects on all plant species habitat under current management are trampling by livestock, wildlife, motor vehicles, and foot traffic), damage from fire, and grazing. Potential indirect effects are soil compaction, erosion, sedimentation, competition from invasive species, habitat fragmentation, and hydrological condition alteration. These impacts can physically damage individuals, populations, and the habitat where they grow. This may reduce growth, development, and seed set. Such impacts may also cause mortality of individuals. These impacts on individual plants can reduce population size, change meta-population structure, and potentially affect the viability of the species on the planning unit or across the species' range.

Seven Region 2 sensitive plant species—*Eleocharis elliptica*, *Machaeranthera coloradoensis*, *Malaxis brachypoda*, *Salix candida*, *Selaginella selaginoides*, *Triteleia grandiflora*, and *Viola selkirkii*—have not been found in the project area or in the counties where the project is located, and their habitats are much less likely to occur there. For those species, Alternative A would have **no impact**.

Existing conservation measures limit some but not all impacts on plant species. Although no Region 2 sensitive plants have been found in the analysis area, for species with a greater likelihood of habitat in the analysis area, impacts on potentially suitable habitat would be possible. Therefore the determination for this alternative “**may adversely impact individuals, but not likely to result in a loss of viability in the analysis area, nor cause a trend toward federal listing**” for *Astragalus leptaleus*, *Botrychium lineare*, *B. paradoxum*, *Carex diandra*, *Eriogonum exifolium*, *Eriophorum gracile*, *Ipomopsis aggregate* ssp. *weberi*, *Mimulus gemmiparus*, *Penstemon harringtonii*, *Potentilla rupincola*, *Rubus arcticus* var. *acaulis*, *Salix serissima*, and *Utricularia minor*.

L. Effects of Alternative B on Sensitive Plant Species

Alternative B would place a 3 percent cap on disturbance in the PHMA, which accounts for approximately 13 percent of the analysis area. Outside the PHMA, activities would continue under current management.

Recreation and Travel

Under Alternative B there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of current roads. In addition, recreational use permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG.

Alternative B measures allow less habitat degradation or loss than Alternative A and would retain more sagebrush habitat and more undisturbed sagebrush habitat. If they were to occur in PHMA, sensitive plants and habitat would improve relative to the effects of Alternative A. Impacts, largely positive, are limited road construction resulting in less use, road density, recreational disturbance, opportunities for collisions, and reduced indirect impacts on adjacent areas from sedimentation to wetland systems. Therefore sensitive plant species with suitable habitat in these areas are likely to benefit from added management direction under Alternative B compared to Alternative A. Since only a very small portion of the RNF is considered PHMA, the effects would likely be minor to negligible, but any management direction leading to conservation would be a positive effect.

The 3 percent cap on disturbance would reduce but not eliminate the potential direct and indirect effects described in Alternative A. Reductions in the amount of disturbance could benefit individuals and populations of species that occur in meadow or shrublands habitats but would not likely affect any species as a whole. Of course, benefits would occur only on PHMA, not all habitat for these plants. Species outside PHMA would still be subject to direct effects, as described for Alternative A.

Lands and Realty

Under Alternative B, PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating conservation for GRSG and other species that depend on sagebrush ecosystems. The RNF would keep and work to acquire PHMA. This would result in little to no degradation, fragmentation, and loss of sensitive species habitat in GRSG PHMA; however, this restriction may shift land and realty project focus to GRSG designated GHMA or other non-grouse habitat types. In non-PHMA, permitted ROWs would likely have effects similar to those addressed in Alternative A. Alternative B conservation measures for GRSG would be more protective than conservation measures in Alternatives A and D but would be less protective than Alternative C. Alternative B represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats, thus indirectly benefiting other sensitive species that use these habitats.

Range

Alternative B proposed conservation measures would benefit 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 to protect habitat. GRSG PHMA accounts for 13 percent of all GRSG habitat in the RNF, so changes would be variable and localized. There could be areas of improved habitat for plant health, growth, development, root storage, or seed set. Species requiring open ground and sparse vegetation cover could benefit from ground disturbance but not the

associated impacts, such as plant loss, habitat loss, compaction, or weed increases. Proposed adjustments, timing, stocking rates, and residual cover, would likely provide a minor but positive effect on habitat and decrease the likelihood for trampling and disturbance for sensitive plant species using areas in PHMA.

The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to localized habitat improvements; however, these improvements would likely be considered insignificant to sensitive species at the forest scale, particularly for those species that use a broader range of habitat types.

Energy and Minerals

Under this alternative, PHMA would be closed to new fluid mineral leases and existing leases would have a 4-mile NSO buffer around leks. Presumably, the above protective measures would be expected to benefit those sensitive plant species whose ranges or habitat are coincident with GRSG PHMA. This restriction could create impacts on other adjacent habitat types if there were interest in energy or mineral development under the NSO. Direct impacts on plant habitats from construction and operation of energy or mineral facilities would be similar to impacts for ROWs and could include direct plant loss, habitat loss, fragmentation and degradation.

Though currently there are no known active GRSG leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, thereby improving conditions for sensitive species that may use areas mapped as PHMA. This alternative may shift energy and mineral development to less desirable sagebrush or non-sagebrush habitat; there may be lingering effects of not protecting all sagebrush or ADH. This alternative would minimize or eliminate the likelihood for impacts on sensitive plant species using PHMA

Fire and Fuels Management

GRSG habitat, specifically PHMA, would have additional management direction designed to protect PHMA from wildfire and ensure that effects from fuels management are accomplished in a manner that benefits or does not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. This would be a benefit to sensitive plant species that use PHMA habitats.

Cumulative Effects on All Plant Species Evaluated

Cumulative effects for Alternative B would be similar to those described for Alternative A. However, because this alternative places a 3 percent cap on new disturbance in the PHMA the magnitude of cumulative impacts could be less than that described for Alternative A. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive plant species over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability issues in the RNF.

Summary of Alternative B

Alternative B limits loss, fragmentation, and disturbance in PHMA to 3 percent of the area. So, there would be benefits to individual plants and habitat in PHMA. None of the proposed GRSG design criteria is specific to sensitive plant species. Implementing the criteria would likely reduce but not

eliminate direct and indirect effects on sensitive plants and habitat in sagebrush. Generally, activities in GHMA and the remaining sagebrush habitat would occur as they do currently or could expand as existing direction allows. Overall impacts would be reduced slightly, compared to Alternative A.

Seven Region 2 sensitive plant species have not been found in the project area or in the counties where the project is located, and their habitats are much less likely to occur there. For those species—*Eleocharis elliptica*, *Machaeranthera coloradoensis*, *Malaxis brachypoda*, *Salix candida*, *Selaginella selaginoides*, *Triteleia grandiflora*, and *Viola Selkirkii*—Alternative B would have **no impact**.

Existing conservation measures limit some but not all impacts on plant species. Although no Region 2 sensitive plants have been found in the project area, for species with a greater likelihood of habitat in the project area, impacts on potentially suitable habitat would be possible. Therefore the determination for 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 leptaleus*, *Botrychium lineare*, *Botrychium paradoxum*, *Carex diandra*, *Cypripedium parviflorum*, *Eriogonum exifolium*, *Eriophorum gracile*, *Ipomopsis aggregata* ssp. *weberi*, *Mimulus gemmiparus*, *Penstemon harringtonii*, *Potentilla rupincola*, *Rubus arcticus* var. *acaulis*, *Salix serissima*, and *Utricularia minor*.

M. Effects of Alternative C on Sensitive Plant Species

This alternative would place a 3 percent cap on disturbance in PHMA and GHMA (the entire 12,500-acre analysis area). Closure to grazing would further reduce disturbance in ADH.

Recreation and Travel

Under this alternative, road and trail construction would be limited in ADH, and no new roads would be constructed within 4 miles of a lek or occupied habitat. Under this alternative, effects would be similar to those under Alternative B, except that it would apply to ADH and not just PHMA. This is the most restrictive alternative for recreation and travel.

There would be very few if any negative effects from this alternative on sensitive plant species occurring in ADH as a result of recreation or travel related projects. Any sensitive plants or habitat in any of the ADH would largely be protected, and the impacts would likely be positive, such as reduced siltation/sedimentation of ponds, wetlands, or streams, slightly improved and likely largely undisturbed habitat, and less human disruption.

Lands and Realty

Under this alternative, ADH would be exclusion areas for ROWs and special use permits. The RNF would keep and seek to acquire GRSG ADH where interest and opportunities exist. This would result in little to no degradation, fragmentation, and loss of sensitive plant habitat in all areas of ADH. In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat conservation and management. This alternative would be expected to have the least potential for negative impacts and the greatest potential for positive impacts on sensitive plant species whose ranges overlap with PHMA and GHMA.

Range

Alternative C would eliminate grazing in ADH. If this happened, impacts from livestock grazing would be reduced. The direct effects of changes to vegetation condition due to grazing and the potential for trampling of individuals, as well as the indirect effects of erosion and sedimentation

caused by domestic livestock, would be removed. Wild ungulates would still create some of these types of impacts, though to a lesser degree due to lower concentrations. This management action would result in greater vegetation cover and habitat quality for GRSG and sagebrush associated species. Palatable forbs may increase, allowing improved conditions for pollinators.

With the removal of grazing and potential increases in the amount of fine fuels, the potential for fire may increase. Removing domestic livestock may increase forage available to wildlife. This may increase wildlife numbers and, if wildlife populations were to increase, the negative effects of herbivory and trampling may return to levels previously experienced under domestic grazing. These indirect effects could cancel the beneficial direct effects previously described.

Energy and Minerals

Under this alternative, ADH would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. Presumably, the protective measures would benefit those sensitive plant species whose ranges or habitat are coincident with all designated GRSG habitat or the buffer. Under Alternative C, effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH. There would be reduced physical damage or death to individual plants, reduced infestations of noxious or invasive weeds, and reduced erosion, sedimentation, and soil compaction.

Fire and Fuels Management

Alternative C would aim to protect and restore sagebrush habitats in all designated GRSG habitat using native seed post fire, with all burned areas closed to grazing post wildfire. Any reduction in wildfire near and around sagebrush habitats would likely benefit GRSG and other sensitive species in the short term. Alternative C extends management direction throughout ADH, as opposed to just priority habitat as under Alternative B, thus increasing the potential for retaining larger areas of sagebrush ecosystem in a condition more suitable for GRSG. This may improve opportunities for population expansion in the future. Under this alternative, the effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH. This alternative would not increase the open habitat that some plants need for establishment and spread.

Cumulative Effects on All Plant Species Evaluated

The cumulative effects for Alternative C would be similar to those described for Alternatives A and B. Because this alternative limits the level of disturbance in both PHMA and GHMA, the magnitude of cumulative impacts could be less than those for either Alternative A or Alternative B. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive plant species over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability issues in the RNF.

Summary of Alternative C

This alternative limits habitat loss, fragmentation, and degradation in ADH across the analysis area, providing conservation for sensitive plant habitat. However, none of the proposed GRSG conservation measures are specific to sensitive plant species. Implementing the conservation measures would likely reduce, but not eliminate, direct and indirect effects on sensitive plant habitat or any undiscovered sensitive plants growing in GRSG habitat. Generally, activities in the sagebrush habitat outside ADH

would occur as they do currently or could expand as existing direction allows. Overall, impacts on sensitive plants would be reduced, compared to all other alternatives.

Seven Region 2 sensitive plant species have not been found in the project area or in the counties where the project is located, and their habitats are much less likely to occur there. For those species—*Eleocharis elliptica*, *Machaeranthera coloradoensis*, *Malaxis brachypoda*, *Salix candida*, *Selaginella selaginoides*, *Triteleia grandiflora*, and *Viola selkirkii*)—Alternative C would have **no impact**.

Existing conservation measures limit some but not all impacts on plant species. Although no Region 2 sensitive plants have been found in the project area, for species with a greater likelihood of habitat in the project area, impacts on potentially suitable habitat would be possible. Therefore the determination for 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 leptaleus*, *Botrychium lineare*, *B. paradoxum*, *Carex diandra*, *Cypripedium parviflorum*, *Eriogonum exifolium*, *Eriophorum gracile*, *Ipomopsis aggregata* ssp. *weberi*, *Mimulus gemmiparus*, *Penstemon harringtonii*, *Potentilla rupicola*, *Rubus arcticus* var. *acaulis*, *Salix serissima*, and *Utricularia minor*.

N. Effects of Alternative D on Sensitive Plant Species

Alternative D would apply a 5 percent disturbance cap in ecological sites that support sagebrush in PHMA, calculated in CMZs. Range management would aim to meet GRSG habitat objectives in ADH. Most protections from fire and fuels management activities would apply to ADH.

Recreation and Travel

Under this alternative, the effects of most proposed management actions would be similar to Alternative B, with the exception that more flexibility or discretion would be given to the land management agency to allow route construction in PHMA, road improvements, and issuance of special use permits if it is determined that these actions would not adversely affect GRSG. The exceptions to this would be that any new roads could be constructed to the highest standard, and the amendment would allow upgrading roads based on no adverse effect on GRSG. Under Alternative B, if GRSG populations and habitats were healthy or improving, disturbance above the 5 percent cap could be permitted for the CMZs (See the Greater GRSG section above). The effects of this alternative could include greater disturbance to sensitive plant habitat compared to Alternatives B or C, although differences are minor, and overall effects from recreation and travel are likely insignificant in the RNF due to the limited extent of designated GRSG habitat.

Lands and Realty

This alternative is similar to Alternative B, with the major differences being no ROW would be permitted in PHMA, with the exception of transmission lines for Alternative D. This would result in the potential for minimal impacts from lands and realty management in PHMA, but could shift impacts to GHMA or other habitat types. In non-PHMA, permitted ROW would likely have effects similar to those addressed in Alternative A.

Under Alternative D, PHMA would be managed as an avoidance area, but new ROW projects would be allowed in designated corridors. ROW would also be allowed in PHMA if the project would not adversely affect GRSG populations. This alternative would be more protective than Alternative A, but less protective than Alternatives B and C for sensitive plant species and potential habitat. However, due to the limited amount of GRSG habitat on RNF the effects would be similar to Alternatives B and C.

Range

Alternative D would be similar to Alternative B but would be slightly more restrictive because GRSG habitat objectives in grazing allotments would be applied to ADH and not just PHMA. This alternative would have more management direction than Alternatives A and B, resulting in benefits to sensitive plant species, but benefits would be less than under Alternative C. Generally speaking, if GRSG habitat were taken into consideration before applying the management action, then GRSG and sensitive plant species would likely benefit from that protection or management action.

Energy and Minerals

Under Alternative D, ADH would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. However, with some mineral development, this alternative would allow up to 5 percent disturbance in any CMZ (see the GRSG section above). Direct effects would be similar to those associated with Alternative B. There could be a few more impacts if the disturbance allowance were increased from 3 percent under Alternative B to 5 percent.

Fire and Fuels Management

Alternative D is generally the same as Alternative B, except that it extends most protections across ADH not just PHMA. It would be the most restrictive for fire and fuels management and thus the most protective for sensitive plant species for fire and fuels management. This alternative would help reduce the localized threats to ADH from fire, compared to Alternative A. This would benefit most sensitive plant habitat in ADH.

Cumulative Effects of Alternative D

Cumulative effects for Alternative D would be similar to those for Alternatives A and B. However, because this alternative places a 5 percent cap on new disturbance in the PHMA, the magnitude of disturbance could be more than described for Alternative B. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive plant species over a threshold toward a federal listing; nor would they cause concerns for population loss or species viability issues in the RNF.

Summary of Alternative D

Alternative D has provisions that fall between those of Alternatives A and B. It does include a cap on disturbance in PHMA, while there is no similar limit under Alternative A. The allowance of 5 percent disturbance in PHMA would allow some additional habitat loss and degradation. Limited conservation in the remaining sagebrush habitat could allow changes in habitat quantity, quality, and ownership in sagebrush habitat in the RNF. None of the proposed conservation measures is specific to sensitive plant species. Implementing the measures would likely reduce but not eliminate direct and indirect effects on sensitive plants growing in PHMA and some areas of ADH.

Seven Region 2 sensitive plant species—*Eleocharis elliptica*, *Machaeranthera coloradoensis*, *Malaxis brachypoda*, *Salix candida*, *Selaginella selaginoides*, *Triteleia grandiflora*, and *Viola selkirkii*—have not been found in the project area or in the counties where the project is located, and their habitats are much less likely to occur there. For those species, Alternative D would have **no impact**.

Existing conservation measures limit some but not all impacts on plant species. Although no Region 2 sensitive plants have been found in the project area, for species with a greater likelihood of habitat in the project area, impacts on potentially suitable habitat would be possible. Therefore the determination for 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 leptaleus*, *Botrychium lineare*, *B. paradoxum*, *Carex diandra*, *Cypripedium parviflorum*, *Eriogonum exifolium*, *Eriophorum gracile*, *Ipomopsis aggregata* ssp. *weberi*, *Mimulus gemmiparus*, *Penstemon harringtonii*, *Potentilla rupincola*, *Rubus arcticus* var. *acaulis*, *Salix serissima*, and *Utricularia minor*.

O. Effects of the proposed plan on Sensitive Plant Species

The proposed plan would apply a 3 percent disturbance cap to PHMA, calculated in a Biologically Significant Unit (CMZ). The proposed plan expands many of the conservation measures in Alternative B to all designated GRSG habitat. Grazing use guidelines would be applied in each of the seasonal GRSG habitats, and other grazing guidelines would focus on protecting areas within 1.2 miles of active leks (regardless of which type of habitat the lek is in). Most protections from fire and fuels management activities would apply to ADH.

Recreation and Travel

Similar to Alternative C, the proposed plan would prohibit new road or trail construction in PHMA and GHMA, except when necessary for administrative access, public safety, or access to valid existing rights. This is more restrictive than Alternatives B and D, where a similar restriction applies only to PHMA. For travel management activities, the effects of the proposed plan could result in less disturbance to sensitive plant habitats, compared to Alternatives B or D, and would be similar to Alternative C.

Under Alternatives B, C, and D, recreation SUAs would be allowed in PHMA only for activities without the potential to adversely affect GRSG or its habitat. Under the proposed plan, this same guideline exists for SUAs in PHMA, but it should not be approved unless the development results in a net conservation gain to GRSG or their habitats or the development is required for visitor safety. In addition, the proposed plan would not allow temporary recreation facilities or activities in either PHMA and GHMA that would result in loss of habitat or would have long-term (greater than 5 years) negative impacts on GRSG or their habitats. Terms and conditions that protect or restore GRSG habitat should be included in recreation SUAs in both PHMA and GHMA. For authorizations of recreation facilities or activities, fewer disturbances to sensitive plant habitats would be expected because of the additional restrictions in GHMA, compared to Alternatives B, C, and D. For sensitive plants, the differences are minor, and overall effects from recreation and travel are likely insignificant in the RNF due to the limited extent of designated GRSG habitat.

Lands and Realty

Whereas Alternatives B and C would make PHMA exclusion areas for new SUAs, Alternatives D and the proposed plan make PHMA avoidance areas for new SUAs. In addition, the proposed plan makes GHMA avoidance areas for new SUAs, and no new roads or aboveground structures would be authorized within 1 mile of an active lek (regardless of the type of GRSG habitat). This alternative would be more protective than Alternative A but slightly less protective than Alternatives B and C for sensitive plant habitats in PHMA. However, the proposed plan is the most restrictive in GHMA because it also makes GHMA avoidance areas for new SUAs. Therefore in PHMA the effects of this alternative on sensitive plant habitats would be similar to Alternative D (less restrictive than

Alternatives B or C), but more restrictions would apply in GHMA compared to all of the other alternatives.

Range

The proposed plan would be similar to Alternative D, but it would be slightly less restrictive because GRS habitat objectives in grazing allotments would be applied to GRS seasonal habitats (wherever they occur) instead of throughout all designated GRS habitat. This may result in grazing restrictions being implemented on fewer acres, and thus benefits to GRS and sensitive plant habitats could be slightly less than Alternative D. Because Alternative C proposes to remove livestock grazing entirely in all designated GRS habitats, that alternative would still benefit sensitive plant habitats the most. Sensitive plant habitats would benefit more from the proposed plan because it includes more restrictive management direction than Alternatives A and B.

Energy and Minerals

Under the proposed plan, in PHMA, any new oil and gas leases must include a NSO stipulation. In terms of overall disturbance allowed, this alternative is similar to Alternative B due to a 3 percent cap being applied to PHMA. However, the proposed plan uses CMZs as the basis for calculating the total disturbance. The proposed plan would be less restrictive than Alternative C, which applies a 3 percent disturbance cap to PHMA and GHMA, and would be more restrictive than Alternative D, which applies a 5 percent disturbance cap to PHMA. Sensitive plant habitats would benefit from disturbance restrictions at a level commensurate with the extent and level of the restrictions applied.

Fire and Fuels Management

The proposed plan is similar to Alternatives C and D because it extends most protections across ADH, not just PHMA. Alternatives C, D, and the proposed plan are the most restrictive for fire and fuels management, therefore it is the most protective for sensitive plant habitats for fire and fuels management activities. This alternative would help reduce the localized threats to sensitive plant habitats in ADH from fire, compared to Alternatives A and B.

Cumulative Effects of The proposed plan

Cumulative effects for the proposed plan would be similar to those described for Alternatives A and B. Overall, impacts on sensitive plant habitats would be more than under Alternative C and less than under Alternative D. Given the small area of the RNF affected by this proposed LRMP amendment, its programmatic scale, and the requirements for analysis of site-specific projects, when combined with the potential impacts of this action, the impacts of other projects are not expected to cumulatively push any of the sensitive plant species over a threshold toward a federal listing; nor would the impacts cause concerns for population loss or species viability issues in the RNF.

Summary of The proposed plan

Generally, this alternative has provisions that fall between those of Alternatives C and D. This alternative includes a cap on disturbance in PHMA, while there is no similar limit under Alternative A. The allowance of 3 percent disturbance in PHMA could allow some additional habitat loss and degradation. Limited conservation in the remaining sagebrush habitat could allow changes in habitat quantity, quality, and ownership in sagebrush habitat in the RNF. Although none of the proposed conservation measures is specific to sensitive plant species, implementing the measures would likely

reduce but not eliminate direct and indirect effects on sensitive plants growing in PHMA and some areas of ADH.

Seven Region 2 sensitive plant species—*Eleocharis elliptica*, *Machaeranthera coloradoensis*, *Malaxis brachypoda*, *Salix candida*, *Selaginella selaginoides*, *Triteleia grandiflora*, and *Viola selkirkii*—have not been found in the project area or in the counties where the project is located, and their habitats are much less likely to occur there. For those species, the proposed plan would have **no impact**.

Existing conservation measures limit some but not all impacts on plant species. Although no Region 2 sensitive plants have been found in the project area, for species with a greater likelihood of habitat in the project area, impacts on potentially suitable habitat would be possible. Therefore the determination for 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 leptaleus*, *Botrychium lineare*, *B. paradoxum*, *Carex diandra*, *Cypripedium parviflorum*, *Eriogonum exifolium*, *Eriophorum gracile*, *Ipomopsis aggregata* ssp. *weberi*, *Mimulus gemmiparus*, *Penstemon harringtonii*, *Potentilla rupicola*, *Rubus arcticus* var. *acaulis*, *Salix serissima*, and *Utricularia minor*.

MANAGEMENT INDICATOR SPECIES REPORT

I. INTRODUCTION

The National Forest Management Act directs National Forests to identify MIS. MIS are chosen as a representative of certain habitat conditions important to a variety of other species. [The previous sentence is not complete – MIS are chosen to meet one of 5 different criteria] MIS are generally presumed to be sensitive to habitat changes.. According to the Routt National Forest LRMP Amendment 4 (Forest Service 2007a, 2007b), MIS for the RNF include the six terrestrial and aquatic wildlife species listed in Table 9. There are no plant MIS in the RNF.

Table 9. RNF Revised MIS list

Common Name	Scientific name
Golden-crowned kinglet	<i>Regulus satrapa</i>
Northern goshawk	<i>Accipiter gentilis</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>
Brook trout	<i>Salvelinus fontinalis</i>

MIS were reviewed to determine which are present or have habitat in the analysis area and to identify those likely to be affected by the implementation of a management decision. Table 10 outlines RNF MIS, their presence in the analysis area, and anticipated effects due to implementation of an action alternative.

Table 10. RNF MIS

Common Name	Management Issue	Species Present in ADH in the RNF?	Habitat Present in ADH in the RNF?	Summary of Anticipated Effects on MIS from Implementing an Action Alternative
Golden-crowned kinglet	Spruce-fir timber management	No	No	There are no records of the species or habitat in mapped PHMA or GHMA habitat. Implementing the alternatives would not change populations of golden-crowned kinglets or its habitat. Therefore this species <u>is not evaluated</u> in more detail.
Northern goshawk	Lodgepole pine timber management	No	No	There are no records of the species or habitat in mapped PHMA or GHMA habitat. Implementing the alternatives would not change populations of northern goshawk or its habitat. Therefore this species <u>is not evaluated</u> in more detail.
Vesper sparrow	Rangeland residual forage	Yes	Yes	There are records of the species in PHMA and GHMA habitat. The alternatives propose some changes to grazing management in PHMA and GHMA, so populations of vesper sparrow could respond to changes in grazing management under each of the alternatives. Therefore this species is evaluated in more detail in this analysis under each of the alternatives.
Wilson’s warbler	Herbivory in riparian areas	No	No	There are no records of the species in the analysis area. It generally breeds in willow thickets of lakeshores, streambanks, and wet meadows, at or just above the timberline at higher elevation subalpine meadows. The alternatives propose some changes to grazing management, but it is not anticipated that these actions will affect in more than a negligible way the Wilson’s warbler or its habitat. This species <u>is not evaluated</u> in more detail.
Colorado River cutthroat trout/brook trout	Aquatic habitat fragmentation and sedimentation of riparian areas and aquatic habitats	Yes /Yes	Yes/Yes	There are records of these species in streams in the analysis area and next to PHMA and GHMA habitat. In addition, all fish-bearing streams in the analysis area likely contain brook trout. The alternatives propose some changes to grazing management in PHMA and GHMA, so populations of CRCT and brook trout could respond to changes in grazing management under each of the alternatives. Therefore these species are evaluated in more detail in this analysis under each of the alternatives.

II. MIS EVALUATIONS

A. Vesper sparrow (*Poocetes gramineus*)

The vesper sparrow was selected as an MIS to represent issues associated with rangeland residual forage. Vesper sparrows are primarily summer residents in the RNF and use grass/forb habitats in or near the forest for breeding. Refer to the Environmental Assessment for Management Indicator Species Forest Plan Amendment 4 and the associated decision notice for more information regarding this species' selection as an MIS (Forest Service 2007b).

Natural History—Vesper sparrows breed in grasslands, open shrublands mixed with grasslands, and open pinyon-juniper woodlands. Vesper sparrows have two broods per nesting season with 3 to 6 eggs per clutch (Kingery 1998). This species seeks a narrow set of habitat conditions in its nesting range (middle to high elevation sagebrush and grassland habitats), and subtle changes in these conditions, such as reductions in residual grass and forbs, can impact essential nesting habitat components (Kingery 1998). The vesper sparrow is a common summer resident in foothills (and adjacent lowlands) and mountain parks, a fairly common spring and fall migrant in western valleys, foothills, mountain parks, and on eastern plains.

In migration this sparrow occurs in open riparian and agricultural areas (NDIS 2005). *Breeding Bird Atlas* (Kingery 1998) data show that, in Colorado, the densest populations occur in middle to high elevation sagebrush. The *Breeding Bird Atlas* also shows that montane grasslands support high population densities, as do lower elevation sagebrush grasslands in northwestern Colorado. Sparsely or patchily distributed shrubs with a good grass cover make the best habitat (Kingery 1998). It is rare in late summer and fall above the timberline. There are about 20 winter records in the western valleys of Colorado, mostly in Mesa County, and on the eastern plains near foothills from Larimer County southward. It appears that this species is occasionally present in these areas during the winter (NDIS 2005).

Population Status, Abundance, and Trend—Vesper sparrows are primarily summer residents in the RNF and use grass/forb habitats in or near it for breeding. The 2008 report (Blakesley 2008) concluded that density estimates of Vesper sparrows in sage/mountain meadow habitat were slightly lower in the RNF than statewide for 2005 to 2007, although 90 percent confidence intervals of the two samples overlapped in two of the three years (Table 11, Figure 2). Results from 2009 further support this trend. In 2010, the sample sites were changed. This change places more of an emphasis on sensitive species and was not specifically stratified with the detection of MIS in mind. With limited samples since that time, there have been no adequate detections to estimate densities of vesper sparrow in the RNF (Tables 10-11). The change in density and data availability are an artifact of the change in sampling technique and are not likely representative of a change in vesper sparrow population status or trends.

Rout National Forest MIS Monitoring—The RNF has an established protocol for monitoring the vesper sparrow as an MIS. This protocol is based on point transect sampling and distance analysis. The protocol identifies an approach to compare the RNF trend-to-trend at the scale of the Colorado and evaluate if the rate of change between the two trends is significantly different (Skorkowsky and Dolan 2005).

A preliminary analysis was conducted in 2005 (Lukacs 2005). An additional analysis was completed in 2008 (Blakesley 2008).

Table 11. Estimated Densities of Vesper Sparrow in Sage/Mountain Meadow Habitat Throughout Colorado, 1999-2007, and in the RNF, 2005-2007 (Blakesley 2008)

Year	Colorado					RNF Planning Area				
	D	LCL	UCL	% CV	n	D	LCL	UCL	% CV	n
1999	16	10	26	30	145					
2000	37	21	64	34	210					
2001	19	13	30	26	172					
2002	21	14	33	26	175					
2003	29	20	43	24	153					
2004	22	16	31	20	179					
2005	40	28	57	21	231	12	4	32	59	26
2006						13	6	29	46	40
2007	47	30	74	28	346	24	12	46	39	59

D = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90 percent confidence limits on *D*; *Percent CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*

Table 12. Vesper Sparrow Density for Colorado and the RNF from 2008-2011 (Blakesley and Hanni 2009; Blakesley et al. 2010; White et al. 2011; White et al. 2012)

Year	State of Colorado						RNF		
	D	N	SE	%CV	90 % CI (lower)	90 % CI (High)	n	D	% CV
2008	0.46	120,906	50,346	42	55,216	264,746	7	0.59	48
2009	-	-	-	-	-	-	7	0.5	49
2010	6.18	1,667,129	-	17	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-

D = estimated density (birds/km²); *N* = XXX; *SE* = XXX; *Percent CV* = percent coefficient of variation of *D*; *Percent CI* = XXX; *n* = number of observations used to estimate *D*.

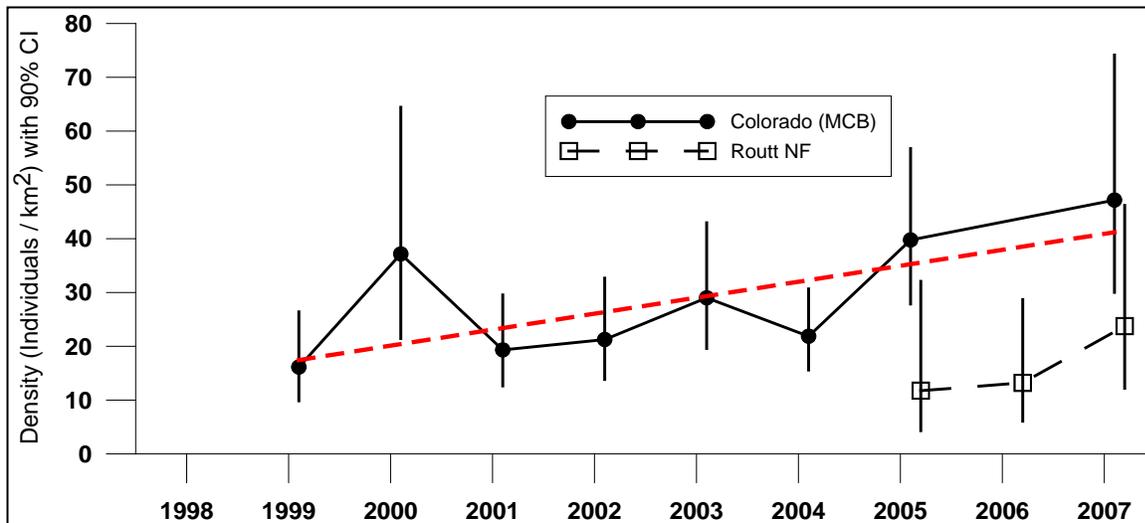


Figure 2. Estimated densities of vesper sparrow in sage/mountain meadow habitat throughout Colorado, 1999-2007, and in the RNF, 2005-2007. Error bars represent 90 percent confidence intervals. The red dashed line represents the best estimate of observed population trend.

Table 13. Vesper Sparrow Unadjusted Counts for the RNF (All Cover Types) 1998-2011

Year	Effort (Number of Points Sampled)	Number of Vesper Sparrows Observed)	Vesper Sparrow Relative Abundance
1998	75	0	0
1999	195	10	0.051
2000	213	13	0.061
2001	180	7	0.039
2002	210	20	0.095
2003	135	10	0.074
2004	197	22	0.112
2005	560	33	0.059
2006	621	57	0.092
2007	579	84	0.145
2008	239	9	0.038
2009	106	0	0
2010	228	0	0
2011	337	0	0

On the RNF, the vesper sparrow was identified as the MIS species best suited to assist in evaluating this management issue related to rangeland residual forage and the specific question: Is adequate residual forage being retained for native species?

Livestock and wild ungulate grazing affects several habitat types, particularly mountain parks and aspen forests. Residual grass and forbs are important as food and cover for many species using rangeland habitats. Species affected are invertebrates, birds, small mammals, and several native predators that feed on the birds and small mammals that are associated with these communities. Retaining insufficient residual forage could affect several rangeland-associated species. Monitoring residual forage is an ongoing activity in managing rangelands and using the vesper sparrow as an MIS complements the evaluation of whether residual forage direction in the forest plan is adequate.

Population trends of this species have historically been relatively stable to slightly increasing, indicating that management approaches implemented in the RNF have been adequate to maintain vesper sparrow populations.

Within the analysis area, the RNF NRIS wildlife database contains 42 observation records for this species, indicating that suitable habitat exists in the analysis area. All but one of these observations was in the California Park and Slater Park portion of GHMA on the Hahns Peak/Bears Ears Ranger District. The other observation was on the edge of the RNF boundary in PHMA on the Parks District north of Walden.

Existing habitat conditions for vesper sparrows across the RNF are well-suited to sustain current populations of these birds. During the last 50 years, rangeland management practices have improved grassland conditions in the RNF, and vesper sparrow populations have undoubtedly stabilized as nesting and brood-rearing habitat responded positively to lower livestock numbers. Though numbers may be variable on private lands, where human encroachment and habitat alteration/conversion continues, vesper sparrow habitat appears to be improving on National Forest System lands.

Conclusions—Available population and habitat information suggests vesper sparrows in the RNF have a population trend that is currently stable. In addition, the vesper sparrow is widely distributed in the RNF and is well distributed throughout all grassland areas in Colorado. Evidence from the *Colorado Breeding Bird Atlas* (Kingery 1998) surveys across the state suggests vesper sparrow breeding pairs are present in relatively high densities across the landscape, ranking it as the 21st out of 264 most abundant breeding birds in Colorado (Kingery 1998).

Alternative A—No Action

Recreation and Travel

Under Alternative A there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the RNF. That means there would be minimal seasonal restrictions on casual use, and some of the areas in GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and disturbance to vesper sparrows. In addition, less restrictive travel conditions usually mean higher concentrations of human use next to motorized routes. This can disrupt nesting activities, causing abandonment of young and temporary displacement. However, since populations have been either stable or increasing in the

last few years in the RNF and throughout Colorado, indications are that the current recreation and travel conditions are not adversely affecting vesper sparrows.

Lands and Realty

Under this alternative, there would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. All 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 for vesper sparrows. Indirect effects may include new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest negative impact on vesper sparrows.

Range

Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing in the RNF. In addition, there would be no change to wild horse or burro management. Potential direct effects on vesper sparrow habitat could include site-specific overgrazing, cover, structure, and diversity of residual vegetation reduction due to consumption, and rangeland habitat degradation due to trampling of riparian vegetation. As current livestock grazing management has not caused a decline in vesper sparrow numbers, it is unlikely that Alternative A would have any adverse effects.

Energy and Minerals

Under this alternative, a small percentage of PHMA would be closed to nonenergy leasable mineral leasing, with most or the remainder of ADH open to leasing (including expansion of new leases), with no cap on surface-disturbing activities. As such, this alternative would cause the greatest extent of direct and indirect habitat loss, degradation, and fragmentation for vesper sparrows. There would likely also be greater negative effects from noise, increased presence of roads and humans, and anthropogenic structures in an otherwise open landscape. Recent work from developed natural gas in Wyoming gas fields (Gilbert and Chalfoun 2011) documents 10 to 20 percent declines in the abundance of the sagebrush obligates, sage sparrow and Brewer's sparrow.

Fire and Fuels Management

Alternative A would have the fewest restrictions for fuels management actions and has a high potential for vegetation disturbance. As this alternative does not prioritize fire operations beyond what has already been determined in the fire management plans for the area, potential impacts may include removing or losing large tracts of habitat due to wildfire, injuring or killing eggs or chicks, changing species movement patterns due to areas being devoid of vegetation, and the increase of nonnative or exotic grasses or weeds.

Alternative B

Recreation and Travel

Under this alternative there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of current roads. In addition, recreational use

permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG and no cross country driving were permitted in PHMA. This is more restrictive than Alternative A, reducing direct and indirect impacts on vesper sparrows by minimizing human use and disturbance and construction or upgrading of roads. This would also likely keep some areas, such as leks and GRSG nesting habitat, less disturbed and fragmented, indirectly benefiting the vesper sparrow.

Lands and Realty

Under this alternative, PHMA would be managed as an exclusion area and GHMA would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation of GRSG habitat and therefore most of the known habitat for vesper sparrows in the RNF. These conservation measures would be more protective than conservation measures under Alternatives A and D but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats indirectly benefiting the vesper sparrow.

Range

Alternative B would adjust grazing direction in GRSG PHMA. This accounts for less than 1 percent of the land cover of the RNF. The potential effects due to livestock grazing, vegetation disturbance, and range improvements are expected to be the same under Alternative B as they would be under Alternative A, except that Alternative B would provide a few more restrictions to protect vesper sparrow habitat. Not only would that minimize disturbance, but it would provide a very minor positive effect on the PHMA habitat, likely creating small pockets of improved areas for productive breeding, nesting, and brood rearing for vesper sparrow. Though this would occur at a very small scale, the effects on local populations would likely be beneficial.

Energy and Minerals

Under Alternative B, PHMA would be closed to new fluid mineral leases and existing leases would have a 4-mile NSO buffer around leks. Though currently there are no known active leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass the habitats used by vesper sparrows. This alternative may shift energy and mineral development to less desirable sagebrush or non-sagebrush habitats. As the vesper sparrow also prefers grassland areas, by minimizing the effects in sagebrush habitats, other minor negative effects may be observed if development occurs in grassland habitats.

Fire and Fuels Management

Alternative B would be the most restrictive for fire and fuels management actions, but only in PHMA. As vesper sparrows are currently found in GHMA, effects from this alternative would not largely benefit the species. Effects would be very similar to those described under Alternative A.

Alternative C

Recreation and Travel

Under this alternative, effects would be similar to those for Alternative B, except that Alternative C would apply to ADH and not just PHMA.

Lands and Realty

Alternative C would have the most protective measures for vesper sparrows. Under this alternative, ADH would be managed as an exclusion area for new ROW projects. In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat conservation and habitat contiguity. This alternative would have the greatest positive impacts on vesper sparrows because, of the observations recorded, all but one occurred in GHMA. This alternative would restrict all ROWs in ADH, thereby protecting every known observation of the species in the RNF.

Range

Under this alternative, all grazing in ADH would be discontinued. As overgrazing of livestock is the single largest threat to this species, removing domestic livestock grazing would lessen the impacts on vegetation this species uses for nesting and foraging, and it would eliminate the possibility of nest trampling. There would be no known negative effects on vesper sparrows under Alternative C, with respect to range resources. Conversely, this alternative would likely provide the most positive impacts on vesper sparrows.

Energy and Minerals

Under this alternative, the effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Fire and Fuels Management

Under this alternative, the effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Alternative D

Recreation and Travel

Under Alternative D, the effects of most suggested management actions would be similar to Alternative B, except that more flexibility or discretion would be given to the land management agency to allow route construction, road improvements, and SRP issuance in PHMA if it were determined that these actions would not adversely affect GRSG. If populations and habitats were healthy or improving, Alternative D could permit disturbance above the 5 percent cap of disturbance for the CMZ. The effects of this alternative could include small continued additive disturbances of vesper sparrow habitat and disruption of normal life history behaviors. As conditions would be monitored for GRSG, the vesper sparrow would likely benefit from the association of sagebrush habitats in the RNF.

Lands and Realty

Under Alternative D, PHMA would be managed as an avoidance area; however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PHMA if the

project would not adversely affect GRSG populations. This alternative would be more protective than Alternative A, but less protective than Alternatives B and C.

Range

Alternative D would be similar to Alternative B but would be slightly more restrictive because GRSG habitat objectives in grazing allotments would be applied to ADH and not just PHMA. This alternative would have much fewer negative impacts than Alternative A but slightly more than Alternative C. With regard to wild horses and burros, Alternative D would be similar to Alternatives B and C, but would consider all resource values in conjunction with GRSG when managing wild horses and burros. Generally speaking, if GRSG habitat were taken into consideration before the management action were applied, then vesper sparrows would likely benefit from that protection or management action.

Energy and Minerals

Under this alternative, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks, similar to Alternative B. However, with some mineral development, this alternative would allow up to 5 percent disturbance in any CMZ. Direct effects would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance were increased from 3 percent to 5 percent. However the potential for this difference to have negative impacts on vesper sparrows is minor. Therefore the effects would be similar to those described under Alternative B.

Fire and Fuels Management

Alternative D is generally the same as Alternative B except that the potential for direct habitat loss and indirect impacts would be greater under than under Alternatives B and C, due largely to the five percent disturbance cap and allowance for development to occur in PHMA (open for development). As such, this alternative would provide fewer protective measures to vesper sparrows than Alternatives B and C but more than Alternative A.

The proposed plan

Recreation and Travel

Under this alternative there would be no new road or trail construction in PHMA or GHMA. No road or trail maintenance activities would be allowed within 2 miles of an active lek during lekking (March 1 to April 30). In addition, recreation use permits would be given in PHMA or GHMA only if there were a neutral or beneficial impact on GRSG. This alternative is more restrictive than Alternative A, reducing direct and indirect impacts on vesper sparrows by minimizing human use and disturbance and constructing or upgrading roads. This would also likely keep some areas, such as leks and GRSG nesting habitat, less disturbed and fragmented, thereby indirectly benefiting the vesper sparrow. Since only a very small portion of the RNF is considered PHMA, the effects would likely be minor to negligible, but any management direction leading to conservation would be a positive effect.

Please refer to the recreation and travel section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Lands and Realty

Under this alternative, PHMA and GHMA would be managed as avoidance areas for new SUA projects. No new roads or aboveground structures would be authorized within 1 mile of an active lek. PHMAs and GHMAs would be managed as avoidance areas for high voltage transmission lines (greater than 100 kilovolts). In addition, the proposed plan would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating conservation for GRSG and other species that depend on sagebrush ecosystem, and therefore most of the known habitat for vesper sparrows in the RNF. These conservation measures would be more protective than the conservation measures in Alternatives A and D but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats, indirectly benefiting the vesper sparrow.

Please refer to the lands and realty section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Range

The proposed plan would adjust grazing direction in PHMA. This is less than 1 percent of the land cover of the RNF. The potential effects under the proposed plan of livestock grazing, vegetation disturbance, and range improvements are expected to be very similar under Alternative A, except that there would be a few more restrictions to protect vesper sparrow habitat. Not only would that minimize disturbance, but it would provide a very minor positive effect on the PHMA habitat, likely creating small pockets of improved areas for productive breeding, nesting, and brood rearing for vesper sparrows. Though this would occur at a very small scale, the effects on local populations would likely be beneficial.

Please refer to the rangeland management related section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Energy and Minerals

Under this alternative, no new leasing in ADH would be allowed within 1 mile of an active lek. There would be NSO in PHMA and within 2 miles of active leks in GHMA. A no activity buffer within 4 miles of active leks from March 1 to July 15 would be enforced. For wind and solar projects, PHMA would be excluded and GHMA would be avoidance areas. PHMAs would be closed to new mineral material sales and new nonenergy mineral leasing. NSO would be precluded on existing nonenergy leasable mineral leases within 2 miles of active leks in PHMAs. Though currently there are no known active leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for the most important GRSG habitats, which would encompass the habitats used by vesper sparrow. This alternative may shift energy and mineral development to less desirable sagebrush or non-sagebrush habitats. As the vesper sparrow also prefers grassland areas, by minimizing the effects in sagebrush habitats, other minor negative effects may be observed if development occurs in grassland habitats.

Please refer to the energy and minerals related section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Fire and Fuels Management

GRSG habitat, specifically PHMA, would have additional management direction designed to promote the protection of PHMA from wildfire and to ensure that effects from fuels management are accomplished in a manner that benefits or does not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. Because vesper sparrows are currently found in GHMA, effects from this alternative would not largely benefit the species. The effects would be very similar to those described for Alternative A.

Please refer to the fire and fuels management related sections of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Summary

The effects on the vesper sparrow and its habitat are similar to those described for the sagebrush-associated birds in this BE. Overall, the highest potential for negative effects would be under Alternative A. Though populations of this species appear to be stable or slightly increasing, additional effects from management actions that might change the structural makeup of the vegetation could have minor detrimental effects. However, the species appears to be doing well under the current management regime. Alternative C restricts direct and indirect human disturbances on the largest number of acres (17,354 acres, or 1.5 percent of the RNF). Under this alternative, grazing would be removed from ADH. Alternatives B, D, and the proposed plan would also provide greater protections to the habitats used by vesper sparrow but would allow grazing to occur at lower intensities than currently allowed.

The vesper sparrow was identified as an MIS to assess the adequacy of residual vegetation for other native species. Under all action alternatives adequate residual forage would also be retained for these species.

B. Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*)

The CRCT was selected as an MIS to represent issues associated with aquatic habitat fragmentation and sedimentation of riparian areas and aquatic habitats. Refer to the Environmental Assessment for Management Indicator Species Forest Plan Amendment 4 and the associated decision notice for more information regarding this species selection as an MIS (Forest Service 2007).

CRCT has already been analyzed in the project BE fish section. A summary at the end of this section includes CRCT, describing the overall effects and placing in context the alternatives with respect to aquatic habitat fragmentation and sedimentation of riparian areas and aquatic habitats.

C. Brook trout (*Salvelinus fontinalis*)

The brook trout was selected as an MIS to represent issues associated with aquatic habitat fragmentation and sedimentation of riparian areas and aquatic habitats. Refer to the Environmental Assessment for Management Indicator Species Forest Plan Amendment 4 and the associated decision notice for more information regarding this species selection as an MIS (Forest Service 2007).

Natural History—Brook trout is now the most widely introduced nonnative trout species in the west. Preferred habitat is clear, cool, well-oxygenated creeks, small to medium rivers, and lakes.

The brook trout is highly adaptable to disturbance and can tolerate temperatures ranging from 0 °C to 20 °C, but it prefers temperatures of 14 to 16 °C (NatureServe 2014). It spawns from September into October. Its usual life span is approximately four years, however in higher elevation colder climates, it often does not reach reproductive maturity until four years unless it migrates to larger bodies of water (Page and Burr 1991).

Brook trout are nearly ubiquitous in most RNF watersheds. At the broadest scale, none of the common trout species (brook, brown, or rainbow) are native to Region 2. However, these desired nonnative game fish have been stocked repeatedly for more than 100 years throughout most of the Rocky Mountain Region. They are now widely distributed, commonly captured, and generally abundant in the Rocky Mountain Region as a whole. These fish occur in both stocked and wild (naturally reproducing) populations, although the distribution varies locally by habitat type and elevation as a result of minor ecological differences. Brook trout are capable of living under a wide variety of conditions, from high to low elevation, often at very high densities.

The primary threats to brook trout populations are negative factors that lower survival of large juveniles and small adults (NatureServe 2014). Introduced brook trout have contributed to the decline of native fishes, amphibians, and invertebrates. In areas identified for CRCT restoration, brook trout are targeted for eradication. Methods such as depletion-removal electrofishing have significantly reduced populations and recruitment but have not totally eradicated brook trout (NatureServe 2014).

Population Status, Abundance and Trend—Several sources of information are available and are useful for estimating current population trend and abundance for brook trout. The data used is from various sources, which include Division of Wildlife stocking reports and survey data from the analysis area. While none of these data are independently adequate to estimate brook trout population trend and abundance, and some information may even be contradictory, collectively the information affords a basis for making credible inferences about population trend and abundance.

Globally the conservation status is G5 ~ Secure and nationally is N5 ~ Secure (NatureServe 2014). NatureServe (2014) does not have a conservation status rank for Colorado because it is not a suitable target for conservation activities. In Colorado, the brook trout is a game species and can be harvested (CDOW 2007). The daily bag limit is 4 and possession limit is up to 8. In addition to this limit, the daily bag and possession limit for brook trout that are 8 inches or less is 10.

The brook trout was first introduced into Colorado in the late 1800s (CDOW 2006). In the early 1900s, state and federal hatcheries began stocking brook trout in great numbers. The numbers peaked in 1930, when 15.4 million brook trout were stocked into Colorado streams and lakes. Most streams in Colorado have a self-sustaining population of wild brook trout that likely are descendants of the nineteenth century pioneers.

At a broad scale, brook trout are found to be abundant across the streams of the RNF. For the preparation of the Forest Plan Revision (Forest Service 1998), a geographic information systems analysis was completed for presence of trout species. Approximately 606 miles of stream were analyzed for the presence of brook, brown, cutthroat, or rainbow trout species. Approximately 439 miles of stream contained brook trout (Forest Service 1996). Through this analysis it was estimated that 72 percent of the streams in the RNF have brook trout, but this percentage is likely

higher with so few streams having only Colorado River cutthroat, brown, or rainbow trout present.

Collectively, the available population and habitat information suggests brook trout in the RNF have a population trend that is stable or likely increasing. Except for streams that are designated as CRCT conservation populations, the brook trout is widely distributed across the RNF and is well distributed in mountain streams, ponds, and lakes. The Natural Diversity Information Source (NDIS 2007) categorizes this cold-water game fish in Colorado streams as extremely prolific, with up to 3,500 brook trout per acre, which also suggests stability and likely increasing populations.

RNF MIS Monitoring—Two rotations of monitoring for this species have been conducted in recent years; those data have not been analyzed. Brook trout would be expected to occur in streams in all of the designated habitat in the analysis area except for the small sections of GHMA near Carter Mountain and North Ryder Peak. These two areas are too dry to hold suitable streams.

Alternative A—No Action

Recreation and Travel

Under this alternative there would be no changes to the current National Forest System roads, transportation plan, or recreation management in the RNF. That means that the fewest acres would have seasonal restrictions on casual use, and some of the areas in GRSG habitat would remain open to cross country travel. Motorized travel would continue to contribute to minor degradation of aquatic habitat. The condition of fish populations and aquatic habitats across designated habitat would remain stable, reflecting the effects of all past and current management activities. The cumulative effects from existing activities would generally result in maintaining the current conditions of aquatic habitats.

Lands and Realty

Under this alternative, there would be no changes to the current approach associated with exchange, acquisition, or disposal of lands or with permitting ROWs on Forest Service lands. All Forest Service lands would continue to be managed according to its policy and regulation. Permitted ROWs would continue to allow construction, maintenance, and operation, which may result in temporary increases in road use and potential sedimentation. Indirect effects may include new infestations of noxious or invasive weeds, which could change the soil stability of the site, making it more likely to erode over time and end up in streams and waterways. These effects would be negligible, especially in light of other conservation measures in the LRMP that would be employed to protect aquatic species.

Range

Under this alternative, there would be no change in the numbers, timing, or method of livestock grazing in the RNF. In addition, there would be no change to wild horse or burro management. The negative effects of livestock grazing could include trampling and consumption of riparian plants that shade streams, increased sediment loads from overgrazed eroding hill slopes, unstable stream banks due to hoof action, and decreases in water quality and increases in turbidity. This may degrade the conditions for fish, making them less suitable. Under this alternative, there

would be no change in management action and currently the populations of fish are stable, so they would likely remain the same.

Energy and Minerals

Under this alternative, a small percentage of PHMA would be closed to nonenergy leasable mineral leasing, with the majority or remainder of ADH open to leasing (including expansion of new leases) with no cap on surface-disturbing activities. As such, this alternative would have the greatest potential for damage to riparian and fish habitat. Though there are conservation measures and best management practices in place to minimize effects, continued development would not likely improve conditions for fish species.

Fire and Fuels Management

Alternative A would have the fewest restrictions for fuels management actions and has a high potential for vegetation disturbance. As this alternative does not prioritize fire operations beyond what has already been determined in the fire management plans for the area, potential impacts may include large burns devoid of vegetation, invasion of exotic grasses or other weeds, and potential decrease in soil stability, leading to sedimentation in streams.

Alternative B

Recreation and Travel

Under this alternative there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of current roads. In addition, recreation use permits would be given in PHMA only if there were a neutral or beneficial impact on GRSG and if driving cross country would not be permitted in PHMA. This is more restrictive than Alternative A, providing small beneficial impacts on fish by minimizing human use and maintaining the footprint of existing roads. As only 1 percent of the RNF is considered PHMA, the effects would likely be minor to negligible, but any management direction leading to conservation would be a positive effect.

Lands and Realty

Under this alternative, PHMA would be managed as an exclusion area, and general habitat would be managed as an avoidance area for new ROW projects. In addition, Alternative B would encourage consolidation of GRSG habitat, facilitating habitat conservation and continuity. These conservation measures would be more protective than conservation measures under Alternatives A and D but less protective than under Alternative C.

Range

Alternative B would adjust grazing direction in GRSG PHMA. This accounts for less than 1 percent of the land cover of the RNF and includes only a very small proportion of the southern site in the analysis area where CRCT are known to occur. Mountain sucker are not found in the PHMA in the RNF. Even in the area where CRCT do occur, there would be no direct effects on the species from Alternative B. The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to habitat improvements for populations of CRCT farther

downstream by decreasing the amount of sediment deposited in waterways; however, these improvements would likely be so small as to not be measurable.

Energy and Minerals

Under Alternative B, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks. Although currently there are no known active leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for GRSG habitats. There would likely be very minor indirect benefits to fish from protecting PHMA.

Fire and Fuels Management

Alternative B would be the most restrictive for fire and fuels management actions, but only in PHMA. Again, as there is very little PHMA, effects would be similar to those described under Alternative A.

Alternative C

Recreation and Travel

Under this alternative, effects would be similar to those under Alternative B, except that it would apply to ADH and not just PHMA.

Lands and Realty

Alternative C would have the most protective measures for all GRSG habitat. Under this alternative, ADH would be managed as an exclusion area for new ROW projects. In addition, Alternative C would encourage consolidation of GRSG habitats, facilitating habitat contiguity. Maintaining continuous diverse sagebrush habitats would likely maintain good watershed and runoff patterns that sustain health of the land and the streams that bear fish.

Range

The positive effects of Alternative C on fish would be even more pronounced than those described for Alternative B, because all grazing would be terminated on ADH. Though this accounts for only 1.5 percent of the land cover of the RNF, effects on fish downstream of these areas could be ameliorated by prohibiting cattle grazing in, near, and around riparian areas and streams. There would likely be no negative effects on fish by removing cattle from the system, but there would be substantial positive benefits of reduced sedimentation and turbidity, as well as overall riparian vegetative health and water quality.

Energy and Minerals

Under this alternative, the effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Fire and Fuels Management

Under this alternative, the effects would be similar to those described under Alternative B, except that the same protections would be expanded to include ADH.

Alternative D

Recreation and Travel

Under this alternative, the effects of most suggested management actions would be similar to Alternative B, with the exception that more flexibility or discretion would be given to the land management agency to allow route construction in PHMA, road improvements, and SRP issuance if it were determined that these actions would not adversely affect GRSG. This alternative is still more restrictive than Alternative A, and it would likely provide some minor beneficial effects over time.

Lands and Realty

Under Alternative D, PHMA would be managed as an avoidance area; however, new ROW projects would be allowed in designated corridors. ROWs would also be allowed in PHMA if the project were not to adversely affect GRSG populations. This alternative would be more protective than Alternative A but less protective than Alternatives B and C for fish. Due to the extent of habitat on RNF, the effects would be similar to Alternatives B and C.

Range

Alternative D would be similar to Alternative B but would be slightly more restrictive because GRSG habitat objectives in grazing allotments would be applied to ADH and not just PHMA. This alternative would have fewer impacts than Alternative A but greater impacts than Alternative C. With regard to wild horses and burros, Alternative D would be similar to Alternatives B and C, but would consider all resource values in conjunction with GRSG when managing wild horses and burros. Generally, if conservation efforts are made to maintain or improve GRSG habitat before applying the management action, then fish would likely benefit, even in small measure, from that protection or management action.

Energy and Minerals

Under this alternative, PHMA would be closed to new fluid mineral leases, and existing leases would have a 4-mile NSO buffer around leks, similar to Alternative B. However with some mineral development, this alternative would allow up to 5 percent disturbance in any CMZ. Direct effects would be similar to those associated with Alternative B. There may be a few more impacts if the disturbance allowance were increased from 3 percent to 5 percent, but the potential for this difference to have negative impacts on fish is negligible. Therefore the effects would be similar to those described under Alternative B, mostly positive.

Fire and Fuels Management

Effects due to Alternative D are generally the same as Alternatives B and E, except that the potential for direct habitat loss and indirect impacts would be slightly greater under this alternative, compared with Alternatives B, C, and E. This is due largely to the five percent

disturbance cap and allowance for development to occur in PHMA. As such, this alternative would be expected to provide fewer protective measures for fish than Alternatives B, C, and the proposed plan but more than Alternative A.

The Proposed Plan

Recreation and Travel

Under this alternative there would be no new road or trail construction in PHMA or GHMA. No road or trail maintenance would be allowed within 2 miles of an active lek during lekking (March 1 to April 30). In addition, recreation use permits would be given only in PHMA or GHMA if there were a neutral or beneficial impact on GRSG. This is more restrictive than Alternative A, providing small beneficial impacts on fish by minimizing human use and maintaining the footprint of existing roads. As only 1 percent of the RNF is considered PHMA, the effects would likely be minor to negligible, but any management direction leading to conservation would be a positive effect.

Please refer to the recreation and travel section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Lands and Realty

Under this alternative, PHMA and GHMA would be managed as avoidance areas for new SUA projects. No new roads or aboveground structures would be authorized within 1 mile of an active lek. PHMAs and GHMAs would be managed as avoidance areas for high voltage transmission lines (greater than 100 kilovolts). In addition, the proposed plan would encourage the retention, acquisition, and consolidation of GRSG habitat areas, facilitating conservation for GRSG and other species that depend on sagebrush ecosystem. The RNF would keep its PHMA and would work to acquire more. This would result in little to no degradation, fragmentation, and loss of sensitive species habitat in GRSG PHMA, but this restriction may shift land and realty project focus to GRSG-designated GHMA or other non-grouse habitat types. In non-PHMA, permitted ROWs would likely have effects similar to those addressed in Alternative A. These conservation measures would be more protective than the conservation measures in Alternatives A, B, and D but less protective than Alternative C. This represents a concerted effort to maximize connectivity and minimize fragmentation of sagebrush habitats, thus indirectly benefiting aquatic sensitive species that use these habitats.

Please refer to the lands and realty section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Range

The proposed plan would adjust grazing direction in GRSG PHMA; this is less than 1 percent of the land cover of the RNF and includes only a very small proportion of the southern site in the analysis area where CRCT are known to occur. Even in the area where CRCT occur, there would be no direct effects on the species from the proposed plan. The indirect effects from decreasing grazing pressure on such a small part of the RNF could lead to habitat improvements for populations of CRCT farther downstream by decreasing the amount of sediment deposited in waterways; however, these improvements would likely be so small as to not be measurable. Mountain sucker are not found in the PHMA in the RNF.

Please refer to the rangeland management related section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Energy and Minerals

Under this alternative, no new leasing in ADH would be allowed within 1 mile of an active lek. There would be NSO in PHMA and within 2 miles of active leks in GHMA. A no activity buffer of 4 miles within active leks from March 1 to July 15 would be enforced. PHMA would be excluded for wind and solar projects, and GHMA would be avoidance areas. PHMAs would be closed to new mineral materials sales and new nonenergy mineral leasing. NSO would be precluded on nonenergy leasable mineral leases within 2 miles of active leks in PHMAs. Though currently there are no known active leks and very little PHMA in the RNF, this alternative would provide protection now and into the future for GRSG habitats. There would likely be very minor indirect benefits to fish from protecting PHMA. This alternative may shift energy and mineral development to less desirable sagebrush or non-sagebrush habitat, and there may be lingering effects of not protecting all sagebrush or ADH.

Please refer to the energy and minerals related section of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Fire and Fuels Management

GRSG habitat, specifically PHMA, would have additional management direction designed to protect PHMA from wildfire and ensure that effects from fuels management were accomplished in a manner that benefits or does not impact GRSG. This alternative would help reduce the localized threats to PHMA from fire, compared to Alternative A. This would be a benefit to aquatic species that use PHMA.

Please refer to the fire and fuels management related sections of the FEIS for additional information and more detailed information on the effects of the proposed plan.

Summary

Currently, under the No Action Alternative, population levels and habitat conditions for brook trout and CRCT appear to be stable, even with the current grazing practices. However, under the action alternatives, the suggested management actions to be taken would further minimize negative impacts and promote more intact and higher quality sagebrush ecosystems in the RNF.

Alternative C, is the most conservative and restricts direct and indirect anthropogenic impacts on brook trout and CRCT on the largest number of acres. Under Alternative C, grazing would be terminated in ADH (17,354 acres or 1.5 percent of the RNF). The removal of domestic livestock grazing would lessen the impacts on streams and riparian areas, eliminate the possibility of domestic livestock trampling fish eggs, and would improve overall fish habitat and water quality. Despite the fact that under the current grazing conditions populations appear to be stable, all of the action alternatives would reduce current impacts on brook trout and CRCT beyond management under current management.

It is apparent that the action alternatives would likely improve or stabilize the aforementioned conditions on a localized site-specific scale, commensurate with the 1.5 percent of designated GRSG habitat in the RNF and better than the No Action Alternative alone. This is because the

CRCT and brook trout were selected as an MIS to represent issues associated with aquatic habitat fragmentation and sedimentation of riparian areas and aquatic habitats.

Alternative C would likely have the longest term overall beneficial effects due to the removal of livestock, but each of the action alternatives would likely improve aquatic and riparian habitats by minimizing ROWs, energy development, and road upgrading or construction.

III. CONCLUSION

Golden-crowned kinglet, northern goshawk, and Wilson's warbler, three species of MIS in the RNF were reviewed but not considered in a detailed analysis. This is because there would be no impact on these species from any of the proposed actions due to the different habitat type and areas these species use. The remaining three MIS—vesper sparrow and both of the aquatic MIS (CRCT and brook trout)—have been documented in the analysis area and could be affected by an action alternative.

When considering the potential for population-level impacts on these species across the planning area of the entire RNF, it is important to consider that the analysis area makes up less than 1 percent (12,501 acres) of the entire acreage of the RNF. Therefore it is unlikely that any population-level trends at the forest scale would be significantly altered by any of the action alternatives. A more likely scenario under the action alternatives is that there could be slight increases in the numbers of individuals and quality of habitat in areas of designated habitat. This analysis indicates that implementing any of the action alternatives would maintain at least stable populations and habitat of all species of MIS or would not add to the potential for negative impacts.

IV. CONTACTS

The following specialists, in addition to the authors, provided their expertise in the development of this document:

Robert Skorkowsky
Wildlife Biologist
rsorkowsky@fs.fed.us
(970) 870-2146

Rick Henderson
Routt Zone Fisheries Biologist
rhenderson01@fs.fed.us
(970) 870-2219

V. LITERATURE CITED

- Adams, P. W., and H. A. Froehlich. 1981. "Compaction of Forest Soils." Pacific Northwest Extension Publication PNW 217, Oregon, Washington, and Idaho Extension Service. Corvallis, Oregon.
- Anderson, D. G. 2006a. *Eriogonum exilifolium* Reveal (dropleaf buckwheat): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: http://www.fs.fed.us/r2/projects/scp/assessments/eriogonum_exilifolium.pdf.

- Baxter, G. T., and M. D. Stone. 1995. *Fishes of Wyoming*. Wyoming Game and Fish Department, Cheyenne.
- Beatty, B. L., W. F. Jennings, and R. C. Rawlinson. 2003a. *Botrychium ascendens* W.H. Wagner (trianglelobe moonwort), *B. crenulatum* W.H. Wagner (scalloped moonwort), and *B. lineare* W.H. Wagner (narrowleaf grapefern): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/botrychiums.pdf>.
- _____. 2003b. *Mimulus gemmiparus* (Rocky Mountain monkeyflower): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: http://www.fs.fed.us/r2/projects/scp/assessments/mimulus_gemmiparus.pdf.
- _____. 2004. *Machaeranthera coloradoensis* (Colorado tansyaster): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/machaerantheracoloradoensis.pdf>.
- Bell, T., Tolhurst, K., Wouters, M., 2005. Effects of the fire retardant Phos-Chek on vegetation in eastern Australian heathlands. *International Journal of Wildland Fire* 14, 199–211.
- Belica, L. T., and N. P. Nibbelink. 2006. Mountain Sucker (*Catostomus platyrhynchus*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/mountainsucker.pdf>.
- Behnke, R. J. 1992. "Native trout of western North America." *American Fisheries Society Monograph* 6.
- Bergelson, J., and M. Crawley. 1992. "Herbivory and *Ipomopsis aggregata*: The disadvantages of being eaten." *Am. Nat.* 139:870-872.
- Blakesley, J. A. 2008. Population densities and trend detection of avian Management Indicator Species on the Routt National Forest. Supplemental Report M-MCB-USFS07-01. Rocky Mountain Bird Observatory, Brighton, Colorado.
- Blakesley, J. A., and D. J. Hanni. 2009. Monitoring Colorado's Birds, 2008. Tech. Rep. M-MCB08-01. Rocky Mountain Bird Observatory, Brighton, Colorado.
- Blakesley, J. A., D. C. Pavlacky, Jr., and D. J. Hanni. 2010. Monitoring the birds of the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR 16), 2009 field season report. Tech. Rep. SC-RMR-USFS09-01. Rocky Mountain Bird Observatory, Brighton, Colorado.
- Bock, C. E., and J. H. Bock. 1987. "Avian habitat occupancy following fire in a Montana shrubsteppe." *Prairie Naturalist* 19:153-158.
- Braun, C. E., M. F. Baker, R. L. Eng, J. S. Gashwiler, and M. H. Schroeder. 1976. Conservation committee report on effects of sagebrush communities on the associated avifauna. *Wilson Bulletin* 88:165-171.

- CDOW (Colorado Division of Wildlife). 2006. Pioneer Brookies. Colorado Division of Wildlife Outdoor Journal. Internet website: <http://wildlife.state.co.us/NewsMedia/OutdoorsJournal/PioneerBrookies.htm>.
- _____. 2007. 2007 Colorado Fishing: Fishing Regulations and Property Directory Brochure. Internet website: <http://wildlife.state.co.us/NR/rdonlyres/6DE0299B-B621-4248-B56A-00DFF8A66BB3/0/07fishingbrochure.pdf>.
- Cochran, P. H., and T. Brock. 1985. Soil Compaction and Initial Height Growth of Planted Ponderosa Pine. PNW-RN-434 USDA Forest Service Pacific Northwest Research Station. Portland, Oregon.
- Conant, R., and J. T. Collins. 1991. *A Field Guide to Reptiles and Amphibians: Eastern and Central North America*. Third edition. Houghton Mifflin Company, Boston, Massachusetts.
- Daddow, R. L., and G. E. Warrington. 1983. Growth-limiting soil bulk densities as influenced by soil texture. WSDG Report WSDG-TN-0005, January 1983. Watershed Systems Development Group, USDA Forest Service, Fort Collins, Colorado.
- Decker, K. 2006a. *Salix candida* Flueggé ex Wild. (sageleaf willow): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/salixcandida.pdf>.
- _____. 2006b. *Salix serissima* (Bailey) Fern. (autumn willow): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/salixserissima.pdf>.
- Decker, K., D. R. Culver, and D. G. Anderson. 2006. *Eriophorum gracile* W. D. J. Koch (slender cottongrass): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/eriphorumgracile.pdf>.
- Forest Service. 1996. Routt National Forest GIS data. GIS coverage of trout streams located on Routt National Forest GIS library used for the preparation of the Routt National Forest Plan Revision.
- _____. 1998. Routt National Forest Revised Land and Resource Management Plan. Medicine Bow Routt National Forest. Steamboat Springs, Colorado.
- _____. 2003. Region 2 Sensitive Species Recommendation Rationale: Loggerhead Shrike. <http://www.fs.fed.us/r2/projects/scp/evalrationale/rationales/birds/loggerheadshrike.pdf>
- _____. 2007a. Management Indicator Species. Data located in Medicine Bow-Routt National Forest NRIS Wildlife database. GIS-based application used for administrative purposes.
- _____. 2007b. Decision Notice and Finding of No Significant Impact for the Management Indicator Species Forest Plan Amendment 04 to the Routt National Forest Land and Resource Management Plan—1997 Revision, January 2007.
- _____. 2012. NRIS Wildlife database. A GIS-based tracking system of threatened, endangered, sensitive species, or species of local concern.

- Gage, E. and D. J. Cooper. 2006. *Carex diandra* Schrank (lesser panicled sedge): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/carexdiandra.pdf>.
- Garton, E.O, A.G. Wells, J.A. Baumgardt and J.W. Connelly. 2015. Greater Sage-Grouse Population Dynamics and Probability of Persistence. Report to Pew Charitable Trust (18 March 2015). 90 pp. (unpublished report).
- Garton, E. O., J. W. Connelly, J. S. Horne, C. A. Hagen, A. Moser, and M. Schroeder. 2011. "Greater sage-grouse population dynamics and probability of persistence." In "Greater sage-grouse: Ecology and conservation of a landscape species and its habitats" (S. T. Knick and J. W. Connelly, editors). Studies in Avian Biology 38:293-382. University of California Press, Berkeley.
- Gilbert, M. M., and A. D. Chalfoun. 2011. Energy development affects populations of sagebrush songbirds in Wyoming. *Journal of Wildlife Management* 75:816–824.
- Heidel, B., and J. Handley. 2006. *Selaginella selaginoides* (L.) Beauv. ex Mart. & Schrank (club spikemoss): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/selaginellaselaginoides.pdf>.
- Hirsch, C. L., S. E. Albeke, and T. P. Nesler. 2006. Range-wide status of Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus*) 2005. Colorado River cutthroat trout Conservation Team Report. Colorado Division of Wildlife, Fort Collins, Colorado.
- Hoffman, R. W., and A. E. Thomas. 2007. Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/columbiansharptailedgrouse.pdf>.
- Holmes, J. A., and M. J. Johnson. 2005. Brewer's sparrow (*Spizella breweri*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/brewerssparrow.pdf>.
- Hornbeck, J. H., C. Hull Seig, and D. J. Reyher. 2003. Conservation Assessment for great-spurred violet in the Black Hills, South Dakota and Wyoming. Custer, South Dakota: US Department of Agriculture, Forest Service, Rocky Mountain Region, Black Hills National Forest.
- Hunter ME, Omi PN, Martinson EJ et al (2006) Establishment of non-native plant species after wildfires: effects of fuel treatments, abiotic and biotic factors, and post-fire grass seeding treatments. *Int J Wildland Fire* 15:271–281
- Keinath, D., and M. McGee. 2005. Boreal toad (*Bufo boreas boreas*): a technical conservation assessment. USDA Forest Service., Rocky Mountain Region. Internet website <http://www.fs.fed.us/r2/projects/scp/assessments/borealtoad.pdf>.
- Kingery. H. (editor).1998. *Colorado Breeding Bird Atlas*. Colorado Bird Atlas Partnership. Co-published by the Colorado Division of Wildlife Resources.

- Knick, S. T., and J. T. Rotenberry. 1995. "Landscape characteristics of fragmented shrubsteppe landscapes and breeding passerine birds." *Conservation Biology* 9:1059-1071.
- Ladyman, J. A. R. 2004. *Ipomopsis aggregata* (Pursh) V. Grant ssp. *weberi* V. Grant and Wilken (scarlet gilia): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/ipomopsisaggregatasspweberi.pdf>.
- _____. 2006a. *Astragalus leptaleus* Gray (park milkvetch): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/astragalusleptaleus.pdf>.
- _____. 2006b. *Rubus arcticus* L. ssp. *acaulis* (Michaux) Focke (dwarf raspberry): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region.
- _____. 2007. *Triteleia grandiflora* Lindley (largeflower triteleia): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/triteleiagrandiflora.pdf>.
- Lambeth, R. 1998. "Sage sparrow *Amphispiza belli*." In *Colorado Breeding Bird Atlas* (H. Kingery, editor). Colorado Bird Atlas Partnership and Colorado Division of Wildlife, Denver. Pp. 466-467.
- Loeffler, C. (editor). 2001. Boreal toad conservation plan and agreement. Boreal Toad Recovery Team. Internet website: <http://wildlife.state.co.us/NR/rdonlyres/5E48BE99-6ED0-4A7A-9799-7AC65E2C271E/0/BorealToadRecovery.pdf>
- Lukacs, P. M. 2005. Analysis of Avian Management Indicator Species for the Routt National Forest. Medicine Bow-Routt National Forest. Laramie, Wyoming.
- Mergen, D. E. 2006. *Cypripedium parviflorum* Salisb, lesser yellow lady's slipper: A technical conservation assessment. Technical report prepared for the USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/cypripediumparviflorum.pdf>.
- Muths, E., S. Rittmann, J. Irwin, D. Keinath, and R. Scherer. 2005. Wood Frog (*Rana sylvatica*): a technical conservation assessment. USDA Forest Service. Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/woodfrog.pdf>.
- NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life. Version 4.2. NatureServe, Arlington, Virginia. Internet website: <http://www.natureserve.org/explorer>.
- NDIS. 2005. Colorado Species Occurrence and Abundance Tool (homepage of Colorado Natural Diversity Information Source, Species Occurrence and Abundance Tool, NDIS). Internet website: <http://www.ndis.nrel.colostate.edu/wildlife.asp>.
- _____. 2007. Colorado Species Occurrence and Abundance Tool (Homepage of Colorado Natural Diversity Information Source, Species Occurrence and Abundance Tool, NDIS). Internet website: <http://www.ndis.nrel.colostate.edu>.
- Neid, S. L. 2006. *Utricularia minor* L. (lesser bladderwort): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/utriculariaminor.pdf>.

- Nellessen, J. E. 2006. *Eleocharis elliptica* Kunth (elliptic spikerush): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/eleochariselliptica.pdf>.
- Olson, Bret E. 1999. "Impacts of noxious weeds on ecologic and economic systems." In *Biology and Management of Noxious Rangeland Weeds* (Roger L. Sheley and Janet K. Petroff, editors). Oregon State University Press, Corvallis. Pp. 4-18.
- Page, L. M., and B. M. Burr. 1991. *A Field Guide to Freshwater Fishes: North America North of Mexico*. Houghton Mifflin Company, Boston, Massachusetts.
- Paige, K. N. 1992. "Overcompensation in response to mammalian herbivory: from mutualistic to antagonistic interactions." *Ecology* 73:2076-2085.
- Paige, C., and S. A. Ritter. 1999. "Birds in a sagebrush sea: Managing sagebrush for bird communities." Partners in Flight Western Working Group, Boise, Idaho.
- Paige, K. N., and T. G. Whitham. 1987. "Overcompensation in response to mammalian herbivory: The advantage to being eaten." *Am. Nat.* 129: 407-416.
- Pruitt, L. 2000. Loggerhead shrike status assessment. US Fish and Wildlife Service. Fort Snelling, Minnesota.
- Randall, J. A., and M. B. Walters. 2011. "Deer density effects on vegetation in aspen forest understories over site productivity and stand age gradients." *Forest Ecology and Management* 261:408-415.
- Rotenberry, J. T., M. A. Patten, and K. L. Preston. 1999. "Brewer's sparrow (*Spizella breweri*)."
The Birds of North America, No. 390 (A. Poole and F. Gill, editors). The Birds of North America, Inc., Philadelphia, Pennsylvania.
- Sage-Grouse National Technical Team. 2011. A Report on National Greater Sage-Grouse Conservation Measures. Internet website: http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/85336_FSPLT2_115747.pdf.
- Schroeder, M. A., and R. K. Baydack. 2001. "Predation and the management of prairie grouse." *Wildlife Society Bulletin* 29:24-32.
- Simpson, J. C., and R. L. Wallace. 1982. *Fishes of Idaho*. University of Idaho Press, Moscow.
- Skorkowsky, R. C., and P. Dolan. 2005. Draft Medicine Bow—Routt National Forests Songbird Management Indicator Species Monitoring Protocol. Medicine Bow-Routt National Forest. Laramie, Wyoming.
- Smith, B. E., and D. A. Keinath. 2007. Northern Leopard Frog (*Rana pipiens*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/northernleopardfrog.pdf>.
- Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, the US Forest Service, and the US Fish and Wildlife Service by the Colorado Natural Heritage Program.

- Spackman-Panjabi, S. S., and D. G. Anderson. 2006. *Penstemon harringtonii* Penland (Harrington's beardtongue): a technical conservation assessment. Unpublished report. USDA Forest Service, Rocky Mountain Region.
- USFWS (US Fish and Wildlife Service). 2010. Endangered and threatened wildlife and plants: 12-month findings for petitions to list the Greater Sage-Grouse (*Centrocercus urophasianus*) as threatened or endangered. *Federal Register* 75(55): 13910-14014.
- _____. 2013. Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. US Fish and Wildlife Service, Denver, Colorado. February 2013.
- White, C. M., N. J. Van Lanen, D. C. Pavlacky, Jr., J. A. Blakesley, R. A. Sparks, J. A. Fogg, M. F. McLaren, et al. 2012. Integrated Monitoring of Bird Conservation Regions (IMBCR): 2011 Annual Report. Rocky Mountain Bird Observatory. Brighton, Colorado.
- White, C. M., N. J. Van Lanen, D. C. Pavlacky, Jr., J. A. Blakesley, R. A. Sparks, J. M. Stenger, J. A. Rehm-Lorber, et al. 2011. Integrated Monitoring of Bird Conservation Regions (IMBCR): 2010 Annual Report. Rocky Mountain Bird Observatory. Brighton, Colorado.
- Wiggins, D. A. 2005. Loggerhead Shrike (*Lanius ludovicianus*): A technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Internet website: <http://www.fs.fed.us/r2/projects/scp/assessments/loggerheadshrike.pdf>.
- Young, M. K. 1995. Colorado River cutthroat trout. In Conservation assessment for inland cutthroat trout (M. K. Young, technical editor.). USDA Forest Service General Technical Report RM-GTR-256. Pp. 16-23.
- Wiens, J. A., and J. T. Rotenberry. 1981. "Habitat associations and community structure of birds in shrubsteppe environments." *Ecological Monographs* 51:21-41.
- With, K. A. 2002. "The landscape ecology of invasive spread." *Conservation Biology* 16(5):1192-1203.
- Zouhar, K. 2003. *Linaria* spp. In: Fire Effects Information System. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Internet website: <http://www.fs.fed.us/database/feis/>.