
Chapter 3

Affected Environment

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CHAPTER 3

AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The planning area is the geographic area within which the BLM and USFS will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction. Lands addressed in the LUP amendments will be public lands (including split estate lands) managed by the BLM and USFS in GRSG habitats. Any decisions in the LUP amendments will apply only to federal lands administered by either the BLM or the USFS.

This chapter documents the existing conditions and trends of resources in the planning area that may be affected by implementing any of the proposed alternatives described in **Chapter 2**, Alternatives. The affected environment provides the context for assessing the potential impacts described in **Chapter 4**, Environmental Consequences. For this LUPA/EIS, the planning area is the entire Northwest Colorado sub-region, which contains BLM-administered and Forest-Service-administered lands, as described in **Chapter 1**, Introduction.

To augment this planning document at a biologically meaningful scale for GRSG, a Baseline Environmental Report (BER) of GRSG was produced by USGS for BLM and Forest Service (Manier et al. 2013). The BER is a science support document that provides information to put planning units and issues into the context of the larger WAFWA GRSG Management Zones. The BER examines each threat identified in USFWS listing decision published on March 15, 2010. For each threat, the report summarizes the current, scientific understanding of various impacts to GRSG populations and habitats. When available, patterns, thresholds, indicators, metrics, and measured responses that quantify the impacts of each specific threat are reported. Data from the BER are presented throughout this chapter to illuminate the location (e.g., PH and GH), magnitude, and extent of the threats within each WAFWA Management Zone that comprises the planning area.

Because the BER focuses on threats to GRSG at the WAFWA Management Zone (or “range-wide”) scale, it provides biologically meaningful data for larger-scale analyses, such as the cumulative effects analysis for GRSG in **Chapter 5**, Cumulative Effects.

Chapter 3, Affected Environment, also presents data that are available at a finer scale than used in the BER’s larger-scale, WAFWA Management Zone

focus. These fine-scale, local data are incorporated into the affected environment discussion to complement the BER's biologically meaningful data, characterize the relative contributions of threats in the planning area versus the WAFWA Management Zones, and to set the stage for the cumulative effects analysis for GRSG (**Chapter 5**, Cumulative Effects). Unless specifically described as WAFWA Management Zone (or referred to as the Wyoming Basin or the Colorado Plateau Management Zone), references to management zones throughout Chapter 3 describe the affected environment in the Colorado MZs in the planning area, as described in **Chapter 1**, Introduction.

Acreage figures and other numbers used are approximate projections; readers should not infer that they reflect exact measurements or precise calculations. Acreages were calculated using GIS technology, and there may be slight variations in total acres between resources.

3.1.1 Organization of Chapter 3

This chapter contains sections describing the biological, physical, cultural, and human resources of the planning area and follows the order of topics addressed as follows:

- Fish and Wildlife
- Special Status Species (GRSG and Other Special Status Species of Issue)
- Lands and Realty
- Vegetation (Forest, Rangelands, Riparian and Wetlands, and Weeds)
- Wildland Fire Ecology and Management
- Minerals – Leasable (Oil and Gas, Oil Shale, Coalbed Natural Gas, Carbon Dioxide, Geothermal Resources, Sodium, Uranium, Coal)
- Minerals – Locatable
- Minerals – Salable
- Travel Management
- Recreation
- Range Management
- Wild Horse and Burro Management
- Special Designations (ACEC, Wilderness Areas, Wilderness Study Areas, Inventoried Roadless Areas, Wild and Scenic Rivers, National Scenic and Historic Trails, Scenic Byways, Watchable Wildlife Areas, Special Interest Areas)
- Water Resources
- Soil Resources

- Air Quality and Climate Change
- Visual Resources
- Lands with Wilderness Characteristics
- Soundscapes
- Cultural Resources
- Paleontological Resources
- Social and Economic Conditions (Including Environmental Justice)

Each resource section in this chapter contains a discussion of existing conditions and trends:

- Existing conditions describe the location, extent, and current condition of the resource in the planning area in general and on BLM-administered and National Forest System lands. Conditions for a resource can vary depending on the resource. The Northwest Colorado sub-region planning area contains approximately 15 million acres, regardless of land status, including approximately 8.5 million acres of public lands managed by the five BLM field offices and the Routt National Forest. Within the Northwest Colorado sub-region planning area, the decision area includes GRSG habitat. In the decision area there are approximately 1.7 million acres of BLM-administered surface lands and approximately 20,000 acres of Routt National Forest lands (totaling approximately 2.9 million acres of federal mineral estate and surface acres). For each resource, a general description of the existing conditions is provided for the Northwest Colorado sub-region planning area, regardless of land status. This is done to provide a regional context for the resource. Then, a more detailed description of the existing conditions is provided for the BLM-administered and National Forest System lands managed according to the BLM and Forest Service LUPs being amended by this LUPA/EIS. This is done to provide an area-specific description of the existing conditions for the resource. When possible, greater emphasis is placed on describing the existing conditions of the resource as it pertains to GRSG and their habitat.
- Trends identify the degree and direction of resource change between the present and some point in the past. If there is change, the degree and direction of resource change is characterized as moving toward or away from the current desired condition based on the indicators, and the reasons for the change are identified. Similar to indicators, trends can also be described in quantitative or qualitative terms. Identifying the trends is done to provide an understanding of how BLM and Forest Service management influences the desired condition of the resource over time. It can be

difficult to analyze trends for certain resources, because changes to the resource often occur due to factors beyond the control of the BLM and Forest Service.

The BLM and Forest Service reviewed the LUPs being amended under this LUPA/EIS and other relevant information sources (such as LUP amendments, maps, and state GRSG conservation assessments) for existing conditions and trends for the resources listed above with respect to GRSG and their habitat. This affected environment information is summarized below and, where appropriate, noted when the information is incorporated by reference.

3.2 FISH AND WILDLIFE

This section describes the existing conditions of fish and wildlife resources within the planning area, including aquatic and terrestrial animal species and their habitats. The planning area lies within three EPA Level III Ecoregions: Southern Rockies, Wyoming Basin, and Colorado Plateaus. Although CPW and USFWS are directly responsible for the management of fish and wildlife species, the BLM and Forest Service are responsible for land management. Therefore, on BLM-administered and Routt National Forest lands in the decision area, these agencies are directly responsible for the management of habitat for fish and wildlife species and indirectly responsible for the health of fish and wildlife populations that are supported by these habitats. In addition, the BLM and Forest Service are mandated by the ESA, the BLM is mandated by BLM Land Use Planning Handbook (BLM 2005), and the Forest Service is mandated by Forest Service Manual 2670, to ensure that special status species are protected. This mandate is reinforced through a Memorandum of Agreement with USFWS, Forest Service, and National Marine Fisheries Service (BLM et al. 2000).

The fish and wildlife habitats present in the planning area are primarily characterized in the soil, water, and vegetation existing conditions discussions in **Sections 3.16, 3.15, and 3.5**, respectively. The discussions of aquatic and terrestrial habitat in this section identify attributes of these resources that are particularly important to their role in providing fish and wildlife habitat (**Table 3.1**). Special status species are described in **Section 3.3**, Special Status Species.

Table 3.1
Fish and Wildlife Species of Primary Interest in the Planning Area

Species	Rationale for Priority Designation
Birds	
Eagles (bald and golden)	High interest, protected by law, apex predators
Other raptors (prairie falcon, red-tailed hawk, goshawk, owls)	High interest, protected by law, apex predators
Upland game birds (GRSG)	Economic and recreational value
Great blue heron	Protected by law, uses concentrated nesting areas
Ducks, geese, and other waterfowl	Economic and recreational value
Migratory birds	High interest, protected by law

Table 3.1
Fish and Wildlife Species of Primary Interest in the Planning Area

Species	Rationale for Priority Designation
Mammals	
Elk	High interest, economic and recreational value
Mule deer	High economic and recreational value
Pronghorn antelope	High economic and recreational value
Bighorn sheep	High economic and recreational value
Moose	High interest, economic and recreational value
Black bear	High interest, economic and recreational value; apex predators
Mountain lion	High interest, economic and recreational value, apex predators
River otter	High interest, protected by law
White-tailed prairie dog	High interest, association with federally listed black-footed ferret
Aquatic Wildlife	
Cold water fish (sport and native)	Economic and recreational value, protected by law
Warm water fish (sport and native)	Economic and recreational value, protected by law

BLM

Wildlife and Terrestrial Habitat

BLM-administered lands within the planning area sustain an abundance and diversity of wildlife (including insects, birds, and mammals) and wildlife habitat. These lands provide a permanent or seasonal home for numerous species of amphibians, reptiles, birds (including migratory birds protected under the Migratory Bird Treaty Act), and mammals. Wildlife populations are found in areas where their basic needs (such as food, shelter, water, reproduction, and movement) are met. The area in which the needs of a particular population are met is referred to as habitat. Plants or animals that have been officially listed, proposed for listing, or are candidates for listing as threatened or endangered under provisions of the ESA, as well as those listed by a state in a category implying potential endangerment or extinction, and those designated by a BLM State Director as sensitive are discussed in **Section 3.3**, Special Status Species. This section will focus on those species that are less specialized and can use a wider range of habitats.

Several features make certain habitats better for wildlife than others. In turn, the more of these features that are present, the greater the diversity of wildlife species that is likely to be present. These features include:

- Structure: shape, height, density, and diversity of the vegetation and other general features of the terrain
- Vertical layers: layers of vegetation (such as herbaceous, shrub, and forest canopy)
- Horizontal zones: vegetation and other habitat features that vary across an area
- Complexity: an integration of vertical layers and horizontal zones

- Edge: the area where two types of vegetative communities meet (such as a forest and shrub community)
- Special features: unique habitat features needed for survival or reproduction, including snags (dead trees), water, and rock outcrops (Cooperrider 1986) BLM-administered lands within the planning area are important habitat for many types of wildlife. Wildlife and their habitat are impacted by a variety of land uses, such as timber harvesting, grazing, recreation, as well as by natural events, such as wildfire and insects. The BLM is indirectly responsible for the health and well-being of fish and wildlife populations that are supported by the habitats under the management of the BLM. The BLM works cooperatively with the USFWS and the CPW in order to manage wildlife habitats on BLM-administered lands.

Standards for Public Land Health

One method the BLM uses in order to measure the health of the land that it manages is through land health assessments. These assessments follow several standards that the BLM developed in response to public concern about livestock grazing management on western public lands. Standards for Public Land Health describe conditions needed in order to sustain public land health, and relate to all uses of the public lands. Standards, based upon their associated indicators, are applied on a landscape scale and relate to the potential of the landscape. See **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado.

Guidelines for Livestock Grazing Management

Guidelines are the management tools, methods, strategies, and techniques, such as best management practices, designed to maintain or achieve healthy public lands as defined by the standards. Currently, the only guidelines developed in concert with the Resource Advisory Councils for the BLM Colorado are livestock grazing management guidelines. See **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado.

Proper Functioning Condition

Another method used to evaluate habitat is to assess the proper functioning condition of streams and water bodies. Many surveys using the proper functioning condition protocol have been conducted as part of land health assessments on various landscapes within the planning area.

Aquatic Resources

Fish and other aquatic resources are critical resources to humans and, as such, have influenced the development, status, and success of social and economic systems in the western US. Aquatic organisms, such as insects and aquatic

invertebrates, provide food for fish. The health of fish and other aquatic organisms is often indicative of the health of the watershed.

Forest Service

Wildlife Species on the Routt National Forest are categorized into four main categories as it related to this analysis:

- Sensitive Species
- Threatened and Endangered Species
- Management Indicator Species (MIS)
- Other wildlife species

Sensitive Species

Sensitive species are a special status species for the Forest Service. The Forest Service has developed policy regarding the designation of plant and animal species (Forest Service Manual 2670.32; Region 2 Forest Service Manual Supplement 2670-2011-1). In the Rocky Mountain Region, species are identified as Forest Service Sensitive, and are included on a comprehensive list, using eight evaluation criteria to determine the merits of sensitive status for a particular species (Forest Service Manual 2672.11, Region 2 Forest Service Manual Supplement No. 2600-2003-1, Exhibit 02). The Regional Forester's list was last updated in 2011 (Holifield 2011). All candidate species are automatically placed on the Forest Service Sensitive species list. As such, because GRSG is a candidate species, it also is a Forest Service Sensitive species. Sensitive species are addressed in **Appendix M**, US Forest Service Biological Evaluation, and are not further discussed in this section.

Threatened and Endangered Species

Threatened and Endangered Species are a special status species which have been listed by USFWS under the ESA. A Biological Assessment will be prepared for the preferred alternative with the Final EIS. Threatened and Endangered Species are not further addressed in this section.

Management Indicator Species

The NFMA directs the Forest Service to select certain plants, communities, and vertebrate or invertebrate species to manage for maintenance and improvement of habitat. Requirements to identify and utilize MIS in the decision area and project-level planning were identified under NFMA planning regulations in 1982-219.19(a) (1). MIS are species that respond to habitat changes, are scarce or unique, are of high economic interest, or are listed as federal or state threatened or endangered species. By monitoring and assessing population trends of MIS, managers can determine if management actions are affecting species populations. MIS are also included in **Appendix M**, US Forest Service Biological Evaluation.

Other Wildlife Species

These are not conservation priority species with a ‘special status,’ but are those that may be related to this specific analysis. For this analysis the focus is on elk. The Routt National Forest Plan contains management direction specifically related to elk and deer. GRS habitat overlaps with designated elk and deer winter range on the Routt National Forest (see **Figure 3-1** and **Figure 3-2**), and issues were raised during scoping regarding the potential impacts that elk may be having on GRS habitat.

During the scoping process, commenters were interested in the Forest Service (and the BLM) addressing the issue of competition for resources (i.e., habitat and food) with other wildlife (e.g., the increasing numbers of elk in Colorado). In recent years, competition between livestock and wildlife, or more specifically, wild ungulates such as moose (*Alces alces*), deer (*Odocoileus* spp.), and elk (*Cervus elaphus*) has become an increasing concern by the public as well as range conservationists and wildlife biologists. Little scientific evidence has been collected on whether competition is occurring between species such as GRS and elk and the direct and indirect effects on the resource when combined with livestock grazing. It is the Forest Service’ responsibility to adjust livestock numbers according to wildlife use, so that allowable use criteria are not exceeded. The Routt National Forest Plan (Forest Service 1998) Range Standards state, “remove livestock from the grazing unit or allotment when further utilization on key areas will exceed allowable-use criteria in the forest plan or allotment management plan.”

Competition begins to occur when the food resources are in short supply and one species may decline due to the limited food resources. In the drier west, the spatial configuration of cover types leads to wild and domestic ungulates, as well as other wildlife species congregating in the same areas where there is desirable forage and cover. At the landscape level, competition may be causing site-level resource impacts in these areas such that community types may shift in succession. Resource competition may include community types that are converted to a different ecotype. A specific example is the introduction of noxious weeds into habitats that displace important resources for a species such as GRS, thus impacting their life history requirements.

Aquatic organisms include fish and amphibians that reside in streams and water bodies as well as wetlands and riparian areas. The Routt National Forest includes the headwaters of the North Platte, Yampa, and upper Colorado River basins. Elkhead Creek and Slater Creek Watersheds are within GH in the California and Slater Parks areas. These areas support many priority aquatic resources, including several designated sensitive species, such as Colorado River cutthroat trout, mountain sucker, boreal toad, and northern leopard frog.

3.2.1 Indicators

Management Indicator Species

According to the Routt National Forest Plan Amendment #4 (Forest Service 2007), terrestrial MIS for the Routt National Forest include the six fish and wildlife species found in **Table 3.2**. At the project and plan level, management indicators are selected that best represent the issues, concerns, and opportunities.

Table 3.2
Routt National Forest Management Indicator Species in the Decision Area

Common Name of MIS	Management Issue	Species Present in Analysis Area?	Habitat Present in Analysis Area?	Species selected for MIS analysis?
Golden-crowned Kinglet	Spruce-fir timber management	No	No	No
Northern goshawk	Lodgepole pine timber management	No	No	No
Vesper sparrow	Rangeland residual forage	Yes	Yes	Yes
Wilson's warbler	Herbivory in riparian areas	Yes	Yes	Yes
Colorado River cutthroat trout and brook trout	Aquatic habitat conditions	Yes	Yes	Yes

3.2.2 Existing Conditions

Conditions of the Planning Area

Within the planning area, the BLM manages over 1.7 million acres of fish and wildlife habitat, and the Forest Service manages just over 20,000 acres. The presence and interspersed of many habitat types support a large number of wildlife species. The discussion of fish and wildlife populations and habitat addresses the entire planning area, not just the BLM-administered or Routt National Forest lands (decision area), because fish and wildlife are mobile and may readily cross these boundaries, mule deer, pronghorn (*Antilocapra americana*), bighorn sheep (*Ovis canadensis canadensis*, *O. c. nelsoni*, and *O. c. mexicana*), mountain lion (*Felis concolor*), raptors, and many nongame species, including, but not limited to, migratory birds, are among the species that use habitat in the planning area. The diversity and populations of fish and wildlife throughout the planning area provide considerable recreational opportunity and economic benefit.

A group of species that are of primary interest to the BLM and Forest Service for environmental planning within the planning area are presented in **Table 3.1**. These species are of management concern to one or more agencies, such as the BLM, Forest Service, CPW, and USFWS, because they are game, rare, or keystone species. Therefore, they require consideration in management activities and may affect land management decisions. A keystone species is one

whose presence and role within an ecosystem has a disproportionate effect on other organisms within the system.

Conditions on BLM-Administered Lands

Wildlife

A variety of terrestrial wildlife species use the vegetation types discussed in **Section 3.5**, Vegetation. The key terrestrial wildlife species within the planning area are primarily herptiles (reptile and amphibians), birds, and mammals. However, many terrestrial invertebrate species also exist, and adequate populations of terrestrial invertebrates are assumed when populations of the vertebrate groups that prey on invertebrates are healthy. The land health assessments, Rocky Mountain Bird Observatory, Colorado Natural Heritage Program, and GIS data maintained by CPW provide information on terrestrial wildlife distribution in the planning area. In addition, CPW maintains statistics on big game harvests, recreational use days, and population trends. The general conditions of key terrestrial and aquatic life within the decision area are summarized below.

Reptiles

Several species of reptiles exist within the planning area, mostly in lower elevations and in dryer habitats, such as semi-desert shrub, sagebrush, greasewood, and pinyon-juniper. Species found in the planning area include bull/gopher snake (*Pituophis catenifer*), sagebrush lizard (*Sceloporus graciosus*), prairie/plateau lizard (*Sceloporus undulates*), smooth green snake (*Liochlorophis vernalis*), western terrestrial garter snake (*Thamnophis elegans*), and milk snake (*Lampropeltis triangulum*). Other reptiles in the planning area include collared lizard (*Crotaphytus collaris*), tree lizard (*Urosaurus ornatus*), side blotched lizard (*Uta stansburiana*), short-horned lizard (*Phrynosoma hernandesi*), plateau striped whiptail (*Cnemidophorus velox*), western whiptail (*Cnemidophorus tigris*), desert striped whipsnake (*Masticophis taeniatus*), western blackneck garter snake (*Thamnophis cyrtopsis*), wandering garter snake (*Thamnophis elegans vagrans*), western yellow-belly racer (*Coluber constrictor*), corn snake (*Elaphe guttata*), Mesa Verde night snake (*Hypsiglena torquata loreala*), Utah blackhead snake (*Tantilla planiceps*), and prairie rattlesnake (*Crotalus viridis*).

Waterfowl and Shorebirds

The numerous streams, rivers, reservoirs, ponds, associated riparian areas, and wetlands vegetation provide excellent habitat for a wide variety of waterfowl and shorebirds. Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), pintail (*Anas acuta*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca carolinensis*), American wigeon (*Anas americana*), and other waterfowl species winter along many of the major rivers within the planning area. Waterfowl production also occurs throughout the planning area. Important foraging areas include private lands in agricultural areas and within the river corridors.

Wading birds such as great blue heron (*Ardea herodias*), cattle egret (*Bubulcus ibis*), snowy egret (*Egretta thula*), and white-faced ibis (*Plegadis chihi*) are found throughout the planning area. Great blue heron foraging and breeding areas are primarily along rivers, streams, and ponds throughout the planning area. Killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), willet (*Tringa semipalmata*), and Wilson's phalarope (*Phalaropus tricolor*) are also commonly found within the planning area.

Upland Game Birds

Species common to the planning area include dusky grouse (*Dendragapus obscurus*; formerly known as blue grouse), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), and Merriam's turkey (*Meleagris gallopavo merriami*). Dusky grouse are widely distributed throughout the higher elevation woodlands and mixed mountain shrub, aspen, and coniferous forest habitats above 7,200 feet in the planning area. Turkeys use a variety of habitats, including riparian areas, mixed mountain shrub, and pinyon-juniper woodlands. Small flocks of chukar (*Alectoris chukar*) can also be found in the western portion of the planning area. Gunnison Sage-Grouse (*Centrocercus minimus*) and GRSG (*Centrocercus urophasianus*) exist in the decision area. GRSG occupy the sagebrush-dominant rangelands at lower elevations throughout the planning area and are discussed further in **Section 3.3**, Special Status Species.

Raptors

Raptors serve as important indicators of overall ecosystem health because they are keystone species at the top of the food web. Raptors are found throughout the planning area and include bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*B. swainsoni*), ferruginous hawk (*B. regalis*), osprey (*Pandion haliaetus*), northern harrier (*Circus cyaneus*), great-horned owl (*Bubo virginianus*), burrowing owl (*Athene cunicularia*), and flammulated owl (*Otus flammeolus*).

The BLM has particular management interest in concentrations of raptors, particularly bald eagles and golden eagles. Active nests of all species of raptors are protected under the Migratory Bird Treaty Act. Bald and golden eagles are also protected under the Bald and Golden Eagle Protection Act. Red-tailed hawks, golden eagles, Cooper's hawk (*Accipiter cooperii*), and sharp-shinned hawk (*A. striatus*) are the most common raptor species breeding and nesting in the planning area. Other raptors known to nest in the area include American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), and prairie falcons. Accipiters, such as the Cooper's hawk, goshawk, and sharp-shinned hawk, are primarily woodland nesting species and are common in the forested areas. Precipitous rock formations and large trees provide suitable nesting habitat for these species. The numerous songbirds and small mammal populations provide the primary prey base.

Cavity-Nesting Birds

Cavity nesting species are those species of birds that excavate nesting holes. These birds create cavities from decaying or dead trees or cavities created by other species. Historically, dead or decaying trees (called snags) have been considered undesirable by forest managers. They are now, however, being recognized as important components to forested areas. Some 85 species of birds are considered cavity nesters, including migratory birds, raptors, and waterfowl (Scott et al. 1977). Some of the cavity nesters known within the planning area include the tree swallow (*Tachycineta bicolor*), barn owl (*Tyto alba*), and the common goldeneye (*Bucephala clangula*). The Lewis's woodpecker (*Melanerpes lewis*) also exists in the planning area and inhabits open pine forests, burn areas, cottonwoods in riparian areas, and pinyon-juniper forests (Johnsgard 1986).

Migratory Birds

The planning area supports a wide variety of migratory bird species during the summer and winter, or as they migrate through the area. The habitat diversity provided by the broad expanses of sagebrush, mixed mountain shrub, aspen, pinyon-juniper woodlands, other types of coniferous forests, riparian areas, and wetlands support many species. The most abundant species found within the planning area include the mourning dove (*Zenaida macroura*), common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), sage thrasher (*Oreoscoptes montanus*), green-tailed towhee (*Pipilo chlorurus*), sage sparrow (*Amphispiza belli*), and Brewer's sparrow (*Spizella breweri*).

Other migratory bird species found within the planning area include, but are not limited to, dusky flycatcher (*Empidonax oberholseri*), plain titmouse (*Baeolophus inornatus*), house wren (*Troglodytes aedon*), loggerhead shrike (*Lanius ludovicianus*), black-crowned night-heron (*Nycticorax nycticorax*), yellow warbler (*Dendroica petechia*), Cassin's finch (*Carpodacus cassinii*), Grace's warbler (*Dendroica graciae*), juniper titmouse (*Baeolophus ridgwayi*), and pinyon jay (*Gymnorhinus cyanocephalus*).

Sandhill cranes use areas within the planning area as a migratory stopover in the fall and spring. Ponds and reservoirs managed by the BLM provide a migratory stopover for sandhill cranes. Long-billed curlew (*Numenius americanus*) occasionally nests in the desert areas near the Utah border.

Big Game Species

The three primary big game species in the planning area are elk, mule deer (*Odocoileus hemionus*), and pronghorn antelope. Bighorn sheep and moose exist in more limited numbers throughout the planning area, and their habitat is not as extensively managed. Important big game ranges in relation to PH and GH are identified in **Table 3.3**. Mule deer severe winter range in relation to PH and GH on leased or unleased federal mineral estate are identified in **Table 3.4**.

Table 3.3
Big Game Ranges in PH and GH on BLM-Administered Lands

Species/Range	PHPH (Acres)	ADH (Acres)
Elk		
Summer Range	712,200	1,522,200
Severe/Critical Winter Range	1,025,500	1,723,800
Mule Deer		
Summer Range	1,868,200	3,254,300
Severe/Critical Winter Range	561,000	1,134,600
Pronghorn		
Summer Range	1,920,400	2,896,500
Severe/Critical Winter Range	310,300	425,100

Source: BLM 2013

Table 3.4
Acres of Mule Deer Winter Range on Federal Mineral Estate

Location	Leased		Unleased	
	Mule Deer Winter Range		Mule Deer Winter Range	
	PHPH	ADH	PHPH	ADH
CRVFO	0	100	16,600	26,600
GJFO	0	3,000	0	1,400
KFO	14,100	14,100	45,600	55,900
LSFO	115,400	187,900	232,800	473,400
WRFO	17,500	98,900	3,000	59,800
Roan Plateau	0	0	0	0
Routt National Forest	10	10	500	500
Total	147,010	304,010	298,500	617,600

Source: BLM 2013

Note: Mule Deer Winter Range includes Mule Deer Critical Winter Range, Mule Deer Severe Winter Range, and Mule Deer Winter Concentration Areas.

Areas not available for mineral leasing (i.e., WSAs) are not included.

Habitat supporting elk and mule deer throughout the planning area are quite varied and include forested and shrublands, especially mountain shrub. Summer habitats tend to be more forested areas and occupy higher elevations. Production occurs in the best habitats within summer concentration areas and occurs in both forested areas and shrublands, with cover sometimes provided by trees and sometimes by topography. The White River herd is the largest of the elk herds in the planning area, with an estimated population range between 34,000 and 38,000 elk (CPW 2011a).

Elk and mule deer migrate to lower elevation sagebrush-dominant ridges and south-facing slopes in the winter. BLM-administered lands provide most of the winter range available to elk and mule deer in the planning area. Critical winter ranges for elk, mule deer, and pronghorn antelope are essential to the survival

of these species in the planning area. In several areas, large concentrations of big game species are degrading winter habitats.

Severe winter range is defined as that part of the winter range where 90 percent of the individuals are located when annual snowpack is at its maximum or temperatures are at a minimum in the two worst winters out of ten (CPW 2011). Critical winter range is defined as the winter habitat which is used during the most extreme portion of the winter (CPW 2011). There are several herds of mule deer whose range spans most of the planning area except for areas of high human concentrations. Mule deer occupy nearly all public lands during part of the year, with winter use being the most significant. During the winter, mule deer depend on the sagebrush steppe and mountain shrub habitats for survival. Winter concentrations of mule deer are observed in sagebrush habitats along the Colorado and Eagle Rivers.

Pronghorn antelope are present on BLM-administered lands in diffuse regions throughout the planning area. Pronghorn use habitat including sagebrush-dominant ridges and valleys as well as lower elevation desert areas. Their overall range consists primarily of salt desert and sagebrush shrublands and lowland grassland. The general distribution migrates to lower elevations in winter. Moose and bighorn sheep are present in more limited numbers within the planning area. Moose were introduced to Colorado by CPW in the late 1970s near North Park in willow and lodgepole pine habitat at an elevation of 8,850 to 9,350 feet. Since then, animals from this population have been reported in several adjacent areas, including Middle Park, the upper reaches of the Laramie and Cache la Poudre rivers, and Rocky Mountain National Park. Other sightings have been reported in South Park, near Leadville, near Gunnison, near Yampa, and west of Denver. In the east, moose occupy Routt National Forest, moving to higher elevations in the summer. Moose also move from these areas downstream along the Yampa River and up Elkhead Creek, where the headwaters have been designated as a moose concentration area. The habitat supporting moose in the planning area includes sagebrush, saltbush, and mountain shrub shrublands, as well as some willow, pinyon-juniper woodlands, and aspen forests. Concentration areas, including those used during winter, are found especially in saltbush, but also in sagebrush and mountain shrub habitats.

Moose and bighorn sheep are present in more limited numbers within the planning area. Moose were introduced to Colorado by CPW in the late 1970s near North Park in willow and lodgepole pine habitat at an elevation of 8,850 to 9,350 feet. Since then, animals from this population have been reported in several adjacent areas, including Middle Park, the upper reaches of the Laramie and Cache la Poudre rivers, and Rocky Mountain National Park. Other sightings have been reported in South Park, near Leadville, near Gunnison, near Yampa, and west of Denver. In the east, moose occupy Routt National Forest, moving to higher elevations in the summer. Moose also move from these areas downstream along the Yampa River and up Elkhead Creek, where the

headwaters have been designated as a moose concentration area. The habitat supporting moose in the planning area includes sagebrush, saltbush, and mountain shrub shrublands, as well as some willow, pinyon-juniper woodlands, and aspen forests.

The planning area contains both desert bighorn sheep (south of the Colorado River and west of the Gunnison River) and Rocky Mountain bighorn sheep (east of the Gunnison River and north of the Colorado River). Desert bighorn sheep is a BLM Sensitive species and is discussed in **Section 3.3**, Special Status Species. Bighorn sheep herds are widely scattered throughout the planning area and prefer high-visibility habitat. The habitat supporting use areas is primarily pinyon-juniper woodlands and adjacent sagebrush and mountain shrub habitat. Topography and rock cover play the most important role in the locations used within these habitats.

Bighorn sheep have been reintroduced into the Red Canyon area in North Park and may use portions of Sheep Mountain. Bighorn sheep are found primarily on National Forest System- and National Park Service-administered lands within Rocky Mountain National Park. However, this species is known to use BLM-administered lands in certain areas. The Battlement Mesa herd (Rocky Mountain Bighorn sheep unit S24) is found northwest of the town of Mesa, Colorado, and ranges across both BLM-administered and National Forest System lands. It is one of 34 native, indigenous herds in the State of Colorado and is one of the few low-elevation herds still persisting in native habitat. The Battlement Mesa population is approximately 50 individuals (Duckett 2012).

Other Key Mammal Species

Several other key mammal species are found within the planning area, such as the black bear (*Ursus americanus*), mountain lion, river otter (*Lutra canadensis*), white-tailed prairie dog (*Cynomys leucurus*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and red fox (*Vulpes vulpes*). These species are found within all habitat types, with coyotes being the most habitat-general species.

The habitats supporting black bear use areas are primarily pinyon-juniper woodland and aspen and coniferous forests. Habitat for mountain lion is found throughout the planning area where high densities and concentrations of mule deer are located. White-tailed prairie dogs are present in the lower elevations of the planning area. This sensitive species is described further in **Section 3.3**, Special Status Species. White-tailed prairie dog towns provide potential habitat for black-footed ferrets and are confined to shrublands, and almost exclusively to saltbush habitats, although a few colonies have been mapped in sagebrush or mountain shrub habitats.

An undetermined number of small mammals reside within the planning area, including ground squirrels, mice, chipmunks, rabbits, skunks, and raccoons. Many of these small mammals provide the main prey for raptors and larger carnivores.

Numerous bats use the abandoned mines and natural caves in the planning area. The Townsend's big-eared bat (*Corynorhinus townsendii*) is known to exist in the planning area. Common species observed include the silver-haired bat (*Lasiorycteris noctivagans*), followed by the big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), and long-legged bat (*Macrophyllum macrophyllum*) (Chung-MacCoubrey 2008).

Fish and Aquatic Wildlife

Aquatic habitats in the planning area consist of both lentic (still, as in ponds and lakes) and lotic (moving, as in streams and rivers) systems. Not all of the perennial aquatic habitats support fish, but it is very likely that most of the perennial waters support some abundance of aquatic insects. Amphibians are scattered across the landscape and may exist either exclusively or seasonally in a variety of aquatic habitat types. Within these aquatic systems, the diversity of habitats and differing elevations in which aquatic systems reside dictate the presence of a diverse array of fish and amphibian species. Within these aquatic systems, the diversity of habitats and differing elevations dictate the presence of a diverse array of fish and amphibian species.

Cold Water and Native Fish Species

Higher elevation waters located generally above 5,200 feet support cold water fishes, consisting primarily of brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and cutthroat trout (*Oncorhynchus clarkii*). The primary cold water game fish species include cutthroat, rainbow, brook, and brown trout. Of the five trout species found within the planning area, two are native species: the Colorado River cutthroat trout (*Salmo clarki pleuriticus*) and the greenback cutthroat trout. The greenback cutthroat trout is federally threatened, and the Colorado River cutthroat trout is listed as a BLM Sensitive Species. These species are discussed further in **Section 3.3**, Special Status Species. Other native fishes within the planning area include mountain whitefish (*Prosopium williamsoni*) and mottled sculpin (*Cottus bairdi*).

Several large reservoirs throughout the planning area provide important recreational fisheries for rainbow trout, lake trout (*Salvelinus namaycush*), and kokanee salmon (*Oncorhynchus nerka*). Other sport fish found in the reservoirs include, but are not limited to, brown trout, cutthroat trout, northern pike, and splake (*Salvelinus namaycush* x *Salvelinus fontinalis*). Most of these sport fish populations are maintained by CPW stocking programs.

Warm Water Fish Species

Waters generally below 6,500 feet support primarily cool water and warm water fishes, including nonnative northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), common carp (*Cyprinus carpio*), and walleye (*Stizostedion vitreum*). Additional

nonnative fish that may exist in the planning area include red shiner (*Cyprinella lutrensis*), fathead minnow (*Pimephales promelas*), and plains topminnow (*Fundulus sciaticus*).

Native warm water fish within the planning area include black bullhead (*Ameiurus melas*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanellus*), Johnny darter (*Etheostoma nigrum*), long-nose dace (*Rhinichthys cataractae*), bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), roundtail chub (*Gila robusta*), razorback sucker, creek chub (*Semotilus atromaculatus*), Colorado pikeminnow, plains killifish (*Fundulus zebrinus*), bonytail chub, and humpback chub. Speckled dace (*Rhinichthys osculus*) are the most widely distributed native non-game fish, found regularly in most perennial streams within the planning area. The long-nose sucker (*Catostomus catostomus*) and white sucker (*Catostomus commersonii*) are found in warm and cool water habitats and are also considered invasive, nonnative, or competitive species within the planning area. Special status fish species are discussed further in **Section 3.3, Special Status Species**.

Amphibians

Many species of amphibians are found within the planning area including the western chorus frog (*Pseudacris triseriata*), wood frog, Woodhouse's toad (*Bufo woodhousii*), boreal toad, northern leopard frog, and tiger salamanders (*Ambystoma tigrinum*). For a more complete discussion of special status amphibian species refer to **Section 3.3, Special Status Species**.

High elevation areas within the planning area contain sufficient aquatic habitat to support boreal toads. Lower elevation amphibians include the Great Basin spade-foot toad (*Spea intermontana*).

Conditions on National Forest System Lands

Routt National Forest

Wildlife

Terrestrial wildlife species on the Routt National Forest portion of the analysis area include many of the common mammals, birds, reptiles and amphibians addressed in the BLM wildlife section.

The species highlighted in section include the Routt National Forest MIS and elk.

Terrestrial Management Indicator Species

Vesper Sparrow (Poocetes gramineus). Vesper sparrow was selected as an MIS to represent issues associated with rangeland residual forage. Vesper sparrows are primarily summer residents on the Routt National Forest and use shrublands and grass/forb habitats within or near the planning area for breeding. Vesper sparrow habitat does overlap with mapped GRSG habitat within both PHPH and GH. In selecting the vesper sparrow as an MIS for the 1997 Revision of the

Routt National Forest Plan (Forest Service 1998), no concern existed for species viability or viability of local populations and “viability” was neither a rationale nor motivation for its inclusion on the Forest Service MIS list. All MIS selected in the 1997 Revision were chosen because they “reflect the habitat needs for the majority of the species inhabiting the Routt National Forest” (Forest Service 1998). The vesper sparrow was carried forward in the 2007 Plan Amendment of the Routt National Forest, because it was considered as an appropriate MIS and monitoring of this species will likely answer specific questions to management issues (Forest Service 2007).

Vesper sparrow breeds in grasslands, open shrublands mixed with grasslands, and open pinyon-juniper woodlands. Vesper sparrows have two broods per nesting season with three to six eggs per clutch (Kingery 1998). This species seeks a narrow set of habitat conditions within its nesting range (middle to high elevation sagebrush and grassland habitats) and subtle changes in these conditions (reductions in residual grass and forbs) can impact essential nesting habitat components (Kingery 1998).

In migration, this sparrow is found in open riparian and agricultural areas (Natural Diversity Information Source 2011a). Breeding Bird Atlas (Kingery 1998) data show that, in Colorado, the densest populations inhabit middle- to high-elevation sagebrush. The 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). This sparrow is rarely above timberline in late summer and fall. It appears that this species is occasionally present in these areas during the winter as described by the Colorado Natural Diversity Information Source website (Natural Diversity Information Source 2011a).

Wilson’s Warbler (*Wilsonia pusilla*). The 2007 Routt National Forest Plan Amendment of the Routt National Forest identifies the Wilson’s warbler as an indicator species for the “herbivory in riparian areas” management issue (Forest Service 2007). The Routt National Forest Plan identifies the Wilson’s warbler as a MIS associated with the “riparian/wetland” habitat complex (Forest Service 1998). Wilson’s warblers are summer residents on the Routt National Forest and use riparian and wetland habitats during their breeding season from about late May to mid-August. Though Wilson’s warblers are known for nesting in high elevation riparian/willow habitats, this warbler can be found as low as 6,000 feet in elevation (Kingery 1998). Uncontrolled livestock grazing in riparian areas and degradation of willow shrub riparian systems may adversely affect this species. In selecting the Wilson’s warbler as an MIS for the 1997 Revision of the Routt National Forest Plan (Forest Service 1998), no concern existed for species viability or viability of local populations and “viability” was neither a rationale nor motivation for its inclusion on the Forest MIS list. All MIS selected in the 1997 Revision were chosen because they “reflect the habitat needs for

the majority of the species inhabiting the Routt National Forest” (Forest Service 1998). The Wilson’s warbler was carried forward in the 2007 Plan Amendment of the Routt National Forest, because it was considered as an appropriate MIS and monitoring of this species will likely answer specific questions to management issues (Forest Service 2007).

The Wilson’s warbler was selected for this analysis to assess if changes to livestock grazing within riparian areas under the NTT direction or other alternatives influence the habitats of riparian dependent species, which may include the GRSG. Grazing and browsing by wild and domestic ungulates can have impacts on riparian vegetation that are important to GRSG. If managed improperly, grazing by domestic and wild ungulates can affect streams and can adversely impact the stream bank leading to long-term changes in stream and associated riparian communities. Grazing impacts on riparian systems has been identified as a problem in local areas on the Routt National Forest but has not been identified broadly. The Wilson’s warbler, a riparian dependent species, was selected to evaluate if riparian habitats are being maintained in a proper functioning condition.

The Wilson’s warbler breeds in willow thickets of lakeshores, stream banks, and wet meadows. These warblers nest in willow and alder thickets of stream banks, lake shores, and wet meadows. They may be the most common breeding birds in Colorado's montane and subalpine willow habitats (Andrews and Righter 1992). Wilson's warblers arrive on their breeding grounds in late May and lay eggs soon after. Most young leave their nests by mid-July. Fall migration begins in mid-August (Rocky Mountain Bird Observatory 2011). Migration occurs in riparian forests, shrublands, and wooded urban areas (Natural Diversity Information Source 2011b). Winter range includes northern Mexico south to Panama (Rocky Mountain Bird Observatory 2011).

The Wilson’s warbler is an insectivorous species and is part of the gleaning guild. This warbler displays foraging behavior and habitat selection where high populations of insects are present. Because the Wilson’s warbler is an active searcher for gleaning perches, this warbler has a narrow range of preferences in habitat structure (Eckhardt 1979). For foraging, the Wilson’s warbler prefers larger, more open shrubs surrounded by smaller shrubs (Ruth and Stanley 2002).

According to the Colorado Breeding Bird Atlas, the high altitude habitat of the Wilson’s warbler has few threats other than grazing, thus both species’ populations appears to be secure where appropriate management of grazing has been implemented (Kingery 1998).

Other Wildlife: Elk. The elk and deer winter range on the Routt National Forest is likely the most heavily used area by wildlife as well as domestic livestock. Approximately 1,300 acres of PHPH and 400 acres of GH overlap Management Area 5.41-Elk and Deer Winter Range on the Routt National Forest.

Table 3.5 includes Routt National Forest critical big game ranges present in GRSG PHPH and GH. Critical big game ranges are used in the spring, fall, and winter and may not have a chance to recover especially in heavy snow years when deer and elk are unable to move out of the wintering grounds.

Heavy snow years and cool weather in the spring may also affect GRSG habitat quality when wild and domestic ungulates are moving onto the Forest at about the same time. The cool weather delays the initiation of plant growth and does not provide the time for plants to grow or recover from last year's use before the ungulates begin use. In drier snow years, the wild ungulates can move onto the decision area prior to livestock and can have an influence on forage and habitat attributes important to GRSG. It is the Forest Service' responsibility to adjust livestock numbers according to wildlife use so that allowable use criteria are not exceeded. The Routt National Forest Plan (Forest Service 1998) Range Standards state, "remove livestock from the grazing unit or allotment when further utilization on key areas will exceed allowable-use criteria in the forest plan or allotment management plan."

Important big game ranges in relation to PHPH and GH are identified in **Table 3.5**.

Table 3.5
Big Game Ranges on PHPH and GH on the Routt National Forest

Species/Range	Total (Acres)	PHPH (Acres)	GH (Acres)
Designated Deer and Elk Winter Range	1,700	1,300	400

Source: Query of Forest Service GIS Database, Medicine Bow Routt National Forest, 2013

Fish and Aquatic Wildlife

The condition of aquatic organisms varies by the different geographic areas that contain GRSG habitat within the Routt National Forest. Streams in the Forest occupy a variety of settings ranging from steep narrow valleys with narrow floodplains and riparian areas to broad, low gradient valleys in the lower reaches. Water resources in areas with steep headwater stream channels provide little habitat for fish and amphibians. Drainages with active roads, livestock grazing, and logging are associated with marginal aquatic habitat and populations. Conversely, streams with more moderate gradients and broad floodplains provide more aquatic and riparian habitat.

Native fish species thought to have historically occupied streams in the Routt National Forest include Colorado River cutthroat trout, mountain sucker, speckled dace, and mottled sculpin. Colorado River cutthroat trout are part of CPW's Elkhead Creek conservation population (CPW Fish Management Unit YP-6) which comprises 41 miles of interconnected habitat. Nonnative white

sucker are also present in the larger streams. Nonnative brook trout currently occupy all perennial streams. Little Muddy Creek is thought to contain a healthy population of brook trout, and the North Platte River contains healthy populations of nonnative brook, brown, and rainbow trout. Habitat protection and restoration projects are ongoing within the Routt National Forest.

Wetlands are associated with beaver ponds along the streams in the Routt National Forest providing an abundance of suitable habitat for amphibians. Three native amphibians are found in the planning area: Western chorus frog, northern leopard frog, and boreal toad. Western chorus frogs are widely distributed in appropriate moist habitats across the Forest, including ponds, ephemeral pools and wet areas, marshes, wet meadows and lake margins. Northern leopard frogs are found primarily in beaver ponds. Breeding populations of boreal toad exist near the north end of California Park and in the Lake Agnes area.

Aquatic Management Indicator Species

Colorado River Cutthroat Trout (Oncorhynchus clarki pleuriticus). The Colorado River cutthroat trout range includes colder headwaters of the Green and Colorado rivers that include the Yampa River drainage in Colorado, Utah, and Wyoming (Young 1995). Recent work by Hirsch et al. (2006) estimates that Colorado River cutthroat trout 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).

Colorado River cutthroat trout have been documented on the Routt National Forest (December 2012 NRIS Wildlife database). This includes two sites within the analysis area—along multiple streams in GH 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 1st and Upper Colorado has 75 populations, ranked 2nd).

Colorado River cutthroat trout thrive in cold, clean water environments within high elevation streams and lakes that have well-vegetated stream banks for cover and bank stability. The decline of Colorado River cutthroat trout is attributed to the following threats: 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).

Brook Trout (Salvelinus fontinalis). Brook trout are nearly ubiquitous in most Routt National Forest 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 of species 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. Introduced brook trout have contributed to the decline of native fishes, amphibians, and invertebrates. In areas identified for Colorado River cutthroat trout restoration, brook trout are targeted for eradication. Methods such as depletion-removal electrofishing have significantly reduced populations and recruitment, but did not totally eradicate brook trout.

3.2.3 Trends

Trends on BLM-Administered Lands

For most fish and wildlife species, habitat loss and fragmentation have been and remain the primary cause for declining populations. Some of these species have also suffered from historic efforts to extirpate them, and some suffer competition or predation from species that have expanded their range or that have been introduced. Management efforts by the BLM, Forest Service, USFWS, CPW, and others have reversed the downward trend for a number of these populations, but few populations are near their historic levels.

Wildlife

Certain wildlife species are of high interest to the CPW due to their economic and recreational values. As a result, the CPW maintains accurate population estimates for these species including general trends for wildlife and aquatic species. CPW also maintains population estimates for other wildlife, such as GRS, due to the current interest in this species, and because its numbers are relatively easy to estimate each year as compared with other species (CPW 2004) General trend information for wildlife species that depend upon habitat managed by the BLM for at least part of their annual life cycle is discussed below.

Reptiles

No trend data are available at this time.

Waterfowl and Shorebirds

In the planning area, waterfowl populations have been high during wet years and low during dry years. Despite these fluctuations, the population trend within the planning area is believed to be stable.

Upland Game Birds

Generally dusky grouse and turkey populations are believed to be stable in Colorado. The trends for GRSG and Columbian sharp-tailed grouse are discussed further in **Section 3.3**, Special Status Species.

Raptors

In general, raptors that tolerate disturbance in the environment tend to have increasing populations while those species that require large patches of undisturbed habitat are declining (NatureServe 2012). The wide variety of habitats available within the planning area offers nesting and hunting habitat for these species. Population trends for raptors appear stable throughout the planning area.

Numerous active golden eagle nest sites have been documented on private and public lands within the planning area. Population levels throughout the planning area appear stable, as golden eagles can be readily observed in many vegetative types, especially during spring and summer. In addition to breeding season, some golden eagles remain in the area year-round.

Cavity-Nesting Birds

No trend data are available at this time.

Migratory Birds

Population trends for migratory birds vary by species and largely depend on associated habitat types. Habitat conditions for these species are relatively intact throughout the planning area and associated migratory bird populations are generally stable. However, populations of some migratory species are declining because of habitat loss and fragmentation within the planning area. Obligate bird species expected to be found in the sagebrush habitat type have been documented in sufficient numbers to indicate a stable or increasing trend.

Big Game Species

The CPW classifies all of the species described below as big game animals. Big game species are important due to the high level of public interest in them for their recreational value. The recreational opportunities provided by big game animals found within the planning area equate to high economic value to the CPW, as well as contribute to the economy of local communities.

Elk populations are stable to increasing within the planning area according to data maintained by CPW. Elk herd numbers are greater than long-term objectives within the KFO planning area. It is assumed that these stable/increasing trends are similar throughout the GRSG planning area.

Mule deer populations are stable to declining throughout the planning area. Mule deer are well below the carrying capacity of their habitat and below population objectives established by the CPW.

Pronghorn numbers steadily increased within the planning area since 1984. However, recent CPW surveys suggest pronghorn numbers are stable to declining within the planning area. Pronghorn numbers are within the range of CPW management objectives in the planning area.

Moose were introduced into southeast North Park in the late 1970s, and this population has continued to expand their range. These populations are increasing and are within the population objective range.

Rocky Mountain Bighorn sheep are believed to be stable at this time within the planning area. It is likely that populations of this species will continue to increase, assuming ongoing reintroduction efforts are successful.

Other Key Mammal Species

Black bear and mountain lion population estimates are generally deficient due to the difficulty in counting them accurately. In two reports, one by Martens (2006) and the other by Yost (2006), biologists for the CPW indicated that populations of these species are stable and likely increasing. The distribution and abundance of other small mammal and non-game populations in the planning area are unknown, poorly documented, or studies have been confined to a small geographic area.

Fish and Aquatic Wildlife

Fish Species

The CPW is the lead agency responsible for fisheries management of public waters in the State of Colorado. While some areas within the planning area are stocked by CPW, other areas are managed as wild self-sustaining fisheries. The population of cold water sport fish varies greatly across the planning area, however fish survey and management reports generally indicate a stable to increasing population.

Declines in populations are generally localized and largely due to a number of factors including alteration of habitat, water quality impairment, disease, hybridization, flow reductions resulting from water diversions and other water-depleting activities, and nonnative predatory sport fish.

Amphibians

No trend data are available at this time.

Trends on National Forest System Lands

Routt National Forest

Wildlife

Most wildlife species occur at desired population levels. Those species of concern are considered priorities for conservation and these include those

classified as threatened, endangered, or sensitive. Forest Service Sensitive species are addressed in **Appendix M**, US Forest Service Biological Evaluation. Species identified as indicators for this analysis include MIS and elk.

Management Indicator Species

Vesper Sparrow (Poocetes gramineus). Several sources of information are available and are useful for estimating current population trend and abundance for vesper sparrows on the Routt National Forest. These data reflect different landscape scales and include results that have been gathered over large geographic areas (i.e., the southern Rocky Mountains) as well as locally.

Though Breeding Bird Survey (BBS) (1966-2009) and Christmas Bird Count data indicate widespread and severe declines in eastern North America, the vesper sparrow appears relatively secure and stable in western North America, with declines in some regions (Sauer et al. 2011, NatureServe 2011a). Since 1990, there has been a positive population trend for vesper sparrow within the Colorado BBS region (Sauer et al. 2011). According to Kingery (1998), the vesper sparrow ranks 21 out of the 32 most abundant bird species in Colorado (and 21 out of 264 known breeding birds in the state). Kingery (1998) estimated that the vesper sparrow population ranges between 176,985 and 1,137,179 breeding pairs.

Based on the Breeding Evidence map in Kingery's (1998) Colorado Breeding Bird Atlas; this bird is well distributed and common within suitable habitat on the Routt National Forest. Natural Diversity Information Source (Natural Diversity Information Source 2011a) records also indicate that this bird is considered "common" for all of the counties that overlap the Routt National Forest, including Garfield, Grand, Jackson, Moffat, Rio Blanco, and Routt.

Existing habitat conditions for vesper sparrows across the Routt National Forest are well-suited to sustaining current populations of these birds. 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. Within PHPH and GH, suitable habitat does exist within the various MZs that intersect with the Routt National Forest.

Collectively, available population and habitat information suggests vesper sparrows on the Routt National Forest have a population trend that is currently stable but likely is increasing. In addition, the vesper sparrow is widely distributed on the Forest and is well-distributed throughout all shrubland and grassland areas in Colorado. BBS suggest that populations are increasing slightly in Colorado as well as across the southern Rocky Mountain region (Sauer et al. 2011). Conservation measures for the GRSG would likely benefit the vesper sparrow.

Wilson's Warbler (*Wilsonia pusilla*). Several sources of information are available and are useful for estimating current population trend and abundance for Wilson's warblers on the Routt National Forest. These data reflect different landscape scales and include results that have been gathered over large geographic areas (i.e., the southern Rocky Mountains) as well as locally. While none of these data are independently adequate to estimate Wilson's warbler 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 for these warblers on the Forest.

The Wilson's warbler experienced a significant population increase in western North America between 1978 and 1988 (NatureServe 2011b). However, conflicting information apparently exists at the state level, in which NatureServe (2011b) describes them as apparently secure within Colorado whereas the Rocky Mountain Bird Observatory Partners in Flight (2011) describes them as significantly declining. Kingery (1998) estimated their population in Colorado to range between 60,483 and 379,676 breeding pairs, thereby ranking it as the 53rd most common bird out of 264 breeding birds in Colorado.

Sauer et al. (2011) have analyzed bird count data gathered between 1966 and 2007 from BBS transects across North America. The results of their analyses are available at the continental scale and at other geographic scales as well. Across the Southern Rockies BBS Region, data has been collected nearly every spring on each of 41 BBS routes region-wide. Data derived from these surveys from 1966-2007 imply a significantly decreasing trend and since 1980, the trend is decreasing even more rapidly (Sauer et al. 2011).

Other estimates of Wilson's warbler abundance estimates have been derived for each county in Colorado through collaboration of the Colorado Division of Wildlife, Colorado State University, and the Colorado Natural Heritage Program. As a result of this collaborative effort, the Colorado Natural Diversity Information Source website (Natural Diversity Information Source 2011b) identifies the Wilson's warbler abundance as common (observed daily; 25 to 100 per day in appropriate season and habitat) for the counties of Garfield, Grand, Rio Blanco, and Routt. The warbler is considered fairly common (observed daily; 10 to 25 per day in appropriate season and habitat) for Jackson and Moffat counties. Additionally, raw data associated with this monitoring program is included in the Rocky Mountain Bird Observatory database. A query of the Rocky Mountain Bird Observatory database for this species provided positive (increasing) populations trend information on observations of Wilson's warbler from monitoring transects located on the Routt National Forest (Rocky Mountain Bird Observatory 2011).

The net status of habitat conditions on the Routt National Forest is uncertain. Kingery (1998) suggests that "the higher elevation habitats would seem to face

few threats other than grazing pressure, so the species, at least in Colorado, appears secure.” Though rangeland management practices have improved over the last 50 years such that impacts to willow and riparian habitats should have lessened over time, elk populations have increased in the same timeframe. Therefore, the riparian/willow habitats of the Wilson’s warbler may be suppressed, because elk will hedge and trample willows (Baker et al. 2005).

The information presented here has some conflicting estimates on trend. The Wilson’s warbler appears to be common in the Colorado (53rd most common out of 264 breeding bird species) (Kingery 1998) and Rocky Mountain Bird Observatory trend estimates suggest that this warbler is increasing. BBS suggest a declining trend within the southern Rocky Mountain region and the State of Colorado (Sauer et al. 2011). On the Routt National Forest, Wilson’s warblers are found in their preferred habitats when surveyed for, thus suggesting that this warbler is common on the planning unit. Trend and abundance information will need to be collected to verify the status of the Wilson’s warbler through the continued implementation of the Routt National Forest standardized survey. Conservation measures for the GRSG would likely benefit the Wilson’s warbler.

Colorado River Cutthroat Trout (Oncorhynchus clarki pleuriticus). Several sources of information are available and are useful for estimating current population trend and abundance for Colorado River cutthroat trout. The data used for Colorado River cutthroat trout is from various sources which include conservation plans, CPW stocking reports, and survey data from within the project area. While none of these data are independently adequate to estimate Colorado River cutthroat 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 for Colorado River cutthroat trout.

Behnke (1992) reported that pure Colorado River cutthroat trout populations were thought to occupy less than 1 percent of their historical range. More recent work by Hirsch et al. (2006) estimates that Colorado River cutthroat trout 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). The recent information update by Hirsch et al. (2006) identified 3,022 miles of occupied stream habitat in 42 4th level HUC’s. Of the 3,022 miles, 224 miles were outside of historical habitats identified by Behnke (1992), which adds an additional 1 percent, thus it is estimated that up to 14 percent of historical habitat is occupied by Colorado River cutthroat trout. The additional information was concluded to be the result of the establishment of an interagency Colorado River cutthroat trout Conservation Team in 1999. As the Colorado River cutthroat trout team focused their efforts many more populations were discovered or re-located. Through this effort “conservation populations” were identified based on genetic purity or if Colorado River cutthroat trout displayed unique life history traits and ecological characteristics

in the presence of hybridization. A “core conservation population” is a conservation population that is greater than 99 percent pure, and representative of the historic genome of native cutthroat trout. Of occupied habitat, 285 Colorado River cutthroat trout conservation populations were identified (Hirsch et al. 2006). The Yampa River Basin has 53 conservation populations identified in 79 streams or 339 miles of stream. The Yampa River Basin has the third highest number of conservation populations (Upper Green River Basin has 76 populations, ranked 1st and Upper Colorado has 75 populations, ranked 2nd).

Within the state of Colorado, the cutthroat trout is a game species that can be caught, but fishing regulations often require cutthroat to be released. Many cutthroat waters, specifically identified in the cutthroat conservation require fishing by artificial flies and lures and all cutthroat must be returned to the water immediately (CPW 2007). These restrictions are designed to protect the growing number of cutthroat streams and lakes included in conservation and recovery actions. CPW manages fisheries and stocking of approximately 173 lakes across the Routt National Forest. CPW is actively stocking mountain lakes on the Routt National Forest with an average of 58,000 cutthroats per year. There are several lakes that are managed as a pure cutthroat fishery. Many of the lakes are stocked at high numbers so that the cutthroat can successfully compete with the nonnative trout. Although the cutthroat trout are stocked at high numbers, competition, replacement, or hybridization probably is occurring. To provide for plausible replacement or hybridization occurring in these lakes, additional data was provided on the number of cutthroat lakes with other trout species present. Few lakes on the Routt National Forest are stocked by the CPW with brook or rainbow trout, because rainbow or brook trout populations can complicate restoration efforts for re-establishing native cutthroat trout populations.

For the preparation of the Forest Plan Revision (Forest Service 1998), 606 miles of streams were analyzed for four trout species: cutthroat, brook, brown, or rainbow trout. Of the 606 miles, 197 miles had cutthroat trout present (Routt National Forest 1996). Of the 197 miles of cutthroat streams, 37 miles had presence of brook trout, 3.5 miles had brown trout, and 7 miles had rainbow trout. Overall, 24 percent of the cutthroat streams have the presence of other trout species which suggests that replacement or hybridization is likely occurring.

There is uncertainty on how to define viability or stability among researchers for Colorado River cutthroat trout populations (Colorado River Cutthroat Trout Coordination Team 2006). Some small, isolated populations of Colorado River cutthroat trout have been stable for many years while other populations are at risk of decline. Hirsch et al. (2006) provided measures of population health which includes population connectivity, disease risk, genetic purity, population estimate, habitat condition, and presence of nonnatives for each

conservation population. Hirsch et al. (2006) is the first comprehensive attempt at assessing population viability or stability for Colorado River cutthroat trout populations. Until further understanding and agreement is reached by the Colorado River Cutthroat Trout Conservation Team on how to assess population viability and stability, a collective population trend across the Routt National Forest will not be provided.

Brook Trout (Salvelinus fontinalis). Several sources of information are available and are useful for estimating current population trend and abundance for brook trout. The data used for brook trout is from various sources which include CPW stocking reports and survey data from within 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 for brook trout.

Globally and nationally, the conservation status is G5 ~ Secure and N5 ~ Secure, respectively (NatureServe 2006). NatureServe (2006) does not have a conservation status rank for Colorado, because it is not a suitable target for conservation activities. Within the state of Colorado, the brook trout is a game species and can be harvested (CPW 2007). The daily bag limit is 4 and possession limit is up to 8. In addition to the 4 bag/8 possession limit, brook trout that are 8 inches or less, the daily bag and possession limit is 10 brook trout. The brook trout was first introduced into Colorado in the late 1800's (CPW 2006). In the early 1900's, 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 19th Century pioneers.

At a broad scale, brook trout are found to be abundant across the streams of the Routt National Forest. For the preparation of the Forest Plan Revision (1998), a GIS 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. Out of the 606 miles of streams analyzed, approximately 439 miles of stream had brook trout present (Forest Service 1996). Through this analysis it was estimated that 72 percent of the streams on the Routt National Forest have the presence of brook trout, but this percentage is likely higher with so few streams having only Colorado River cutthroat, brown, or rainbow trout present.

Collectively, available population and habitat information suggests brook trout on the Routt National Forest have a population trend that is stable or likely increasing. Except for streams that are designated as Colorado River cutthroat trout 'conservation populations', the brook trout is widely distributed across the Forest and is well-distributed in mountain streams, ponds, and lakes. The

Natural Diversity Information Source (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.

Other Wildlife: Elk

The Forest Service Range and Wildlife Programs continue to work collaboratively with the CPW to monitor changes in elk and deer numbers as well as vegetation. In addition, all three agencies, with assistance from the Habitat Partnership Program, have collaborated on wildlife habitat improvement projects for elk, deer, and GRS in northwest Colorado to improve habitat conditions and forage availability for elk and other wildlife species.

CPW adjust elk and deer herd objectives to address the land management agencies and the public's concern about competition for resources in northwest Colorado as Data Analysis Unit plans for deer and elk are developed. For example, during the development of the E-6 Data Analysis Unit plan for elk, which covers a large area in northwest Colorado, CPW recommended a 25 percent decrease in elk to address management concerns, which included maintenance of acceptable range and forage conditions, concerns regarding drought, potential impacts of oil and gas development on winter ranges, and elk and mule deer competition on winter range (Finley 2005). Due to issues and concerns raised by CPW, Forest Service, BLM, and the public during the development of the E-6 Data Analysis Unit plan, the elk herd objective was set at a recommended range of 32,000 to 39,000 (Finley 2005). Currently, the elk herds are estimated at a range of 36,000 to 40,000 based on the post-hunt data from 2011 (Finley 2012).

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3.3 SPECIAL STATUS SPECIES

The ESA requires that federal agencies ensure, in consultation with USFWS, that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered and threatened species, or result in the destruction or adverse modification of habitat of such species

that is determined critical by USFWS. There are three effect (impact) determinations for consultation:

- no effect (concludes consultation)
- may affect, not likely to adversely affect (effects must be discountable, insignificant, or completely beneficial for this determination; USFWS concurrence required)
- may affect, likely to adversely affect (the appropriate determination when adverse effects may occur as a direct or indirect consequence and are not discountable, insignificant, or completely beneficial; triggers formal consultation and requires a Biological Assessment from the action agency and, subsequently, a Biological Opinion from USFWS)

BLM

Special status species include animal or plant species that are formally designated by USFWS as federally endangered or threatened, proposed for listing, or candidates for listing. They also include those species designated by the CPW as state endangered or threatened Species, and those identified as BLM Sensitive species in the State of Colorado.

Responsibilities for management of federally listed, proposed, or candidate species are outlined in the ESA, as well as in the BLM Special Status Species Manual (Manual 6840; BLM 2008). The policy for management of federally listed species is to not authorize, fund, or implement any actions that are likely to jeopardize the continued existence of listed species, or to destroy or adversely modify designated critical habitat, and to develop programs to conserve listed species.

The goal of special status species management is to improve or provide habitat for the species that may exist on public lands in order to maintain viable populations of these species. Principal considerations include management of species habitat in order to ensure continued use by these species, identification of areas where other resource activities may conflict with special status species and their habitat requirements, and incorporation of programmatic consultations and conservation strategies.

Species discussed in this section have been listed by USFWS or by the State of Colorado, or have been placed on the Colorado BLM State Director's sensitive species list. The USFWS manages threatened and endangered species and designated critical habitat, in cooperation with other federal agencies, in order to support recovery. The BLM cooperates with USFWS in order to determine and manage habitats to support the species. Candidate species are managed in a manner designed to maintain viable populations, with the objective of preventing the need for them to be listed by the federal government. Under the ESA, federally listed threatened and endangered species require specific management.

The ESA requires a consultation with USFWS (a Section 7 consultation) on any actions taken that are planned to occur where these species reside.

The BLM Special Status Species Manual defines Special Status Species as:

- species listed, or proposed for listing, under the ESA; and
- species requiring special management consideration in order to promote their conservation and to reduce the likelihood and need for future listing under the ESA, which are designated as BLM Sensitive by the BLM State Director(s).

All federal candidate species, proposed species, and delisted species in the 5 years following delisting, will be conserved as BLM Sensitive species. Species designated as BLM Sensitive species must be native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either:

- there is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or
- the species depends upon ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008).

It is BLM policy to provide BLM Sensitive species with the same level of protection that is given federal candidate species. The major objective of this protection is to preclude the need for federal listing.

Forest Service

The Forest Service has policy and direction on how wildlife, fish, and plant species and their habitats are managed. These species may be threatened, endangered, or sensitive plants and animals. Direction on how these species should be managed is described in the Forest Service Manual 2600, Chapter 2670. The 2670.12 US Department of Agriculture Directives, Departmental Regulation 9500-4, provides regulation and directs the Forest Service to:

1. Manage “habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species.”
2. Conduct activities and programs “to assist in the identification and recovery of threatened and endangered plant and animal species.”

3. Avoid actions “which may cause a species to become threatened or endangered.”

Federal land management agencies must consult on any action that may affect a federally listed species (threatened or endangered) and must conference on any action that may affect a species proposed for listing. Section 7(c)(1) of the ESA requires a Biological Assessment be performed if a listed species or critical habitat may be present in the action area (US Department of Agriculture 2011).

The Forest Service has developed policy regarding the designation of plant and animal species (Forest Service Manual 2670.32; Region 2 Forest Service Manual Supplement 2670-2011-1). In the Rocky Mountain Region, species are identified as Forest Service Sensitive, and are included on a comprehensive list, using eight evaluation criteria to determine the merits of sensitive status for a particular species (Forest Service Manual 2672.11, Region 2 Forest Service Manual Supplement No. 2600-2003-1, Exhibit 02). The Regional Forester's list was last updated in 2011 (Holifield 2011). All candidate species are automatically placed on the Forest Service Sensitive species list. As such, because GRSG is a candidate species, it also is a Forest Service Sensitive species.

3.3.1 Existing Conditions

Conditions of the Planning Area

There are 14 federally listed wildlife species and 9 listed plant species in the planning area. In addition, the planning area includes five candidates for federal listing, including the GRSG. These species may also be listed as sensitive by the BLM/Forest Service or as priority species by the State of Colorado. Within the planning area, the distribution of most of the special status wildlife species is known from land health assessment comments, Colorado Natural Heritage Program, CPW GIS data, Rocky Mountain Bird Observatory, field surveys, and other reports. Limited inventories and surveys have been conducted for special status wildlife species in the planning area. Specific management direction to influence habitat components, leading to species recovery, is integrated into BLM and Forest Service management plans.

Table 3.6 and **Table 3.7** summarize those species located in the planning area and in which field office(s) or National Forest their habitat exists. These are also displayed in **Figure 3-3**. The tables include each species' listing status and its habitat requirements. GRSG is discussed in more detail following the tables.

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
MAMMALS									
American marten	<i>Martes Americana</i>	FSS	Mature coniferous and mixed deciduous forest				X		X
Big free-tailed bat	<i>Nyctinomops macrotis</i>	BLMS	Found in rocky canyons where it roosts in crevices		X			X	
Black-footed ferret	<i>Mustela nigripes</i>	FE, SE	Occupies prairie dog towns almost exclusively; prairie dog prey base in the planning area unlikely to be large enough to support breeding population				X	X	
Canada lynx ³	<i>Lynx canadensis</i>	FT (P), SE	Habitat suitable to support viable populations of lynx is thought to consist of 15- to 25-square-mile areas of contiguous Spruce-fir and lodgepole pine forests on slopes of less than 30 percent	X	X	X	X	X	X
Fringed myotis	<i>Myotis thysanodes</i>	BLMS, FSS	Coniferous forest and woodland; ponderosa pine, pinyon-juniper, greasewood, saltbush and oak; roosts in rock crevices, caves, abandoned mines and buildings and trees; hibernates in caves and buildings	X	X			X	X
Gray wolf ⁴	<i>Canis lupus</i>	FC, SE	Range through mixed open and forestland with abundant prey; can disperse long distances when not taken by humans						

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Hoary bat	<i>Lasiurus cinereus</i>	FSS	Roosts primarily in foliage of coniferous trees, occasionally in caves, and forages over open areas				X	X	X
North ⁴ American wolverine	<i>Gulo gulo</i>	SE, FC, FS, SE-S	Dense forest at higher elevations; nearly extirpated from Colorado			X	X		X
Pygmy shrew	<i>Sorex hoyi</i>	FSS	Open wet areas in coniferous and deciduous forests						X
Rocky Mountain bighorn sheep	<i>Ovis canadensis</i>	FSS	Found in alpine meadows, grassy mountain slopes and foothills near rugged, rocky cliffs and bluffs		X	X			X
Southwest river otter	<i>Lutra canadensis sonora</i>	SE, FS, SE-S	Inhabits high quality riparian areas along permanent water with abundant food base	X	X	X	X	X	X
Spotted bat	<i>Euderma maculatum</i>	BLMS, FSS	Found in cliffs, dense forests, agricultural fields, marshes, riparian areas and shrub-steppe grasslands		X		X	X	X
Swift fox	<i>Vulpes velox</i>	BLMS, FSS	Dens in sandy soils of deserts and short-grass prairies				X		
Townsend's big eared bat	<i>Corynorhinus townsendii pallescens</i>	BLMS, FSS	Roosts and hibernates usually in caves and abandoned mines; however, may roost in old buildings, tunnels and bridges; typically feeds along riparian habitat, open areas, edge habitats	X	X	X		X	X

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
White-tailed prairie dog	<i>Cynomys leucurus</i>	BLMS, FSS	Found in valleys between 5,000 and 10,000 feet in desert grasslands and shrub grasslands	X	X	X	X	X	
BIRDS									
American peregrine falcon	<i>Falco peregrinus anatum</i>	BLMS, SC, FS, SC-S	Nests in high cliffs and hunts along riparian zones, especially the Colorado river and uplands above the Roan cliffs	X	X	X	X	X	X
American white pelican	<i>Pelecanus erythrorhynchos</i>	BLMS	Found in open areas of brackish or freshwater lakes near vegetation or rocks	X	X	X	X	X	X
Bald eagle	<i>Haliaeetus leucocephalus</i>	FS, ST FSS Protected under Bald and Golden Eagle Protection Act	Nests in tall trees (typically mature cottonwood in this area) along the Colorado River and hunt along the river and adjacent uplands; seasonal migrant/historic resident	X	X	X	X	X	X
Barrow's goldeneye	<i>Bucephala islandica</i>	BLMS	Breeds in wooded lakes and ponds of western mountains						
Black swift	<i>Cypseloides niger</i>	BLMS, FSS	Nests on steep cliffs near waterfalls and forages in high elevation areas			X			X
Black tern	<i>Chlidonias niger</i>	BLMS FSS	Freshwater marshes, nesting on floating material or near-shore vegetation			X			
Boreal owl	<i>Aegolius funereus</i>	FSS	Cavity nester in dense coniferous forests			X			X

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Brewer's sparrow	<i>Spizella breweri</i>	BLMS, FSS	Sagebrush/shrubland obligate, found on mesas and foothills in dense stands interspersed with grassy areas	X	X	X	X	X	X
Columbian sharp-tailed grouse	<i>Tympanuchus phasianellus columbianus</i>	SE, BLMS, FSS	Breeding in grassland, savanna, partially cleared boreal forest, shrubland, and sagebrush; leks are usually found on small knolls; nests in small depression in grass or under a shrub; may be a seasonal migrant	X		X	X	X	X
Ferruginous hawk	<i>Buteo regalis</i>	BLMS, SC, FSS	Breeding: open country (prairies, plains, badlands); nests in tree with commanding view, on ground, bank, butte or slope; historic and seasonal migrants	X	X	X	X	X	
Flammulated owl	<i>Otus flammeolus</i>	FSS	Cavity nester in mature mixed coniferous forests, primarily Douglas fir and ponderosa pine; migratory				X	X	X
Golden eagle	<i>Aquila chrysaetos</i>	Protected under Bald and Golden Eagle Protection Act	Nest in cliffs, tall trees or human structures; forage over large areas	X	X	X	X	X	X
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	BLMS, FC(w), FS	Breeding in sagebrush, nests under sagebrush	X	X	X	X	X	X

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Greater sandhill crane	<i>Grus canadensis tabida</i>	ST	Breeding in shallow wetlands, freshwater margins; nests on ground and requires surrounding water or undisturbed habitat; seasonal migrant	X	X	X	X	X	
Gunnison Sage-Grouse	<i>Centrocercus minimus</i>	FP, FSS	Breeding in sagebrush, nests under sagebrush		X				
Least tern	<i>Sterna antillarum</i>	FE, SE	Bare sand on shorelines of rivers, lakes, and reservoirs			X ²			
Lewis's woodpecker	<i>Melanerpes lewis</i>	FSS	Open pine woodlands, and other areas with scattered trees and snags		X	X	X		X
Loggerhead shrike	<i>Lanius ludovicianus</i>	FSS	Open grassland, pasture, sagebrush, and desert		X		X	X	X
Long-billed curlew	<i>Numenius americanus</i>	BLMS, SC, FSS	Short-growth grasslands, mixed-grass prairies, meadows, scrub communities, cultivated fields, mud flats, salt marshes and edges of ponds, and lakes	X	X	X	X	X	
Mexican spotted owl	<i>Strix occidentalis</i>	FT, ST	Breeding: in dense old growth conifer (especially old growth fir) and deciduous (especially in steep walled canyons); nests in cliffs and abandoned platform nests of raven, eagle and hawks	X		X	X		
Mountain plover	<i>Charadrius montanus</i>	BLMS, PT, SC, FSS	Nests in flat dry land with sparse vegetation: short-grass prairie, farms, shrub-steppe, grazed areas			X	X		

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Northern goshawk	<i>Accipiter gentilis</i>	BLMS, FSS	Breeding: mixed, often mostly coniferous, forest, open woodland typically in mature aspen, mixed aspen/conifer and in lodgepole pine; nest in crotch or by trunk, occasionally in aspen	X	X	X	X	X	X
Northern harrier	<i>Circus cyaneus</i>	FSS	Wet grassland and marshes; less common in dry grassland, shrub-steppe and desert		X	X	X	X	X
Olive-sided flycatcher	<i>Contopus cooperi</i>	FSS	Coniferous forests and mixed woodlands, early colonizer after fire			X	X	X	X
Piping plover	<i>Charadrius melodus circumcinctus</i>	FT, ST	Open, sparsely vegetated sand and gravel near alkali wetlands, beaches and sandbars			X ²			
Purple martin	<i>Progne subis</i>	FSS	Breed in open areas near water, nest in cavities				X	X	X
Sage sparrow	<i>Amphispiza belli</i>	FSS, BLMS	Found in sagebrush shrub-steppe; sagebrush obligate species	X	X	X	X	X	X
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE, SE,	Breeding in willow (and tamarisk) thickets along rivers and streams; nests in upright or slanting fork; Colorado River, west of Rifle, Colorado						

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Western burrowing owl	<i>Athene cunicularia</i>	ST, BLMS, FSS	Breeding: grassland, prairie, savanna, open areas near human habitation; nests in burrows, often associated with prairie dog towns	X	X	X	X	X	
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	BLMS, SC	Breeding in beaches and dry mud or salt flats; sand margins of rivers, lakes, and ponds			X			
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	FC, FSS	Cottonwood-willow galleries along streams and river corridors	X	X	X	X		
White-faced ibis	<i>Plegadis chihi</i>	BLMS	Breeds in marsh, swamps, ponds, rivers-mostly freshwater, nests in aquatic vegetation, usually on ground but occasionally in shrubs or low trees; may be seasonal migrant	X	X	X	X	X	
White-tailed ptarmigan	<i>Lagopus leucurus</i>	FSS	Alpine and sub-alpine habitats			X			X
Whooping crane	<i>Grus americana</i>	FE, SE	Seasonal migrant with sandhill cranes			X ²			
FISH									
Bluehead sucker	<i>Catostomus discobolus</i>	BLMS FSS	Colorado River Basin	X	X	X	X	X	
Bonytail chub	<i>Gila elegans</i>	FE, SE	Critical habitat: Colorado River, Yampa River, Dinosaur National Monument west, Ruby Canyon west (not in planning area)	X	X	X ²	X	X ²	

Table 3.6
Special Status Animal Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Colorado River cutthroat trout	<i>Oncorhynchus clarkii pleuriticus</i>	BLMS, FSS, SC	Tributaries to the Colorado River Basin	X	X	X	X	X	
Flannelmouth sucker	<i>Catostomus latipinnis</i>	BLMS, FSS	Colorado River Basin	X	X	X	X	X	
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	FE, SE	Upper Colorado River Basin	X	X	X ²	X	X	
Greenback cutthroat trout	<i>Oncorhynchus clarkii stomias</i>	FT, ST	South Platte and Arkansas Rivers	X	X	X	X		
Humpback chub	<i>Gila cypha</i>	FE, SC	Critical habitat: Colorado River, Yampa River, Dinosaur National Monument west, Ruby Canyon west (not in planning area)	X	X	X ²	X	X ²	
Mountain sucker	<i>Catostomus platyrhynchus</i>	BLMS, SC, FSS, SC-S	Colorado River Basin	X			X	X	X
Pallid sturgeon	<i>Scaphirhynchus albus</i>	FE, SE	North Platte and Missouri Rivers			X ²			
Razorback sucker	<i>Xyrauchen texanus</i>	FE, SE	Critical habitat: Colorado River, Rifle west, Yampa River, Gunnison River	X	X	X ²	X	X ²	
Roundtail chub	<i>Gila robusta</i>	BLMS, SC, FSS, SC-S	Colorado River Basin	X	X	X	X	X	X
REPTILES									
Midget faded rattlesnake	<i>Crotalus viridis concolor</i>	BLMS, SC	Desert scrub, rocky outcrops, canyonlands	X	X		X	X	

**Table 3.6
Special Status Animal Species in the Planning Area**

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
AMPHIBIANS									
Boreal toad	<i>Bufo boreas boreas</i>	FC (w), ST, BLMS, FSS	Wetlands, elevation range from 8,000 to 12,000 feet	X		X	X		X
Great Basin spadefoot	<i>Spea intermontana</i>	BLMS, SC	Pinyon-juniper, sagebrush, semi-desert shrub, dry rocky slopes and canyons, elevation range less than 6,000 feet	X	X		X	X	
Milk snake	<i>Lampropeltis triangulum taylori</i>	BLMS, SC	Forested or open areas and rocky slopes	X	X			X	
Northern leopard frog	<i>Rana pipiens</i>	BLMS, SC, FSS, SC-S	Wetlands, ponds, riparian areas, elevation range up to 11,000 feet	X	X	X	X	X	X
Wood frog	<i>Rana sylvatica</i>	SC, FSS, SC-S	Forest and woodland habitats, and at edges of ponds and streams			X			X

¹Status Codes:

- FE Federally listed as endangered
- FT Federally listed as threatened
- FC Federally listed as a candidate species
- FP Federally proposed for listing as endangered
- SE State listed as endangered
- ST State listed as threatened
- SC State listed as species of special concern (no legal status)
- BLMS Colorado BLM Sensitive
- FSS Forest Service Sensitive

² These species do not occur in the KFO planning area, but water depletions may affect the species and/or critical habitat in downstream reaches.

³ These species are relatively uncommon species in the BLM planning area.

⁴ These species are unlikely to occur in the BLM planning area.

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Bladder's-mouth orchid	<i>Malaxis brachypoda</i> (= <i>M. monophyllum</i> spp. <i>Brachypoda</i>)	FSS	Riparian areas (7,200-8,000 feet)						X
Autumn willow	<i>Salix serissima</i>	FSS	Wetland areas including marshes, fens, and bogs (7,800-10,200 feet)						X
Boat-shaped bugseed	<i>Corispermum navicula</i>	BLMS	Endemic to cold climate dunes in northern Colorado			X			
Cathedral Bluff dwarf gentian	<i>Gentianella tortuosa</i>	BLMS	Barren shale knolls and slopes of the Green River Formation (8,500-10,800 feet)					X	
Cathedral Bluffs meadow-rue	<i>Thalictrum heliophilum</i>	BLMS	Dry shale barren communities in Garfield, Mesa, and Rio Blanco Counties in northwestern Colorado (6,200-8,800 feet)	X	X			X	
Clay hill buckwheat	<i>Eriogonum viridulum</i>	BLMS	Sand flats or clay slopes and hills, saltbush or sagebrush communities, pinyon-juniper woodlands				X		
Club spikemoss	<i>Selaginella selaginoides</i>	FSS	Marshy areas and wet spruce forests; east side of the Park Range						X

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
DeBeque milkvetch	<i>Astragalus debequaeu</i>	BLMS	Saline, selenium rich soils found on barren outcrops of dark clay interspersed with lenses of sandstone (5,100-6,400 feet)		X				
DeBeque phacelia	<i>Phacelia submutica</i>	FT	fine-textured, sandy, clay soils (4,970-6,500 feet)		X				
Colorado feverfew	<i>Parthenium ligulatum</i> (<i>Bolophyta ligulata</i>)	BLMS	Gypseous shale soils; bare clayey and gravelly areas				X		
Colorado hookless cactus	<i>Sclerocactus glaucus</i>	FT	Deserts, sagebrush/scrublands (3,900-6,000 feet)		X				
Colorado tansy aster	<i>Machaeranthera coloradoensis</i>	FSS	Mountain parks, slopes and rock outcrops and dry tundra (8,500-12,500 feet)						X
Debris milkvetch	<i>Astragalus desperatus</i>	BLMS	Pinyon-juniper and mixed desert shrub, often on rocky soils ranging from sandy clays to sandy loams; also alluvial terraces with cobbles (5,400-7,200 feet)				X	X	
Dropleaf buckwheat	<i>Eriogonum exilifolium</i>	FSS	Sagebrush flats; North and Middle Parks (7,500-9,000 feet)			X			X
Duchesne milkvetch	<i>Astragalus duchesnensis</i>	BLMS	Pinyon-juniper woodland and desert shrub, around sandstone or shale outcrops (4,600-6,400 feet)				X	X	

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Dudley Bluffs bladderpod	<i>Physaria congesta</i>	FT	Barren, white shale outcrops of the Green River and Uinta Formations (6,000-6,700 feet)					X	
Dudley Bluffs Twinpod	<i>Physaria obcordata</i>	FT	Barren, white outcrops and steep slopes of the Parachute Creek Member of the Green River Formation (5,900-7,500 feet)					X	
Dwarf raspberry	<i>Rubus arcticus</i> var. <i>acaulis</i> (= <i>Cylactis arctica</i> ssp. <i>Acaulis</i>)	FSS	Wetlands in willow carrs and mossy stream sides (8,600-9,700 feet)						X
Elliptic spikerush	<i>Eleocharis elliptica</i>	FSS	Wetlands; widely distributed in North America but with few confirmed Colorado records						X
Ephedra buckwheat	<i>Eriogonum ephedroides</i>	BLMS	Shale and clay flats of slopes in saltbush, sage and pinyon-juniper habitats (4,900-6,900 feet)				X	X	
Flaming Gorge evening primrose	<i>Oenothera acutissima</i>	BLMS	Seasonally wet areas in meadows, depressions or along arroyos, mixed conifer forest to sagebrush, on sandy gravelly, or rocky soils (5,300-8,500 feet)				X	X	

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Fragile rockbrake	<i>Cryptogramma stelleri</i>	BLMS	Rarely seen fern that exists in cool, moist, sheltered calcareous cliff crevices and rock ledges, typically in coniferous forest or other boreal habitats			X			
Gibbens' beardtongue	<i>Penstemon gibbensii</i>	BLMS	Shale and sandy clay in sagebrush, saltbush and pinyon-juniper woodland				X		
Graham's beardtongue	<i>Penstemon grahamii</i>	FC (w), FSS	Talus slopes and knolls of the Green River Formation in sparsely vegetated desert scrub and pinyon-juniper (5,800-6,000 feet)					X	X
Hairy Townsend daisy	<i>Townsendia strigosa</i>	BLMS	Open sites, sands, shales, clays with desert scrub, juniper, pinyon				X		
Harrington's penstemon (Harrington's beardtongue)	<i>Penstemon harringtonii</i>	BLMS, FSS	Found in open sagebrush shrublands (<i>Artemisia tridentata</i> ssp. <i>pauciflora</i> or <i>A. tridentata</i> ssp. <i>Wyomingensis</i>) on rocky loams or rocky clay loams derived from coarse calcareous parent materials (basalt) (6,200-10,000 feet)	X		X			X
Hoary willow	<i>Salix candida</i>	FSS	Fens and pond and stream edges in foothill/montane wetlands (8,800-10,600 feet)						X

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Largeflower triteleia	<i>Triteleia grandiflora</i>	FSS	Full sunlight to partial shade in meadows, grasslands, sagebrush, pinyon-juniper woodlands, aspen woodlands, pine forests, and scattered woodlands (7,760 feet)						X
Lesser bladderpod	<i>Utricularia minor</i>	FSS	Shallow water of subalpine ponds (5,500-9,000 feet)						X
Lesser panicled sedge	<i>Carex diandra</i>	FSS	Wet meadows and subalpine willow cars (7,400-9,000 feet)			X			X
Ligulate feverfew	<i>Bolophyta ligulata</i> (<i>Parthenium ligulatum</i>)	BLMS	Barren shale knolls (5,400-6,500 feet)					X	
Narrow-leaved moonwort	<i>Botrychium lineare</i>	FSS	Disturbed sites, grassy slopes among medium height grasses, along edges of streamside forests, alpine areas and aspen forests (7,900-9,500 feet)			X			X
Narrow-stem gilia	<i>Gilia stenothyrsa</i>	BLMS	Grassland, sagebrush, mountain mahogany, or pinyon-juniper; silty to gravelly loam soils of the Green River formation (6,200-8,600 feet)					X	
Naturita milkvetch	<i>Astragalus naturitensis</i>	BLMS	Sandstone ledges and canyon rims pinyon-juniper woodland (5,400-6,200 feet)		X				

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
North Park phacelia	<i>Phacelia formosula</i>	FE	Barren exposures where Coalmont Formation forms outcrops or ledges of sandy soil or ledges; most abundant on steep, sparsely vegetated, erodible slopes (such as on the sides of deep ravines)			X			
Osterhout milkvetch	<i>Astragalus osterhoutii</i>	FE, BLMS	Indigenous to Grand County, this species prefers alkaline, selenium-rich clay soils derived mostly from Niobrara and Pierre shale; found between 7,500 and 7,700 feet on barren and relatively flat areas			X			
Pale blue-eyed grass	<i>Sisyrinchium pallidum</i>	BLMS	Prefers fens, wet meadows, and stream edges			X			
Parachute penstemon (Parachute beardtongue)	<i>Penstemon debilis</i>	FT	Steep talus slopes of the Parachute Creek Member of the Green River Shale Formation in Garfield County (8,000-9,000 feet)	X					
Park Milkvetch	<i>Astragalus leptaleus</i>	FSS	Moist swales and meadows; South Park to the Wet Mountain Valley (7,500-10,000 feet)						X
Paradox moonwort	<i>Botrychium paradoxum</i>	FSS	Grassy meadows, gravelly road sides, low herbaceous cover under small conifer saplings; probably at 5,000–9,000 feet; 2 small sites in Colorado.						X

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Penland alpine fen mustard	<i>Eutrema penlandii</i>	FT	Alpine tundra habitat above 12,000 feet			X			
Penland beardtongue	<i>Penstemon penlandii</i>	FE, BLMS	Indigenous to Grand County, this species is found in run-off channels shaded by deeply cut banks			X			
Piceance bladderpod	<i>Lesquerella parviflora</i>	BLMS	Shale outcrops of the Green River Formation, on ledges and slopes of canyons in open areas (6,200-8,600 feet)		X			X	
Roan Cliffs blazingstar	<i>Mentzelia rhizomata</i>	BLMS	Steep talus slopes of the Green River Shale Formation in Garfield County (5,800-9,000 feet)	X					
Rock tansy	<i>Sphaeromeria capitata</i>	BLMS	Dry, rocky hills (5,000-7,800 feet)				X		
Rollins cryptantha	<i>Cryptantha rollinsii</i> (<i>Oreocarya rollinsii</i>)	BLMS	White shale slopes of the Green River Formation, in pinyon-juniper or cold desert shrub communities (5,300-5,800 feet)					X	
Selkirk violet	<i>Viola selkirkii</i>	FSS	Forests from montane to subalpine (6,000-9,100 feet)						X
Singlestem buckwheat	<i>Eriogonum acaule</i>	BLMS	Gravelly or clayey flats and slopes, saltbush or sagebrush (6,500-8,000 feet)				X		
Slender cotton grass	<i>Eriophorum gracile</i>		Montane and subalpine wetlands, wet meadows and pond edges (8,100-12,000 feet)			X			X

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
Tufted cryptantha	<i>Cryptantha caespitosa</i> (<i>Oreocarya caespitosa</i>)	BLMS	Sparsely vegetated shale knolls, with pinyon-juniper or sagebrush; usually with other cushion plants (5,500-8,100 feet)				X	X	
Uinta Basin springparsley	<i>Cymopterus duchesnensis</i>	BLMS	Desert shrub, sagebrush, and juniper; sandy clay and clay soils (4,700-6,800 feet)				X		
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	FT	Moist meadows, alluvial banks, oxbows and floodplains of perennial streams (720-7,000 feet)			X	X	X	
Weber's monkey flower	<i>Mimulus gemmiparus</i>	FSS	Granitic seeps, slopes, and alluvium in open sites within spruce-fir and aspen forests (8,500-10,500 feet)			X			X
Weber's scarlet-gilia	<i>Ipomopsis aggregata</i> ssp. <i>weberi</i>	FSS	Forb or shrub dominated montane meadows (6,560-10,500 feet); a narrow endemic known from the Park Range			X			X
Western prairie fringed orchid	<i>Platanthera praeclara</i>	FT	Associated with sedge meadows in the Great Plains, primarily within tall grass prairie in fire- and grazing-adapted grassland communities			X			

Table 3.7
Special Status Plant Species in the Planning Area

Common Name	Scientific Name	Status ¹	General Habitat	CRVFO	GJFO	KFO	LSFO	WRFO	Routt National Forest
White River beardtongue	<i>Penstemon scariosus</i> var. <i>albifluvis</i>	FC, FSS	Sparsely vegetated shale slopes of the Green River Formation Desert in shrub and pinyon-juniper communities (5,000-7,200 feet)					X	
Woodside buckwheat	<i>Eriogonum tumulosum</i>	BLMS	Gravelly to clayey soils, saltbush sagebrush, and pinyon-juniper woodlands (5,000-7,500 feet)				X		
Yellow lady's slipper	<i>Cypripedium parviflorum</i>		Moist forests and aspen groves (7,400-8,500 feet)						X

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² These species do not occur in the KFO planning area, but water depletions may affect the species and/or critical habitat in downstream reaches.

³ These species are relatively uncommon species in the BLM planning area.

⁴ These species are unlikely to occur in the BLM planning area.

Greater Sage-Grouse

GRSG is one of the most important, if not the most important, wildlife species that depends upon the sagebrush vegetative type. The downward trend of GRSG and its sagebrush-dominated habitat throughout its historical range have become a focus of wildlife and land managers in recent years. With the recent interest in the long-term well-being of GRSG and the sagebrush ecosystem, the CPW, BLM, and Forest Service have committed to ensuring that this species remains a high priority for management (BLM 2004b).

The GRSG is a federal candidate species for listing under the ESA, a Colorado BLM Sensitive species, Forest Service Sensitive species, and a Colorado species of concern.

GRSG are considered a sagebrush ecosystem obligate species. Obligate species are those species that are restricted to certain habitats or to limited conditions during one or more seasons of the year to fulfill their life requirements. GRSG are only found where species of sagebrush exist. Sagebrush species provide nesting, brooding, and fall and winter cover, as well as forage throughout the year (Colorado Greater Sage-Grouse Steering Committee 2008).

Each year, male GRSG congregate in late winter through spring on leks to display their breeding plumage, and to attract hens for mating. An active lek is a traditional display area attended by two or more male GRSG in two or more of the previous 5 years. Normally, the area is located in a very open site in, or adjacent to, sagebrush-dominated habitats. Generally, lek sites are traditional, with the same lek sites used year after year. Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day (Colorado Greater Sage-Grouse Steering Committee 2008). Typically, leks are positioned within proximity of nesting and brood-rearing habitat; therefore, they are often considered an excellent reference point for monitoring and habitat protection measures.

Nesting habitat is primarily characterized by sagebrush communities that have 15 percent to 30 percent canopy cover, and a grass and forb understory. Residual cover of grasses is also important for nesting cover. Most nesting occurs within 4 miles of leks (Colorado Greater Sage-Grouse Steering Committee 2008). Nesting and early brood-rearing habitats are similar, and include appropriate sagebrush canopy cover of 10 to 25 percent with greater than 15 percent herbaceous ground cover. Young birds eat insects for their first 3 weeks and mostly forbs until they are 3 months old. As the sagebrush habitat stands begin to dry out in mid-summer, GRSG move to more mesic areas, including higher elevations, wet meadows, and riparian areas where succulent forbs are present. From mid-September into November, GRSG prefer areas with relatively dense canopy cover and late green forbs. Winter habitat comprises sagebrush greater than 12 to 16 inches tall and greater than 25 percent canopy cover in drainages with tall sagebrush and on ridges and south

and west-facing slopes. Winter habitat is used by segregated flocks of males and females (Beck 1977). See **Figure 3-4** for habitat distribution in the planning area.

Habitat loss and fragmentation from agricultural encroachment, urbanization, lack of fire (which rejuvenates native habitat), and overgrazing are the primary threats to the GRSG. Considerable attention has been given to this species since the 1980s, as evidenced by the National Sage-Grouse Habitat Conservation Strategy (BLM 2004). This conservation strategy provides national GRSG habitat conservation guidance for the BLM. The plan identifies potential conservation actions that might be implemented in order to maintain and enhance GRSG populations and habitat (CPW 2004).

Several factors related to GRSG habitat and the way it is used by this species have been considered causes of the decline in GRSG distribution and abundance. These factors include habitat loss, alteration, and degradation (Braun 1995). Historically, sagebrush-dominated vegetation was one of the most widespread habitats in the country and still covers much of the Great Basin and Wyoming Basin, reaching into the Snake River Plain, Columbia Basin, the Colorado Plateau, Montana, southwestern Colorado, northern Arizona, and New Mexico. Across this area, big sagebrush predominates and has five known subspecies (West 1988; Kartesz 1994).

The sagebrush mosaic was historically subject to impacts from natural components of the environment, such as small and patchy fires, and periodic population explosions of jackrabbits, grasshoppers, and crickets. Big sagebrush does not resprout after a fire, but is replenished by wind-dispersed seed from adjacent unburned stands or seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within 5 years of a burn, but a return to a full pre-burn community (density and cover of sagebrush) cover can take 15 to 30 years (Bunting 1984; Miller and Rose 1999).

Since settlement of the West began, the amount, distribution, and quality of sagebrush habitats and populations of the GRSG that depend on them have declined as a result of activities such as large-scale conversions to cultivated croplands or pastures, altered fire frequencies resulting in conifer invasion at higher elevations, and annual grass invasion at lower elevations, livestock grazing, herbicide use, mineral and energy development, and recreational activities related to urban growth and increased human populations. As a result, the 156 million acres of sagebrush that existed historically were reduced to 119 million acres by 2004 (Connelly et al. 2004). Currently, sagebrush communities and GRSG are at risk from multiple sources across multiple scales (BLM 2004b). About 56 percent of the potential pre-settlement distribution of habitat is currently occupied by GRSG (Connelly et al. 2004).

GRSG use different components of their sagebrush habitat for breeding, nesting, brood rearing, and wintering. Key habitat components include adequate canopy

cover of tall grasses and medium height shrubs for nesting, abundant forbs and insects for brood rearing, and availability of herbaceous riparian species for late growing-season foraging (BLM 2004c). Understory, height, density, cover, and patchiness of the sagebrush-dominated ecosystem are important to GRSG.

The negative impacts of habitat fragmentation on GRSG include reductions in courtship site persistence, courtship site attendance, winter habitat use, recruitment, yearling annual survival, and female nest site choice (USFWS 2010a). Invasive plants are also a serious range-wide threat to GRSG habitat. Once established, invasive plants reduce and eliminate vegetation essential for GRSG food and cover. Invasive species can out-compete sagebrush, and increase wildfire frequencies, further contributing to direct loss of habitat. Sagebrush restoration techniques are limited and have generally been ineffective (USFWS 2010a).

GRSG have declined within the past 20 years in large portions of its overall range. In March 2010, USFWS concluded that the GRSG warranted protection under the ESA; however, USFWS determined that proposing the species for protection is precluded by the need to take action on other species facing more immediate and severe extinction threats. As a result, the GRSG will be added to the list of species that are candidates for ESA protection. Habitat loss and fragmentation resulting from wildfire, energy development, urbanization, agricultural conversion, conversion of sagebrush to other vegetation types (such as pinyon-juniper woodlands) and infrastructure development are the primary threats to the species (USFWS 2010a).

For a complete description of acreages in the 21 Colorado MZs, see **Table 3.8** and **Table 3.9**.

Table 3.8
Acres of Land Ownership and ADH within Colorado Management Zones

Colorado Management Zone	BLM Field Office or National Forest	Surface Acres (all ownership)	Surface Acres (BLM-administered lands)	Split-Estate Acres (ADH)
1	LSFO	15,200	8,400	12,700
2	LSFO	172,900	120,000	137,800
3	LSFO	547,400	461,800	487,800
4	LSFO	244,400	111,100	155,500
5	LSFO	258,300	123,100	162,400
6	LSFO	307,900	50,600	99,400
7	LSFO	83,300	18,000	47,800
7	Routt National Forest	11,700	0	9,300
8	LSFO	252,300	4,700	40,400
9	LSFO	372,400	150,000	236,100
9	WRFO	50,800	21,800	32,000

Table 3.8
Acres of Land Ownership and ADH within Colorado Management Zones

Colorado Management Zone	BLM Field Office or National Forest	Surface Acres (all ownership)	Surface Acres (BLM-administered lands)	Split-Estate Acres (ADH)
10	LSFO	3,700	100	1,500
10	WRFO	282,000	190,300	239,200
11	KFO	413,200	138,600	214,400
12	KFO	18,300	6,800	11,800
11	Routt National Forest	800	0	800
13	KFO	272,400	72,900	123,100
13	Routt National Forest	1,000	0	1,000
14	CRVFO	97,300	41,000	69,000
14	Routt National Forest	38,600	0	900
14	LSFO	51,000	2,300	9,900
15	WRFO	47,600	3,000	12,100
16	WRFO	11,300	11,300	11,300
17	CRVFO (Roan Plateau)	37,600	23,900	29,800
17	GJFO	78,600	14,500	23,300
17	WRFO	237,500	75,900	160,300
18	WRFO	19,200	13,000	18,000
19	CRVFO	5,400	2,100	2,100
19	WRFO	219,800	62,400	1,119,000
19	LSFO	40	0	0
20	LSFO	40,600	2,200	5,900
21	KFO	10,700	2,200	4,800
Total		4,203,240	1,732,000	3,479,400

Source: BLM 2013

Table 3.9
Acres of Federal Mineral Estate by PH and GH

BLM or Forest Service Location	BLM-Administered Surface		National Forest System Lands		Other Surface	
	PH	GH	PH	GH	PH	GH
CRVFO	22,800	16,200	0	0	17,400	10,300
Roan Plateau	0	28,300	0	0	0	1,200
GJFO	5,500	8,900	0	0	4,100	4,500
KFO	185,200	18,300	0	0	115,900	25,500
LSFO	554,000	463,500	0	0	239,700	134,100
WRFO	121,900	175,300	0	0	75,800	81,600
Routt National Forest	0	0	1,600	10,300	0	0

Source: BLM 2013

Conditions on BLM-Administered Lands

Colorado River Valley Field Office

GRSG historically existed in the larger sagebrush habitats west of Glenwood Springs, between New Castle and Rifle, and south of Interstate 70 near Eagle. Current populations within the CRVFO planning area are north of Eagle, Gypsum, and Wolcott on scattered BLM and private lands. This habitat is where the majority of the mapped PH falls within the CRVFO boundary. Based on 2004 lek counts, this population of GRSG numbers from 304 to 489 (CPW 2004).

The CRVFO participated in the Northern Eagle/Southern Routt GRSG Workgroup. The Workgroup completed the population-specific Northern Eagle/Southern Routt GRSG Conservation Plan in September 2004 (CPW 2004). The Northern Eagle/Southern Routt GRSG population is one of the smaller populations in Colorado, and the portion of the population within the CRVFO is vulnerable to local extirpation. A significant portion of remaining GRSG habitat in the Northern Eagle portion of the population is managed by the CRVFO. Maintaining the current GRSG habitat on BLM-administered lands is critical to conserving the population (Rossi 2011) and maintaining range-wide connectivity and genetic diversity. The CRVFO performs habitat treatments to conserve and improve GRSG habitat and monitors the population in cooperation with CPW.

As is the case with the North Eagle/Southern Routt population on the east side of the CRVFO, the Roan Plateau is at the southernmost part of the range for this species. It is incorporated in the Parachute-Piceance-Roan population. Although the area is mapped as GH, it does not contain large contiguous sagebrush stands. GRSG habitat use studies are ongoing on the Roan Plateau. Currently, the BLM's only data comes from global positioning system monitoring by the CPW where some use was noted in the Anvil Points area. Overall habitat use by GRSG is most likely transitory in nature.

Grand Junction Field Office

The southern end of the Parachute-Piceance-Roan population of the GRSG is found on the northeastern side of the GJFO planning area with approximately 5,600 acres of PH and approximately 8,900 acres of GH. The Colorado GRSG Conservation Plan (Colorado Greater Sage-Grouse Steering Committee 2008) shows a larger portion of the GJFO planning area as potential pre-settlement habitat based on historic sagebrush distribution, encompassing everything above the Book Cliffs and portions of the Grand Mesa slopes (though the plan identifies this as an area where the species of GRSG is uncertain). There are 16 active and inactive GRSG leks within the GJFO planning area: 3 on BLM-administered lands and 13 on private lands. Of these 16 leks, 7 are considered active; 1 of the active leks is on BLM-administered lands on 4A ridge. In the winter of 2008, Sage-Grouse droppings were found within the GJFO just north

of the town of Mesa in an area between occupied Gunnison Sage-Grouse habitat and GRSG habitat. A follow-up study was conducted in the winter of 2009 by the Rocky Mountain Bird Observatory where numerous droppings and cecal casts were discovered, suggesting the area is an important wintering area. Genetic information could not be collected from the droppings and cecal casts, therefore, the species of Sage-Grouse (Gunnison or Greater) is still unknown (Beason 2009) but is believed to be GRSG. As a result, this area has been mapped as GH.

The local working group completed the Parachute-Piceance-Roan GRSG Conservation Plan in 2008 (Parachute-Piceance-Roan Greater Sage-Grouse Work Group 2008). The Parachute-Piceance-Roan population of GRSG covers portions of the WRFO, CRVFO, and GJFO.

Current populations within the GJFO planning area are located in upper reaches of Roan Creek and its tributaries (Kimball, Carr, Brush, and Clear creeks) north of the Town of DeBeque, primarily on private land and scattered public lands. Some birds are thought to winter in sagebrush areas west of DeBeque, and winter use has been documented in the Plateau Valley south of DeBeque in an area of mixed BLM-administered and private land known as Sunnyside. Since 2008, lek counts in the Parachute-Piceance-Roan population range from a low of 77 males in 2010 to a high of 226 males in 2008 (CPW 2012). GRSG habitat within the GJFO is primarily on relatively flat sagebrush-covered ridges with pockets of aspen in north-facing draw slopes, giving way to mountain shrub communities as one moves further south and down in elevation on the ridges. The landscape is naturally fragmented by deep canyons. Former habitats in the broad Roan Creek Valley south of the steep canyons have been lost to fragmentation from sagebrush plant community conversion to agricultural and residential uses. These activities do not threaten habitat on the remaining ridge top habitat, but natural gas exploration and production activity, lack of fire (which rejuvenates native habitat), and poor grazing management are the primary threats.

The GJFO participated in the Parachute-Piceance-Roan Greater Sage-Grouse Workgroup that developed the local plan. Only a small part of the Parachute-Piceance-Roan population is within the GJFO, and much of it lies on private lands. Nonetheless, the GRSG do use BLM lands for breeding, nesting, and wintering. Maintaining the current GRSG habitat on BLM lands is critical to conserving the population and maintaining range-wide connectivity and genetic diversity.

The current status of the population within the GJFO is better than from 2009 to 2011. Within the GJFO, there were 6 active leks in 2012, with a total of 13 males. In 2008, 14 males were counted on 5 leks. From 2009 to 2011, five to nine males used three or four leks. Only 1 of the leks was active all 5 years; that is also the only lek located on a public land parcel (Chimney Rock, on the edge

of 40 acres surrounded by private lands). Two other leks considered inactive are on GJFO public lands; one of those leks had a single male in 2011. Evidence of wintering GRSG was found in the Sunnyside area of the Plateau Valley in 2009, 5 to 10 miles south-southeast of DeBeque. The Parachute-Piceance-Roan population within the GJFO is the nearest population of GRSG to the Plateau Valley.

Based on lek counts within the GJFO boundary, the GJFO portion of the Parachute-Piceance-Roan population is nine percent of the Southside Parachute-Piceance-Roan population in 2012, and seven percent of the overall Parachute-Piceance-Roan population.

Kremmling Field Office

WAFWA Management Zone II has the largest regional extent and highest breeding density of GRSG in the western US, with several important populations in the Wyoming Basin, including Jackson and Routt Counties, Colorado. Livestock grazing is ubiquitous across these sagebrush ranges, which also have seasonal importance for native ungulates and wild horses (Manier et al. 2013). Changes in land cover and land use are contributing to population declines in this region (Manier et al. 2013).

GRSG inhabit much of the planning area. Throughout the year, GRSG will move between select habitats within the overall sagebrush habitat area. In Jackson County, there are approximately 39 active leks, 5 inactive leks, and 19 historic leks (CPW 2010). Of the active leks, 20 are on BLM-administered lands. In Grand County, there are 19 active leks, 1 inactive lek, and 41 historic leks (2010 data). Of those, 21 leks are on BLM-administered lands. In Larimer County, there is 1 historic lek (last active in the 1960s). In Summit County, there is 1 active lek and 1 historic lek (CPW 2010). In Eagle County, there are no leks within the planning area. Sagebrush habitat in Jackson County is largely intact, and there is little threat of fragmentation. Currently, oil and gas development and related infrastructure is low; however, in 2006, there was an increased interest in coalbed natural gas exploration. In Grand County, there is a high risk of habitat fragmentation and loss due to urban development and related infrastructure, especially at the east end of the county.

Three local GRSG working groups cover the planning area: Eagle/South Routt, North Park, and Middle Park. Each group developed a local conservation plan that sets forth a strategy for the long-term management of GRSG in their area. The BLM administers 27 percent (26,200 acres) of occupied habitat in the Eagle/South Routt population; 34 percent (140,000 acres) of occupied habitat in the North Park population; and 29 percent (74,100 acres) of the occupied habitat in the Middle Park population. The BLM is a partner in all three local working groups, as well as in the Colorado GRSG Plan, and has agreed to implement the plans as fully as possible.

Little Snake Field Office

GRSG use areas are all located in shrublands. Sagebrush is the primary habitat used. Areas of sagebrush along streams, where forbs and insects are abundant, are used for brood rearing. Some production areas have also been identified in areas that have been mapped as saltbush and mountain shrub.

Within the planning area, identified brood-rearing areas are in smaller drainages associated with the Vermillion Creek, Little Snake River, and Yampa River watersheds, where moist conditions in late spring and early summer produce the succulent forbs and insects on which broods feed.

Production areas, traditionally mapped as a 2-mile buffer around leks and believed to contain 80 percent of the nests associated with GRSG displaying at the lek, have recently been expanded. No more than 75 percent of GRSG nests are found within a 4-mile radius of a lek, making the previous production area size insufficient to protect most nests (Apa 2007; Petch 2009).

Data specific to Moffat and Routt Counties and to the planning area are provided by Rogers (1964), who described GRSG populations in Moffat County as having the largest population and the highest density of GRSG of any county in Colorado. The highest density of GRSG was localized in the Beaver Basin area of Cold Spring Mountain, the extreme northwest part of the county. Other areas in Moffat County with a high population density were the western portion of Blue Mountain north of Artesia near the Utah line, the Two Bar Ranch on the Snake River, Lay Creek, Bluegravel Gulch, upper Timberlake drainage, Big Gulch drainage, upper Bighole Gulch, the head of Spring Creek, and the area around the town of Great Divide. The principal GRSG population in the southwest part of the county was on top of Blue Mountain within 10 miles of the Utah line.

In Routt County, there are four distinct GRSG groups: two areas with fair population density near the towns of Toponas and Hayden and about equal numbers and range; one area in the upper Slater Creek and Snake River areas in the extreme northern part of Routt County with a light population in the summer months and a wintering area near the Wyoming line; and one area north of Steamboat Springs and west of Clark on Deep Creek with small range and numbers. The highest concentration of GRSG in the county was in the Twentymile area southeast of the town of Hayden on the upper Sage and Fish Creek drainages. The Breeze Basin-Yampa River area west of Hayden near the Moffat County line was known to contain a high density of GRSG area in 1947, but no GRSG were observed in this area in 1959 and 1960.

Today, within the planning area, essentially all of the land west of State Highway 13 (except the area on the south side of Cold Spring Mountain, and the lands closest to the Yampa and Green River drainages) is within the range of the GRSG. The central portion of this area—north, west, and southeast of Maybell—as well as a broad area along the northern boundary of the planning area from Middle Mountain near the northwest corner of Colorado to Baker

Peak east of State Highway 13 provides winter range. A number of comments in the Land Health Assessments focus on GRSG populations and habitat. The following comments characterize the attention given to this species:

- **Axial.** GRSG habitat types in the Axial Basin Landscape include strutting grounds, brood-rearing habitat, and winter range. Thirty leks have been documented within this landscape. Of these, 11 (37 percent) are active; 6 (20 percent) are inactive (no activity the last 5 years); 11 (37 percent) are historic (no activity the last 6 years or longer), and 2 (7 percent) are unknown.
- **Douglas Draw.** The watershed does have potential to support GRSG near Sheephead Basin. There has not been any documented use by GRSG in this area, but treatments of encroaching juniper may make the area more attractable to GRSG.
- **Cold Spring Mountain.** The large expanses of sagebrush steppe intermixed with wet meadows provide important GRSG nesting and brood rearing habitats. GRSG numbers are up since the early 1990s, with lek counts remaining stable over the last 3 years; however, GRSG are only at 50 to 60 percent of their historic population numbers for the area.
- **Douglas Mountain.** Sagebrush grasslands and sagebrush mixed shrub habitat types have the potential to support GRSG within this landscape. There are no known GRSG leks within the landscape; however, efforts to locate breeding GRSG in the landscape have been minimal.
- **Dry Creek.** The large expanses of sagebrush steppe intermixed with wet meadows provides important GRSG nesting and brood rearing habitats along Vermillion Creek, although there are no known GRSG leks within this watershed. Heavy historic grazing, especially in mesic areas at the higher elevations, has reduced the quality of brood rearing habitat essential for GRSG in the area.
- **Fourmile Creek.** The entire landscape is considered a GRSG production area, although the quality of GRSG brood-rearing habitat has been reduced by heavy historic grazing, especially in mesic areas at the higher elevations. The large expanses of sagebrush steppe intermixed with wet meadows provide important GRSG nesting and brood rearing habitats along Timberlake Creek. Fourteen GRSG leks have been identified and brood rearing habitats have been documented.
- **Green River.** The Green River Landscape provides habitat for GRSG and the various life cycle stages for which they are used. There are no known GRSG leks or nesting habitat within the landscape; however, hens with broods are often observed in the

Ryegrass area. GRSG are also observed near Chicken Springs and Five Springs. A small amount of winter habitat (200 acres) is located near Five Springs. Sagebrush in this area was in good condition, providing suitable winter habitat for GRSG. Overall, the Green River Watershed provides productive habitat for GRSG.

- **Lay Creek.** The majority of this watershed provides habitat for GRSG. GRSG use the watershed throughout the year for breeding, nesting, brood rearing and wintering habitat. This watershed is an important production area for GRSG in Colorado. There are seven active GRSG leks within this watershed, with two additional active leks within 1 mile of the watershed boundary. Breeding, nesting, brood-rearing, and wintering habitat are all found within the boundaries of this watershed. Some portions of the watershed are capable of providing all four habitat requirements in the same area.
- **Powder Wash.** This is an important area for GRSG breeding, nesting and brood rearing, containing 10 known leks and about 2,400 acres of GRSG winter range.
- **Sandhills.** Available habitats provide winter range, nesting, and brood rearing for GRSG.
- **Sand Wash.** This is an important production area for GRSG nesting and winter range. The numerous historic leks on Seven Mile Ridge are no longer active.
- **Williams Fork.** Sagebrush grasslands and sagebrush mixed shrub habitat types have the potential to support GRSG within this landscape. There are no identified GRSG leks or critical habitat, such as nesting or winter, located in the Williams Fork watershed.

White River Field Office

The Northwest Colorado GRSG population area (Colorado MZ 10) is composed of several distinct segments that differ widely in character for GRSG. The Blue Mountain portion of this population (higher-elevation sagebrush communities north of US 40) supports the largest and most productive population and has the largest continuous block of suitable and occupied GRSG habitat in the WRFO. Broods gradually disperse and drift to higher elevations (e.g., Moosehead Mountain), such that essentially all sagebrush habitat on Blue Mountain is considered brood range. Blue Mountain's capacity for strong production and recruitment is largely attributable to an abundance of wet meadow habitats and well-developed herbaceous understories.

The remaining segments of the Northwest Colorado population area in the WRFO consist of: (1) isolated and sporadically occupied parcels in the Douglas Creek drainage south of the White River; (2) extremely small and insular groups of birds along and probably once connected by habitats along the White River valley; (3) a sparsely populated southern extension of the larger Sagebrush

Draw population located in the adjoining LSFO; and (4) most notably, an expansive low-elevation salt-desert complex extending west from Pinyon Ridge along the US 40 corridor and south to the White River. This area supports limited year-round occupation by GRSG, but these xeric habitats, whose ground cover is often dominated by invasive annual weeds, are considered marginal in their support of nesting and brood-rearing functions. These areas have been known to support concentrated high density winter use. The breeding population in the western half of this area (west of Massadona) had begun to collapse prior to the mid-1970s, and this trend continued through the 1980s. The only remaining active lek is located on the far eastern end of the area. Suitable sagebrush stands along Highway 40 are relatively limited. These predominantly salt desert habitats are dissected by deeply incised channels that assume the role of brood habitat, although the broods along the White River probably originate from the lower Red Wash and Boise Creek areas. The origin of large numbers of wintering birds in lower Wolf Creek is unclear but likely involves much of the Highway 40 population.

The Crooked Wash complex is administratively split between the WRFO and the LSFO to the north and is composed of a high percentage of private lands. Although upland sagebrush conditions are superficially adequate for nesting in the WRFO, upper portions of the basin are likely preferred. Late season brood use has been noted, although brood habitat conditions are considered suboptimal in portions of the basin within the WRFO. Although a number of channels in the area support persistent flow, riparian expression is extremely limited. Concentrated winter use in the Crooked Wash area is assumed to represent the major fraction of this complex. The small summer population in Black's Gulch seems to be a fragment of the Crooked Wash complex. This area has also supported concentrated winter use in the past.

The Piceance Basin/Roan Plateau area, encompassing the majority of Colorado MZ 17, is comprised of roughly 152,600 acres of GRSG PH and 84,400 acres of GH. Virtually all seasonal use functions take place on relatively narrow mid-elevation ridges, with a drift toward higher elevations along the Piceance Rim and Roan Plateau through the brood and general summer use periods. Winter use appears to occur at all elevations, depending on accumulated snow depth and snow texture. Broad ridges at lower elevations may support the bulk of wintering birds during extreme conditions.

The Parachute-Piceance-Roan Plateau (PPR) sage-grouse population is considered to be at high risk due primarily to energy and mineral development (USFWS COT report 2013). Presently, there are two distinct sage-grouse population areas in the PPR: the Barnes Ridge subcomplex to the east and the Figure 4 subcomplex on its western margin (both of which are encompassed by identified PACs or Priority Areas for Conservation). The Figure 4 subpopulation hosts the largest number of birds and active leks in the PPR. Identified priority habitats that support the western Figure 4 subcomplex are composed of a large

continuous central core of fee land (30,000+ acres) currently complemented by two relatively large consolidated tracts of unleased federal minerals forming extensions of priority habitat to the north (10,950 acres) and southwest (14,700 acres).

The Magnolia area (Colorado MZ 16) has within the past decade become heavily industrialized. This area is comprised entirely of BLM-administered lands and contains roughly 7,600 of GRSG PH and 3,700 acres of GH.

The Meeker GRSG population (Colorado MZ 15) area encompasses about 47,600 acres in the area outside the Piceance Basin (13,000 acres GRSG PH, 34,600 acres GH). Federal mineral estate underlies about 15,500 acres (31 percent) of all mapped range, but federal estate associated with habitats currently supporting GRSG use (north of the White River and across the north flank of LO7 15 Hill) are limited to about 500 acres in 7 parcels (less than 4 percent). The largest parcel, about 300 acres, consists primarily of private agricultural lands, but supports consistent use by this remnant flock of birds. The BLM surface that presently supports habitat potentially suited for this population of GRSG is limited to about 300 acres.

Approximately 115 leks have been identified in the WRFO, of which about 55 are currently active. The status of about 20 leks is unknown, because of limited or irregular use. The count of males at leks in the WRFO planning area in 2012 was 290 birds (CPW 2012) (see **Table 3.12** (p. 3-76), in the **Trends** section).

Other Special Status Species

Other special status species with potential to exist on BLM-administered land are included in **Table 3.6**. Draft RMPs for each field office, which are incorporated here by reference, further describe special status species, including BLM Sensitive and USFWS federally listed species, within each field office.

Conditions on National Forest System Lands

Routt National Forest

Greater Sage-Grouse

The Routt National Forest provides habitat for the GRSG, but no active leks have been documented on the Forest in recent years. One historic lek was documented in Colorado MZ 7 in the vicinity of California Park and Slater Park, but GRSG lek activity has not been documented for several decades. Though no telemetry data has been collected on the Routt National Forest by CPW, it is inferred by CPW and Forest Service biologists that the Routt National Forest does provide GRSG nesting, brood-rearing, and some wintering habitat. GRSG experts at CPW mapped GRSG habitat across much of northwest Colorado. Approximately 17,400 acres was mapped on the Routt National Forest. Of the 17,400 acres, approximately 12,500 acres are on National Forest System lands, and 4,900 acres are within the Routt National Forest's administrative

boundaries, but land ownership is either private or state inholdings (see **Table 3.10**).

Table 3.10
GH and PH by Land Ownership on the Routt National Forest

Surface Land Ownership	Acres
GH	
National Forest System	11,100
Private Inholding	2,300
State Inholding	1,000
PH	
National Forest System	1,600
Private Inholding	1,400
State Inholding	10
Total	17,400

Source: Forest Service 2012

The CPW-mapped GRSG habitat on the Routt National Forest consists of PH and GH and is made up of grass, shrub, riparian, and forb cover types. In some instances, the buffering of 4 miles from leks did include tree cover types. The Routt National Forest's vegetation data (from the Forest Service' Field Sampled Vegetation Spatial database) is different from CPW's vegetation data and so the inclusion of tree cover types is an artifact of how vegetation polygons are delineated on the Routt National Forest. Though CPW has documented GRSG nesting in close proximity to aspen stands, the inclusion of aspen cover types (or other tree cover type) may occur when the dominant cover type is a treed cover type, but remaining portion is shrub or other GRSG habitat that is important for meeting life history needs. As a result, the presence of a tree cover types may be due to a mapping error that is inaccurately typed or it is a large polygon that is buffered in as GH or PH by the 4-mile buffer from a lek. The Routt National Forest biologists briefly reviewed PH and GH habitat maps before they were finalized for the Draft EIS. This review was completed through use of satellite imagery of vegetation, but not through the use of the Field Sampled Vegetation Spatial database.

Other Special Status Species

Other special status species with potential to exist on National Forest System lands are included in **Table 3.6**. Threatened, endangered and sensitive species and MIS are addressed in **Appendix M**, US Forest Service Biological Evaluation.

3.3.2 Trends

Trends on BLM-Administered Lands

Greater Sage-Grouse

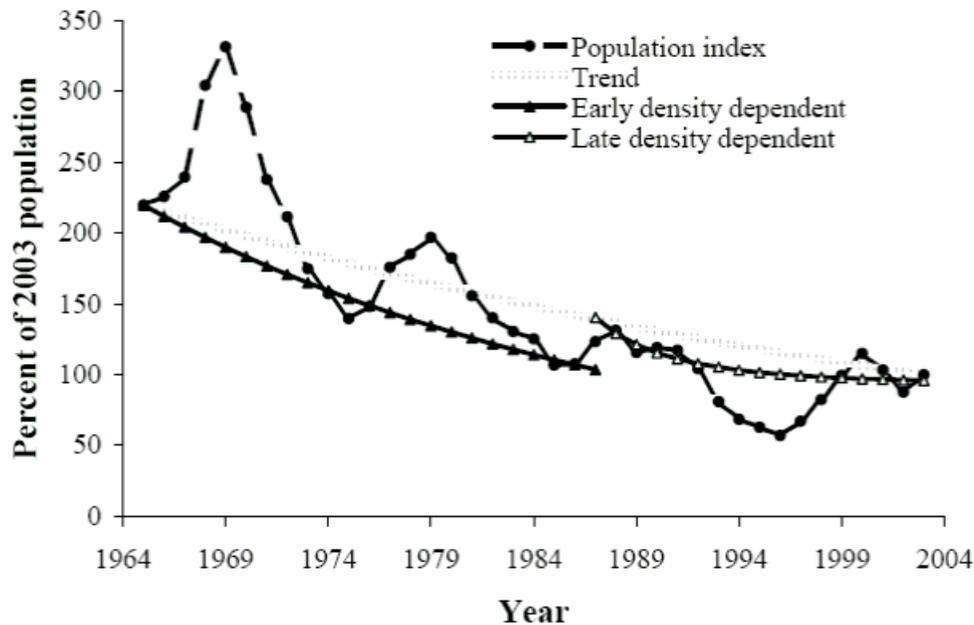
Historically, GRSG inhabited much of the sagebrush-dominated ecosystems of North America. Populations of this species have declined in both abundance and extent throughout most of their historical range. Even after taking into account the strong cyclic behavior of GRSG population dynamics, populations have declined markedly relative to both pre-settlement anecdotal numbers (BLM 2004a), and the records kept in the last 30 years where the peak in the cycle of bird numbers has declined (BLM 2004c).

Rogers (1964) interviewed numerous homesteaders present in northwest Colorado in the early years of the 20th century and reported that GRSG numbered in the “thousands.” Wagon loads of harvested birds were taken near Hayden, and thousands of birds were shot for the annual Sage Hen Days held in Craig in the early 1900s. In the early 20th century, the highest densities of GRSG were found in Moffat, Routt, Rio Blanco, Garfield, and Grand counties. Populations appear to have declined substantially across Colorado in the 1920s and 1930s, resulting in the first closure of the hunting season in 1937. Hunting was again allowed in 1953 after GRSG populations had recovered during the 1950s. Populations of the birds continued to increase into the 1960s but were never so great as in the early part of the century (Rogers 1964).

Connelly et al. (2004) published a conservation assessment of GRSG and sagebrush habitats that is based on data from questionnaires completed by 11 states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming) and two Canadian provinces (Alberta and Saskatchewan). Generally, between 1965 and 2003, there was a 729-percent increase in the number of leks inventoried—a marked increase in monitoring effort, although not all survey methods provided compatible data. In addition, not all leks were active, with the largest number of inactive leks clustered in Colorado, Utah, and Washington. During this time period, 80 percent of the States (all but California and Colorado) showed population declines. Populations in the late 1960s and early 1970s were about two to three times greater than in 2003. The range-wide trends in population index are shown in **Diagram 3-1** below.

Connelly et al. (2004) used data for Colorado from 1965 to 2003 that reflected information from 275 leks, although for 5-year periods within this timeframe averages of 44 to 171 leks were inventoried. The overall results indicated that lek size has decreased, but populations have increased in Colorado. (This discrepancy could result, in part, from the fact that data from Moffat County were collected using inconsistent methods and could not be used in the

Diagram 3-1
Range-wide Change in the Population Index for GRSG in North America, 1965–2003
(Connelly et al. 2004)



Connelly et al. analysis of changes in lek size.) Other findings for Colorado GRSG populations included the following:

- The proportion of active leks ranged from 41 to 96 percent.
- Population trends based on counts of male GRSG at leks decreased over the assessment period, regardless of the parameter used, with a significant decline in males per lek; see **Diagram 3-2** below.
- A decline in lek size was also reflected in the distribution of leks among size classes, with medium and large leks each comprising over 30 percent of the leks sampled from 1965 through 1979, but for the remainder of the period, the proportion of medium and especially small leks increased.
- Annual rates of population change standardized on 2003 populations were relatively stable to increasing (see **Diagram 3-3**). GRSG populations increased at an overall rate of 1 percent per year from 1965 to 2003, at an average rate of 2.2 percent from 1965 to 1985, and fluctuated around a level similar to the 2003 population at an average rate of 4.3 percent from 1986 to 2003, and continued to fluctuate around the 2003 population level.
- Populations in the late 1960s and early 1970s were approximately 0.7 to 1.6 times the current populations (see **Diagram 3-3**) with relatively large population fluctuations.

Diagram 3-2
Change in Lek Size for GRSG in Colorado, 1965–2003 (Connelly et al. 2004)

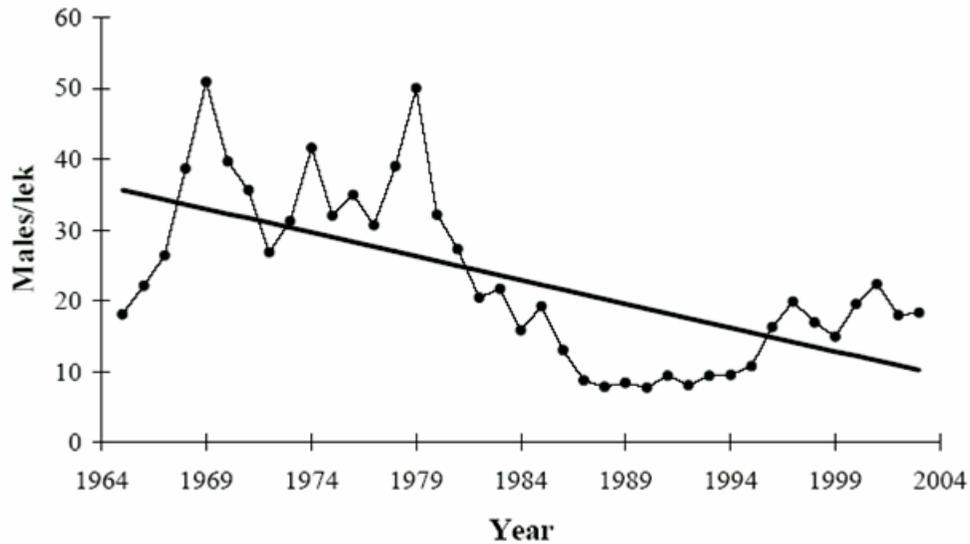
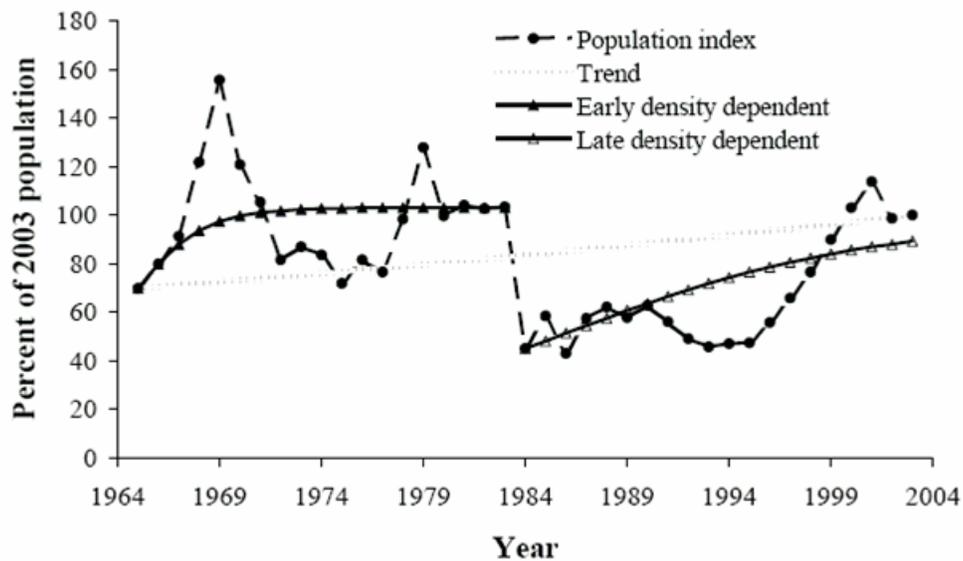


Diagram 3-3
Change in the Population Index for GRSG in Colorado, 1965-2003 (Connelly et al. 2004)



- Populations in the late 1960s and early 1970s were approximately 0.7 to 1.6 times the current populations (see **Diagram 3-3**) with relatively large population fluctuations.

Although GRSG populations have definitely declined nationwide, the GRSG in Colorado have been increasing for about the last 17 years, and breeding populations have not declined for the last 39 years

(see **Figure 3-5** for current densities in the planning area). However, Braun (1995) reported a long-term decline in GRSG distribution and abundance. Similarly, Connelly and Braun (1997) indicated that GRSG breeding populations declined by 31 percent and production declined by 10 percent when they compared the long-term average of males/lek to the average obtained from the 1985 to 1994 data.

Colorado River Valley Field Office

The GRSG population in the Northern Eagle/Southern Routt area is small (<500 birds) and current lek count data indicate that both the high count of males and the number of active leks have decreased since lek counts began in the late 1950s. Long-term lek counts for this population show a general decline (**Diagram 3-4**); however, Colorado Division of Wildlife lek count effort prior to 1998 was inconsistent. Area and District personnel of the CPW were requested, starting in the 1950's, to document GRSG presence and general trend within specific areas of western Colorado. Thus, locations of active leks and counts of males on leks were recorded. Generally, only accessible leks were counted and intensive searches for new or relocated leks were not made because of personnel and equipment priorities. Searches and counts were sporadic, as firm procedures were not in place. Counts of male GRSG on leks were initiated in 1978 under existing protocols (three counts per spring). These counts were conducted 1983 through 1993 (though gaps exist for some years) and were intensified in 1998 (CPW 2004). The lek count results since 1998 have been more consistent with relatively little fluctuation in the population (**Diagram 3-5**).

Diagram 3-4
Historic Annual Male High Counts for the Northern Eagle/Southern Routt GRSG Population

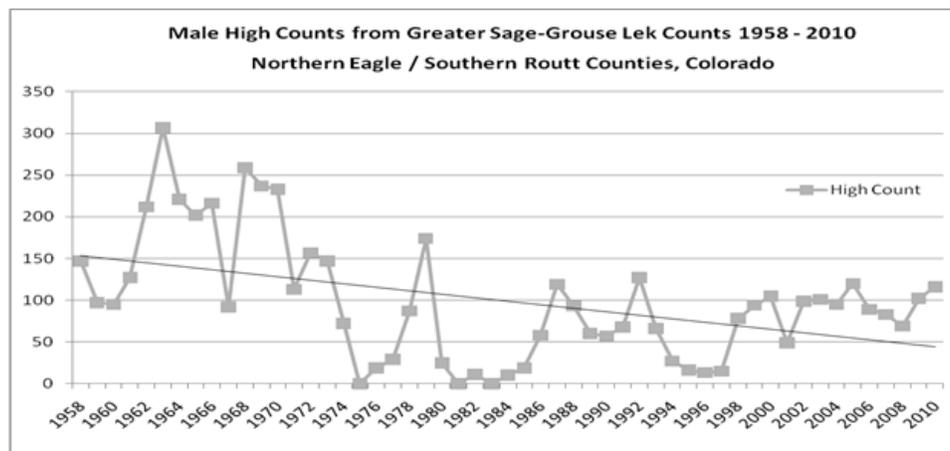
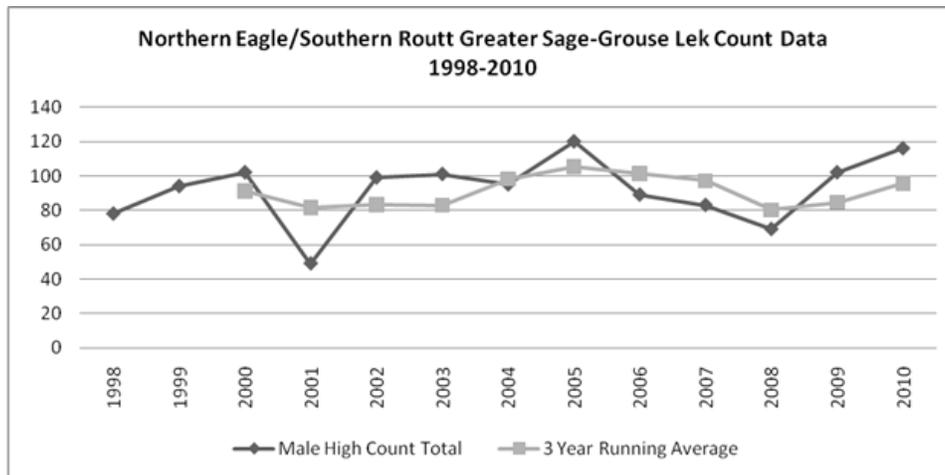


Diagram 3-5
Recent High Count and 3-year Running Average Data for Northern Eagle/Southern Routt
GRSG Population



Grand Junction and White River Field Offices

The Parachute-Piceance-Roan GRSG population has been in general decline since at least 1977 when CPW (Kraeger 1977) documented 25 active leks. Hagen (1999) found only 9 leks active 20 years later. These historic trends are believed to have been primarily attributable to the advancing successional status of the mountain shrub and sagebrush communities used as habitat by the Parachute-Piceance-Roan birds. Current lek count data suggests an increasing population trend, but recent efforts to locate and document high bird counts have intensified over the past few years and may confound comparisons with earlier data. The present emphasis on developing natural gas reserves on these ranges has the potential to impinge heavily on GRSG habitats and behaviors and contribute substantially to declining trends.

Habitat potentially suited for occupation by GRSG in the Piceance Basin exists in physically fragmented patterns. These patterns are due not only to topographic and edaphic variability, but as a function of successional status and deciduous shrub expression in those vegetation communities. Hagen (1999) found GRSG distribution in Piceance Basin to be highly clustered, implying that the availability of suitable habitat was, therefore, also clustered.

Due to the peculiar configuration of habitat associated with the Parachute-Piceance-Roan population, these GRSG are believed to be particularly vulnerable to development and habitat-related effects. The characteristic pattern of GRSG habitats in the Parachute-Piceance-Roan are such that each parcel of ridgeline habitat (generally 400 to 1,000 feet in width) is separated from adjacent ridgeline habitats by 1,000- to 3,000-foot intervals of habitat unsuited for occupation or ground movement. Habitat potentially suited for use by Parachute-Piceance-Roan GRSG comprises only 16 percent of the mapped overall range. Although this pattern moderates at lower elevations where

ridgeline habitats broaden, bird distribution tends to be confined to higher elevations (greater than 7,400 feet in the east, greater than 7,700 feet in the west) and modeled habitat at lower elevations supports few birds.

Adding to this vulnerability, the Parachute-Piceance-Roan population is distributed in clusters across the Piceance Basin and Roan Plateau. The birds' primary distribution across the Cathedral Bluffs and Roan Plateau is divided into two relatively distinct subcomplexes: the Figure Four area to the west and the Barnes Ridge area to the east. Although CPW monitoring of telemetered birds has established that there is regular, but infrequent, interchange among these groups, the large interval of land separating these subgroups (about 9 miles) is relatively devoid of suitable habitat.

The small remnant flock of birds on Magnolia (east of Piceance Creek) has been confined to about 1,000 acres of suitable habitat for at least 3 decades and appears to be effectively isolated from other populations of birds. Although lek numbers have remained relatively constant over this time, several abrupt shifts in lek locations over the past decade suggests that this limited habitat base does not provide a stable continuum of available resources and that the birds are reacting to pronounced short-term fluctuations in habitat quality. **Table 3.11** provides lek count data for those leks within the GJFO and WRFO.

Table 3.11
High Count of Male GRSG from 2008–2012 in the GJFO and WRFO

Area	2008 Male High Count	2009 Male High Count	2010 Male High Count	2011 Male High Count	2012 Male High Count
Parachute-Piceance-Roan North	31 (6 leks)	35 (4 leks)	11 (2 leks)	15 (4 leks)	22 (7 leks)
Parachute-Piceance-Roan South	72 (24 leks)	60 (17 leks)	66 (22 leks)	91 (28 leks)	152 (39 leks)
Meeker	4 (1 lek)	9 (1 lek)	5 (1 lek)	5 (1 lek)	6 (1 lek)
Northwest Colorado population	234 (8 leks)	117 (8 leks)	96 (8 leks)	86 (8 leks)	110 (8 leks)

Source: CPW 2012

The Northwest Colorado population appears to have undergone marked decline since 2008. Large tracts of arid, low-elevation sagebrush and salt-desert habitat in the southwest corner of Moffat County (west of Massadona) became vacant prior to the 1990s. These marginal habitats supported small, widely separated groups of breeding birds. Increased prevalence of cheatgrass and other invasive annual weeds across these shrub-scrub habitats may have contributed substantially to their demise. A single remaining lek at the eastern, higher-elevation margin of this habitat belt has maintained a small but stable number of attending males. The Blue Mountain segment of this population

inhabits a relatively large contiguous block of high-elevation mountain big sagebrush. This group of birds has declined dramatically, and the trend is largely inexplicable since the area has not been subjected to new or pervasive forms or patterns of human activity and land use over the past 30 years or more. No trends can be evaluated for the birds associated with habitats associated with Sagebrush Draw and Indian Valley. These birds occupy the southern margin of the Sagebrush Draw population in the LSFO, and their abundance and distribution appears to expand and contract commensurate with core population status. Those remaining lands mapped south of the town of Rangely in western Rio Blanco County do not appear to support persistent seasonal use. Leks have never been identified, and the numbers of birds encountered over the past 30 years are few. It is possible that these birds occasionally disperse from neighboring Utah.

Kremmling Field Office

GRSG populations have fluctuated greatly since 1984 in both Middle Park and North Park. The CPW counted GRSG males on strutting grounds consistently and reliably since the 1970s in North Park and the 1990s in Middle Park. According to these counts, 1984 GRSG populations were at their lowest levels recorded between 1984 and 1997 in North Park. GRSG males counted in 1984 totaled 466. From 2000 to 2005, counts in North Park were above 1,000 male GRSG. Currently, the 3-year running average for North Park (2010 to 2012) is 755 males. Lek count effort has been fairly consistent in North Park since 1973, and the entire data set was used to generate the North Park Population MZ in the Colorado GRSG Conservation Plan (2008). **Diagram 3-6** illustrates that the annual male high count for the North Park GRSG population has fluctuated through time, but the population has remained fairly stable for the past 40 years. The 2010 to 2012 3-year average is close to the long-term median (1973 to 2012) for the population and well within the North Park Population MZ (639 to 1,214) recommended in the Colorado GRSG Conservation Plan (2008).

In Middle Park, the lowest recorded population from 1984 to 1997 was 51 males in 1985; however, this could be attributed to inconsistencies in lek counts. Lek counts have fluctuated from 238 to 313 between 2000 and 2005, with a 3-year average from 2010 to 2012 recorded at 197. **Diagram 3-7** showing the 3-year average lek counts, high male counts, the 25 percent and 75 percent quartile and the median for these years. The Middle Park plan has the optimum level of spring males counted at 250 and states that effort will be made from keeping the minimum number of males from falling below 125. The populations naturally fluctuate, so it is difficult to determine at any given time if a population is increasing, decreasing, or staying stable. The Middle Park population has fluctuated around and within the population MZ recommendations (185 to 286) provided in the Colorado GRSG Conservation Plan (2008) and could be considered stable. It is worth noting that the 5 years prior to 2012 were the lowest the population had been in the last decade, hovering at or below the low end of the recommendations.

Diagram 3-6
Annual Male High Count for the North Park GRSG Population

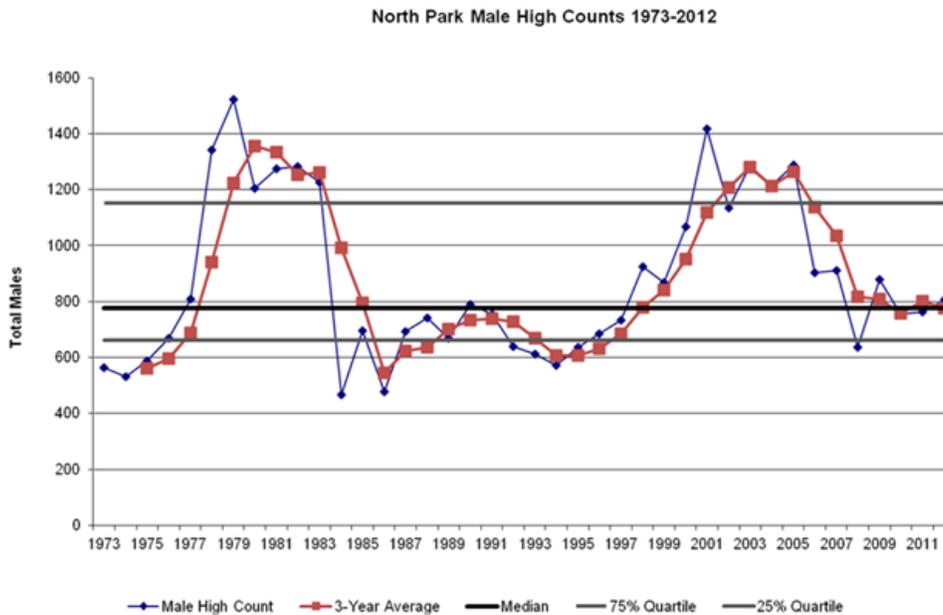
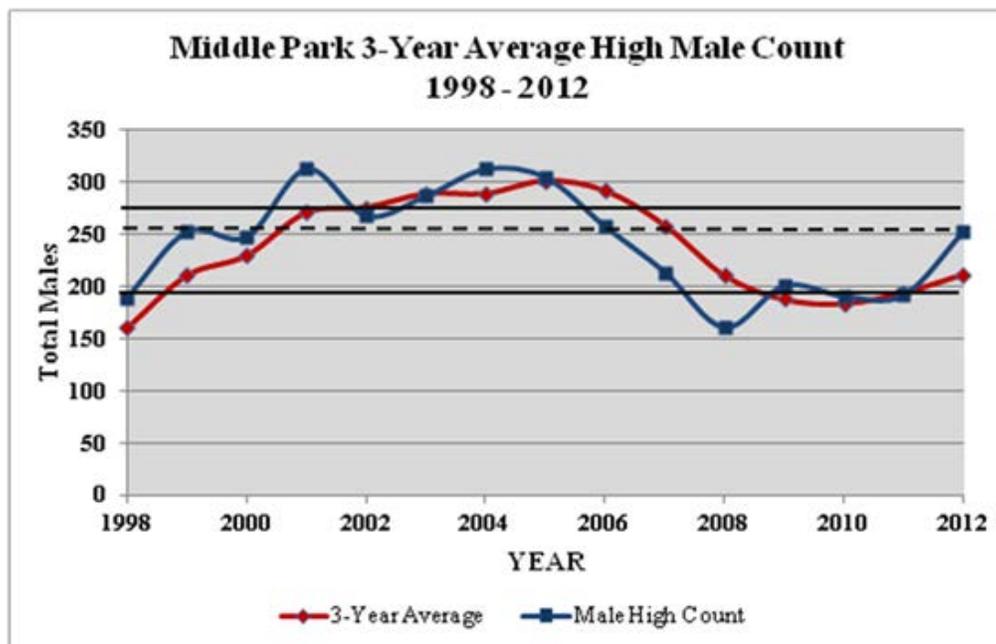


Diagram 3-7
Annual Male High Count for the Middle Park GRSG Population



Little Snake Field Office

In 2012, CPW updated GRSG habitat across the species range in Colorado. There are 138 active leks in the Northwest population (83 on BLM-administered land; 2012 data) and 7 in the Eagle/South Routt population (1 on BLM-administered land; 2011) within the LSFO. Recent data on GRSG populations within the Colorado MZs are provided in **Table 3.12**.

Table 3.12
GRSG Population Data within Colorado Management Zones

Zone	Count 2008	Count 2009	Count 2010	Count 2011	Count 2012
1	62 (2 leks)	96 (8 leks)	63 (10 leks)	55 (7 leks)	66 (10 leks)
2	205 (6 leks)	175 (7 leks)	108 (7 leks)	218 (10 leks)	268 (10 leks)
3a	495 (13 leks)	433 (18 leks)	278 (17 leks)	373 (19 leks)	406 (18 leks)
3b	459 (21 leks)	616 (25 leks)	557 (24 leks)	462 (24 leks)	410 (29 leks)
3c	44 (4 leks)	111 (6 leks)	61 (8 leks)	158 (10 leks)	255 (11 leks)
4a	43 (1 lek)	138 (5 leks)	105 (7 leks)	94 (7 leks)	101 (7 leks)
4b	85 (9 leks)	108 (11 leks)	123 (11 leks)	156 (12 leks)	111 (12 leks)
5	205 (20 leks)	159 (24 leks)	206 (32 leks)	294 (35 leks)	277 (35 leks)
6	234 (7 leks)	117 (8 leks)	96 (9 leks)	92 (9 leks)	112 (9 leks)
7	15 (2 leks)	7 (2 leks)	12 (2 leks)	11 (2 leks)	8 (1 leks)
Total	1,847	1,960	1,609	1,913	2,014

Source: CPW 2012

Other Special Status Species

By definition, the populations of all special status wildlife species have historically suffered downward trends. Management efforts by the BLM, Forest Service, USFWS, CPW, and others have reversed the downward trend for a number of these populations, but none of the populations are near their historic levels. Most populations remain at levels that are biologically insecure, regardless of their legal status. In addition to continued threats from habitat loss and fragmentation, variability in habitat condition is an ongoing factor in the distribution and density of special status plant, fish and wildlife species. For example, population viability for special status plant, fish, and amphibian species varies with hydrologic conditions. The recent drought has reduced the amount or quality of habitat in some areas, further stressing populations of these species.

Draft RMPs for each field office further describe special status species and describe in detail BLM Sensitive and federally listed species within each planning area in Chapter 3. These sections describe the current trends for special status species in each field office and are incorporated here by reference.

Trends on National Forest System Lands

Routt National Forest

Greater Sage-Grouse

The GRSG is associated with sagebrush habitats, though there are several types of sagebrush communities, which include the following floristic regions: Great Plains, Wyoming Basin, Southern Great Basin, Snake River Plains, Northern Great Basin, Columbia Basin, and Colorado Plateau (Stivers et al. 2006). The Routt National Forest is part of the Wyoming Basin Floristic Region (Stivers et al. 2006), and most of the sagebrush is typed as mountain big sagebrush (*Artemisia tridentata* var. *vaseyana*). Although sagebrush appears to still occupy much of the historical distribution of GRSG, sagebrush does not always provide adequate habitat due to degradation and fragmentation or a loss of important understory components within sagebrush habitats (USFWS 2010a).

Prior to 1800, GRSG existed in 13 western states across 463,509 square miles (USFWS 2010a). Currently GRSG are found in 11 western states: Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, and North and South Dakota, and occupy approximately 56 percent of their historical range (USFWS 2010a). Recently, the CPW completed habitat mapping across northwest Colorado that is being used by the BLM and Forest Service to amend the BLM's RMPs and the Routt National Forest's Forest Plan (Forest Service 1998). The result of the mapping has identified PH and GH across much of northwest Colorado in sagebrush habitats. Of the 12,600 acres of GRSG habitat mapped by CPW on the Routt National Forest, 11,100 acres is GH and 1,600 acres is PH.

No active GRSG leks have been documented on the Routt National Forest in recent years; however one historic lek has been previously documented. Though no active leks are found on the Routt National Forest, many leks are located in close proximity (less than 4 miles) to the Forest resulting in the classification of PH. No population trend information exists for the Routt National Forest, thus this section will defer to population trend information provided at the national and state level within the following documents: USFWS's 12-month finding for petition to list the GRSG (USFWS 2010b); Colorado GRSG Conservation Strategy and Plan; GRSG Comprehensive Conservation Strategy (Stivers et al. 2006); and the GRSG NTT direction (2011).

Other Special Status Species

Other special status species are identified in **Table 3.6. Appendix M**, US Forest Service Biological Evaluation, addresses the existing condition for Routt National Forest special status species.

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3.4 LANDS AND REALTY

The Lands and Realty Program secures and protects the American public's rights, title, value, and interests in its public lands, and authorizes a variety of uses on those public lands in order to meet the needs of present and future generations. Lands and realty actions ensure that public lands are managed to benefit the public.

Lands and realty actions can be divided between land tenure adjustments and land use authorizations. Land tenure adjustments focus primarily on land acquisition and disposal (including easement acquisition), while land use authorizations consist of ROWs, utility corridors, communication sites, and other leases or permits. Wind and solar renewable resource production is also permitted by ROW authorizations through the Lands and Realty Program.

LUP decisions related to limitations or restrictions on land use authorizations, such as COAs or stipulations, or land tenure changes (acquisition or disposal of BLM-administered or National Forest System lands) within the planning area could affect the Lands and Realty Program.

3.4.1 Existing Conditions

Conditions of the Planning Area

The planning area includes land in Eagle, Garfield, Grand, Jackson, Larimer, Mesa, Pitkin, Rio Blanco, Moffat, and Routt Counties in central and northwestern Colorado. Lands are administered or owned by multiple federal, state, and local agencies and private landowners. The configuration of land ownerships and their proximity to each other is an important factor when considering land tenure adjustments and evaluating ROW applications. The planning area contains lands owned by the BLM, Forest Service, other federal agencies, various state agencies, counties, and private land owners. In **Chapter 1**, Introduction, **Table 1.2**, Planning Area Land Ownership and GRSG Habitat (in Acres), shows the acreage and overall percent ownership for each land owner in the planning area.

Table 3.13 through **Table 3.17** display data compiled in a baseline environmental report produced by the US Geological Survey and BLM (Manier et al. 2013). In each table, acreages and mileages are presented by surface management agency and their presence within GH and PH in the planning area. **Figure 3-6** displays those corridors listed in **Table 3.16**.

Table 3.13
Acres of GRSG Habitat within City Limits in the Planning Area

Surface Management Agency	Total Acres within City Limits	Acres within GH	Acres within PH
BLM	300	300	0
Forest Service	1,100	1,100	0
Tribal and Other Federal	0	0	0
Private	1,300	1,100	200
State	0	0	0
Other	0	0	0

Source: Manier et al. 2013

Table 3.14
Miles of Transmission Lines within GRSG Habitat in the Planning Area

Surface Management Agency	Total Miles ¹	Miles within GH	Miles within PH
BLM	17,900	7,500	10,400
Forest Service	600	500	100
Tribal and Other Federal	0	0	0
Private	29,500	13,700	15,800
State	3,000	1,200	1,800
Other	1,100	100	1,000

Source: Manier et al. 2013

¹ Includes transmission lines greater than 115 kilovolts

Table 3.15
Number of Communication Towers within GRSG Habitat in the Planning Area

Surface Management Agency	Total Number of Communication Towers ¹	Number within GH	Number within PH
BLM	100	50	40
Forest Service	0	0	0
Tribal and Other Federal	0	0	0
Private	100	80	50
State	10	2	10
Other	0	0	0

Source: Manier et al. 2013

¹ Displays the number of Federal Communication Commission communication towers

Table 3.16
Utility Corridors within GRSG Habitat in the Planning Area

Surface Management Agency	Miles of Utility Corridors			Acres of Utility Corridors		
	Total ¹	GH	PH	Total ²	GH	PH
BLM	80	30	60	61,500	21,000	40,500
Forest Service	0	0	0	0	0	0
Tribal and Other Federal	0	0	0	0	0	0
Private	0	0	0	27,600	13,200	24,400
State	0	0	0	6,400	2,200	4,200
Other	0	0	0	2,200	0	2,200

Source: Manier et al. 2013

¹ Includes Section 368 energy corridors

² Acreages calculated by buffering corridor centerlines with varying widths based on the corridor width itself

Table 3.17
Acres of Vertical Obstructions within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres ¹	Acres within GH	Acres within PH
BLM	0	0	0
Forest Service	0	0	0
Tribal and Other Federal	0	0	0
Private	3,100	3,100	0
State	0	0	0
Other	0	0	0

Source: Manier et al. 2013

¹ Derived from dataset containing Federal Communication Commission communication towers and Federal Aviation Administration vertical obstructions. Assumes footprint of 56.4 square meters per obstruction

Conditions on BLM-Administered Lands

Land Tenure

Land ownership (or land tenure) adjustment refers to those actions that result in the disposal or withdrawal of public land, or the acquisition by the BLM of nonfederal lands or interests in land. The FLPMA requires that public land be retained in public ownership unless, as a result of land use planning, disposal of certain parcels is warranted. Tracts of land that are identified in BLM RMPs as potentially available for disposal could be conveyed out of federal ownership through an exchange or a sale. Land exchanges are an important tool to consolidate land ownership for more efficient management and to secure important objectives of resource management, enhancement, development, and protection; meet the needs of communities; promote multiple-use management; foster sustainable development; and fulfill other public needs. However, the BLM would evaluate and consider the full range of land disposal and acquisition tools

to be able to accomplish these objectives prior to proceeding with a land exchange.

Land exchanges are initiated in direct response to public demand or by the BLM to improve management of the public lands. Lands need to be formally determined as suitable for exchange. In addition, lands considered for acquisition would be those lands that meet specific land management goals identified in the RMP. Nonfederal lands are considered for acquisition through exchange of suitable public land, on a case-by-case basis, where the exchange is in the public interest and where acquisition of the nonfederal lands will contain higher resource or public values than the public lands being exchanged. There are no pending land exchanges within the planning area.

Acquisition of and interests in lands are important components of the BLM's land tenure adjustment strategy. Lands and interests in lands are acquired for the following purposes:

- to improve management of natural resources through consolidation of federal, state, and private lands
- to secure key property necessary to protect endangered species, promote biological diversity, increase recreational opportunities, and preserve archeological and historical resources
- to implement specific acquisitions authorized or directed by acts of Congress

Disposal

Disposal areas include tracts of land that are economically difficult to manage and parcels that could serve important public objectives such as expansion of communities and economic development. These lands are usually disposed of through exchanges or land sales with public or private partners that allow the surrounding lands to be managed more effectively.

There are approximately 1,800 acres of BLM-administered land identified for disposal in the planning area. Case-by-case determinations for disposal would be made on the remaining acres of BLM-managed federal land.

Public lands determined suitable for sale are offered on the initiative of the BLM. The lands are not sold at less than fair market value. Lands suitable for sale must be identified in an RMP. Any lands to be disposed of by sale that are not identified in the current RMP require a plan amendment before a sale can occur. There are no pending land sales within the planning area.

Acquisition

Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, Land and Water Conservation Fund or other purchases,

condemnation, or donations. There are no pending land acquisitions within the planning area.

Withdrawal

Withdrawn lands are lands that are reserved and set aside from application of some, or all, of the public land laws in order to protect specific resource values such as waterpower, reservoir sites, federal reserve water rights, and SRMAs. Segregative effects of withdrawals can vary depending upon the particular resource being protected, and the withdrawal may be modified or eliminated through revocation. Withdrawals are used to preserve sensitive environmental values, protect major federal investments in facilities, support national security, and provide for public health and safety. Federal policy now restricts all withdrawals to the minimum time and acreage required to serve the public interest, maximize the use of withdrawn lands consistent with their primary purpose, and eliminate all withdrawals that are no longer needed.

In the current RMPs, over 900,000 acres are withdrawn from mineral entry in the entire planning area. Within GRSG habitat, 124,800 acres are currently withdrawn from mineral entry. There are no pending withdrawals within the planning area.

Land Use Authorizations

The most common form of authorization to permit uses of BLM-administered lands by commercial, private, or governmental entities is the ROW. A ROW grant is an authorization to use a specific piece of public land for projects such as roads, pipelines, transmission lines, or communication sites. The ROW grant authorizes rights and privileges for a specific use of the land for a specific period of time.

It is the BLM's objective to grant ROWs to any qualified individual, business, or government entity, and to direct and control the use of ROWs on public lands in a manner that:

- protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity
- prevents unnecessary or undue degradation to public lands
- promotes the use of ROWs in common, considering engineering and technological compatibility, national security, and area RMPs
- coordinates, to the fullest extent possible, all BLM actions with local, State, Native American Tribal, and other federal agencies; interested individuals; and appropriate quasi-public entities (43 CFR 2801.2)

Some uses of BLM-administered lands are authorized through land use long-term land uses, and permits are used to authorize short-term uses. Private individuals and groups, as well as various businesses and government entities can hold these authorizations (**Table 3.18**).

Table 3.18
Acres of BLM Land Use Authorizations within the Decision Area

	Acres PH	Acres GH	Total Acres
Existing ROWs	257,600	219,800	477,500
Avoidance Areas	25,600	43,300	68,900
Exclusion Areas	17,100	15,700	32,800
Corridors	22,600	48,100	70,600

Source: BLM 2013

Rights-of-Way

To the extent possible, linear ROWs, such as roads and pipelines, are routed where impacts would be least disturbing to environmental resources, taking into account point of origin, point of destination, and purpose and need of the project. The ROWs for long-term land uses are issued with surface reclamation stipulations and other mitigation measures. Restrictions and mitigation measures are applied and may be modified on a case-by-case basis, depending upon impacts on resources. The placement of major linear facilities depends upon meeting the following location criteria:

- concentrate linear facilities within, or contiguous to, existing corridors, where possible
- avoid locations that would take intensively managed forest land out of production
- avoid locations that would harass livestock or wildlife
- avoid steep topography, poor soils, or other fragile areas (such as Threatened and Endangered habitats)
- avoid cultural sites that are listed on, or are eligible for listing on, the National Register of Historic Places (NRHP).

See **Table 3.18** for an overview of the number and acreages of ROWs within the planning area and the habitat types they cross.

Avoidance and Exclusion Areas

Areas closed to mineral leasing, having an NSO restriction, or otherwise identified as unsuitable for surface disturbance or occupancy are generally identified as avoidance or exclusion areas for ROWs. Restrictions and mitigation measures could be modified on a case-by-case basis for avoidance areas, depending on impacts on resources, while exclusion areas are strictly prohibited from ROW development. See **Table 3.18** for an overview of the ROW

avoidance or exclusion areas within the planning area and the habitat types within these areas.

Corridors

Utility corridors, developed to concentrate the effects of utility lines in manageable locations on BLM-administered lands, often provide suitable locations for utility transmission lines. The corridors may contain power lines, transcontinental fiber-optic communication cables, and trans-state gas pipelines. Identifying corridors does not necessarily mandate that transportation and transmission facilities would be located within the corridor, especially if they are not compatible with other resource uses, values, and objectives in and near the corridors, or if the corridors are already at maximum capacity with existing structures. See **Table 3.18** for an overview of the number and acreages of utility corridors within the planning area and the habitat types they cross.

Communication Sites

Communication sites contain equipment for various public and private tenants, including phone companies; local utilities; and local, state, and other federal agencies. Communication site applications are granted through a ROW communications lease.

Renewable Energy

Solar, wind, biomass (which are administered through the Forestry program), and geothermal (which is managed as a fluid leasable mineral) are considered renewable energy resources. Renewable energy resources all have different requirements related to economic development; however, some issues are common to all renewable energy resources, including distance to existing power transmission facilities and compatibility with existing federal land use.

Wind and solar resource facilities are permitted with ROWs through the Lands and Realty Program. All solar energy projects 20 megawatts and greater are excluded in all RMPs within the Northwest District, as described in the Solar Energy Development Programmatic EIS Record of Decision, dated October 2012. Geothermal resources, as mentioned above, are considered fluid leasable minerals.

There are no existing renewable energy land use authorizations within the planning area within GRSG habitat.

Conditions on National Forest System Lands

Routt National Forest

Several aspects of public land management must be considered in the Forest Planning process, including land tenure adjustments (i.e., disposals, acquisitions, and withdrawals), ROWs, and permits and leases.

Land Ownership Adjustment

National Forest System lands are exchanged to achieve a desired national forest land ownership pattern that supports forest land and resource goals and objectives, addresses fragmentation, reduces future management costs, and responds to urban and community needs. Lands are purchased through the Land and Water Conservation Fund to protect critical resource areas and provide increased public recreation opportunities. Land donations are accepted to consolidate National Forest System lands and protect critical resource areas. The legal public use of National Forest System lands are improved by acquiring ROWs for roads and trails. Opportunities for land ownership adjustments are equally distributed across the Yampa, Hahns Peak/Bears Ears, and Parks Ranger Districts.

The landowner must be willing to engage in a land ownership adjustment, and the Forest Service ensures that market value is obtained for lands or interests in lands to protect the public and private property owner's interest. The Forest Service has identified parcels that meet the criteria for land adjustment. Other parcels not presently identified are evaluated under the merits of each proposal. Nonfederal lands are considered for acquisition through exchange of suitable public land, on a case-by-case basis. The objectives of the land ownership adjustment program are to achieve the optimum land ownership pattern for the protection and management of resource uses, settle land title claims, and provide resource administrators with title information about the use of and resources on the land they administer. In all land exchanges, keeping the surface and mineral estate intact on both the disposed and acquired lands would benefit the future owners and their uses of the land.

Purchase. Land purchase can be pursued to facilitate various resource management objectives. Lands considered for purchase would be those lands that meet specific land management goals identified in the Forest Plan. Most funding for purchases comes from the Land and Water Conservation Fund. This is a competitive national fund and is not a reliable source of funding for land purchases on National Forest System lands. In the future, most land ownership adjustments will be done with land exchanges. In December 2012, the Forest Service accepted a land donation in the California Park area resulted in transferring approximately 100 acres of private lands classified as GH to Forest Service ownership and management.

Rights-of-Way. ROW acquisitions on National Forest System lands is necessary for all improvements, such as roads, trails, telephone lines, power lines, pipelines, ditches, and fences over private or other lands not administered by the Forest Service. To the extent possible, linear ROWs, such as roads and pipelines, are routed where impacts would be least disturbing to environmental resources, taking into account the point of origin, point of destination, and purpose and need of the project. Although established corridors exist, this does not preclude the location of transportation and transmission facilities in other

areas if environmental analysis indicates that the facilities are compatible with other resource values and objectives. Further identification of corridors may not necessarily mandate that transportation and transmission facilities be located within these areas if they are not compatible with other resource uses, values, and objectives in and near the corridors or if the corridors are saturated. ROWs are issued with surface reclamation stipulations and other mitigating measures. Restrictions and mitigating measures may be modified on a case-by-case basis, depending on impacts on resources. Areas closed to mineral leasing, having a NSO restriction, or otherwise identified as unsuitable for surface disturbance or occupancy are generally avoidance or exclusion areas for ROWs.

Wind energy developments on National Forest System lands have not been proposed as of this time. Although the potential in the forest area for wind energy development is high in many locations, the terrain and lack of accessibility to the grid makes it generally unsuitable for development.

Special Uses

Special use permits authorize and administer use of public lands by individuals, companies, organized groups, other federal agencies and State or local levels of government in a manner that protects natural resource values and public health and safety. For example, special use permits authorize uses that contribute to the Nation's infrastructure for generating and transmitting energy resources, such as: electric transmission facilities, oil and gas pipelines, hydropower facilities, and wind and solar facilities. They authorize uses for communications, commerce, public health and safety, and homeland security, such as fiber-optic and wireless telecommunications, water development systems, and federal, state, and local highways. Authorizations are needed by landowners to exercise statutory rights and outstanding and reserved interests in National Forest System lands. **Table 3.19** lists the number of each type of special use permit on the National Forest.

Table 3.19
Number of Special Use Permits on the
Routt National Forest

Use	Number of Permits
Power lines	8
Road permits	72
Ditches	156
Communication permits	28
Dams and reservoirs	51
Recreation residences	20
Cultural Use	0
Oil and gas pipelines	1
Monument	2
Ski area	1

Table 3.19
Number of Special Use Permits on the
Routt National Forest

Use	Number of Permits
Telephone	4
Snow Play	3
Wells of spring developments	6
Stream gauging stations	2
Research/education	3
Outfitters and guides	42
Recreation events	5
Organization camps	1
Fences	1
Other Improvements/permits	12
Warehouse	1
Fish ladder	1
Water Treatment	1
Totals	421

Source: Special Use Data System 2013

The 1986 amendment to FLPMA, known as the Ditch Bill, provides for permanent easement for agricultural water systems in use before 1976. Water users had 10 years from passage of the bill to apply for existing structures located on National Forest System lands. Currently, 48 easements have been issued under this law with an estimated 10 additional applications being processed.

Recreation Residence Permits. There are three summer home groups with a total of 20 cabins located on the National Forest. In many areas, this use has existed since 1925. Permits for the recreation residences are issued for 20 years. The purpose was to encourage use of the National Forests by allowing individuals to build cabins and occupy them for a portion of the year. Several thousand permits were issued nationwide. The current national policy is not to issue any additional permits but continue to acknowledge the recreational values associated with the existing Recreation Residences and to reissue existing permits when the current permit tenure expires. It is the intent of the Routt National Forest to conduct the proper environmental analysis and reissue existing permits when the current permit tenure expires.

3.4.2 Trends

Trends on BLM-Administered Lands

Land Tenure Adjustments

Field offices in Colorado have been consolidating their lands to benefit the public. To achieve this, candidates for land tenure adjustment through disposal,

sale, exchange, or acquisition include parcels that are difficult to manage or that do not have public access, parcels that are relatively small and are adjacent to other federally or state-managed lands, parcels that would increase conservation of natural resources, and parcels that increase access to and use of BLM-administered land.

The planning area currently does not have any pending land tenure adjustments and no indications of increased activity in the future. However, the BLM field offices in the planning area remain open to any suggestions by staff, members of the public, and other entities, and will process land exchanges, acquisitions, easements, and potential sales within the decision area on a case-by-case basis, as staff and priority workload allow.

Land Use Authorizations

Land use authorizations (primarily ROWs) are currently very active in the planning area across all BLM field offices. Each year, the field offices collectively process more than 300 land use authorizations per year.

ROW applications across BLM-administered lands have increased and will likely continue to increase; demand for communication site leases, for both existing and new sites on BLM-administered lands within the planning area is also increasing. Issues driving the trend to more land use authorizations include growth and urbanization issues, the interface between private landowners, and the demands on BLM-administered land to locate the facilities (e.g., access roads, communication sites, mineral development, pipelines, water tanks, and utility corridors) needed to support the fast-growing infrastructure. As communities and mineral developments continue to expand in the planning area, it is likely that requests for the use of BLM-administered land for facilities would increase.

In recent years, small-scale renewable energy facilities on private lands have been increasing in number within the planning area, and are expected to continue into the future. Private wind turbines and solar facilities are being located within the planning area, providing renewable energy to localized structures and services. Within the planning area, however, the potential for wind and solar energy is low to medium. The demand for biomass is expected to increase within the planning area.

Trends on National Forest System Lands

Routt National Forest

Proposals for land adjustments will be considered on a case-by-case basis. Land adjustments tend to be more opportunistic and do not have an apparent trend. In December 2012, the Forest Service completed a 124-acre land donation acquisition of approximately 124 acres of GH in the California Park area. No other land adjustments in GRS habitat are currently being evaluated.

Special land use applications are increasing as more people make use of National Forest System lands. Recreational Residence permits are anticipated as a flat trend because current national policy is not to issue any additional permits, and to reissue existing permits when the current permit tenure expires. Considering that renewable energy developments have not been proposed, and the terrain and lack of grid accessibility are limiting factors, the trend is anticipated to be flat without any increase in demand for renewable energy authorizations at this time.

3.4.3 References

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Forest Service (United States Department of Agriculture, Forest Service). 2013. Geographic Information Systems data. Unpublished data. United States Department of Agriculture, Forest Service, Routt National Forest, Steamboat Springs, CO.

3.5 VEGETATION (FOREST, RANGELANDS, RIPARIAN AND WETLANDS, AND NOXIOUS WEEDS)

Vegetation serves multiple purposes on the landscape and provides many ecosystem benefits. Vegetation stabilizes soils, prevents erosion, uses carbon dioxide, releases oxygen, increases species diversity, and provides habitat and food for animals and products for human use. Many BLM and Forest Service land management policies are directed toward maintenance of healthy vegetation communities.

The riparian community includes wetlands and is associated with and depends on the presence of water during some part of the growing season. This community provides the link between aquatic and upland (dry) habitats across all elevations. Typical riparian areas are lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers, streams, and shores of lakes and reservoirs with stable water levels. Excluded are such sites as ephemeral streams or washes that do not exhibit vegetation dependent on free water in the soil (BLM 2004a). Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions under normal circumstances. Wetlands include marshes, shallows, swamps,

lakeshores, bogs, muskegs, wet meadows, estuaries, springs, seeps, and riparian areas (BLM 2004a).

Oil and gas development, timber harvest and associated activities, fuels management, livestock grazing, recreation, travel management, and special designations can affect vegetation. In particular, activities dealing with water rights and subsequent water diversions may affect riparian areas.

Many BLM and Forest Service land management policies are directed toward the maintenance and improvement, of healthy vegetation communities. Generally, vegetation can be characterized by ecological provinces, and more specifically characterized by plant communities. The plant communities discussed below are those that provide the most important land cover across identified GRSG habitat within the planning area.

3.5.1 Existing Conditions

Conditions of the Planning Area

The planning area lies within three US EPA Level III Ecoregions: Southern Rockies, Wyoming Basin, and Colorado Plateaus (US EPA 2011). Ecoregions represent areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components (Chapman et al. 2006).

The planning area is characterized by high elevations and rugged mountains where vegetation is dominated by conifers of the Southern Rockies Ecoregion (Chapman et al. 2006). Vegetation types within this ecoregion are organized by elevation zones, with grass and shrublands found in the lower elevations up to the highest elevations with coniferous forest and tundra. The Wyoming Basin ecoregion is a broad intermontane basin interrupted by hills and low mountains and dominated by grasslands and shrublands. The Colorado Plateaus ecoregion is an uplifted, eroded, and deeply dissected tableland with mesas, cliffs, and canyons. It has large low-lying areas with saltbush-greasewood, and more pinyon-juniper and Gambel oak (*Quercus gambelii*) woodlands compared to the Wyoming Basin (US EPA 2010).

A number of different vegetation communities exist within GRSG habitat in the planning area, including sagebrush steppe, agriculture/irrigated meadow, mountain shrub, desert shrub/scrub, grasslands subalpine meadow, pinyon-juniper, other forests and woodlands, riparian and wetlands, and other. **Table 3.20** shows the acreage of each of these vegetation communities across GRSG habitat in the planning area. Each vegetation community is also described below.

Table 3.20
Vegetation Communities in GRSG Habitat in the Planning Area

Vegetation Community	PH		ADH	
	Acres	Percent	Acres	Percent
Sagebrush steppe	1,651,300	69.8	2,545,400	61.4
Agriculture/Irrigated meadow	233,000	9.9	426,900	10.2
Mountain shrub	150,500	6.4	347,500	8.4
Desert shrub/scrub	82,300	3.5	227,500	5.5
Grasslands	85,900	3.6	116,900	2.8
Subalpine meadow	17,100	0.7	27,700	0.7
Pinyon-juniper	54,000	2.3	265,600	6.4
Other forest and woodland	58,700	2.5	131,000	3.2
Riparian and Wetlands	19,900	0.8	33,400	0.8
Other	12,400	0.5	26,600	0.6
Total	2,365,100		4,148,500	

Source: BLM 2013

Sagebrush Steppe

Sagebrush steppe vegetation occupies 61.4 percent of ADH and 69.8 percent of PH within the planning area. Sagebrush conditions within the planning area are generally split between upper and lower elevations, with 7,000 feet representing the approximate dividing line. The higher-elevation sagebrush communities are usually composed of mountain big sagebrush (*A. tridentata* ssp. *pauciflora*) or subalpine sagebrush (*A. tridentata* ssp. *vaseyana*), sometimes in pure stands but often with serviceberry (*Amelanchier* spp.), mountain snowberry (*Symphoricarpos rotundifolius*), green rabbitbrush (*Chrysothamnus viscidiflorus*), or antelope bitterbrush (*Purshia tridentata*). The higher-elevation sagebrush tends to be very productive, shows little evidence of decadence (mature shrubs where approximately 25 percent or more of plant is dead), and shows good recruitment of young sage. Common grass and grass-like species found in the sagebrush community include bluebunch wheatgrass (*Pseudoroegneria spicata*), thickspike wheatgrass (*Elymus lanceolatus*), Sandberg bluegrass (*Poa secunda*), muttongrass (*Poa fendleriana*), Indian ricegrass (*Achnatherum hymenoides*), needle and thread (*Hesperostipa comata*), threadleaf sedge (*Carex filifolia*), green needlegrass (*Nassella viridula*), Columbia needlegrass (*Achnatherum nelsonii*), bottlebrush squirreltail (*Elymus elymoides*), and Idaho fescue (*Festuca idahoensis*). Common forbs include phlox (*Phlox* spp.), Hooker's sandwort (*Arenaria hookeri*), buckwheat (*Eriogonum* spp.), penstemon (*Penstemon* spp.), wild onion (*Allium* spp.), Indian paintbrush (*Castilleja* spp.), globemallow (*Sphaeralcea* spp.), Oregon grape (*Mahonia* spp.), and prickly pear cactus (*Opuntia* spp.) (BLM 2007b).

Lower-elevation sagebrush communities [Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) and xeric mountain big sagebrush] consist of older stands of sagebrush that show more signs of decadence (mature shrubs where approximately 25 percent or more of plant is dead) and little recruitment. These communities often have less herbaceous cover and diversity, especially forbs, and are highly susceptible to cheatgrass (*Bromus tectorum*) invasion. The

forb component may vary considerably with recent precipitation amounts and timing. Nearly 100 years of fire suppression have allowed pinyon pine (*Pinus edulis*) and juniper trees (*Juniperus utahensis*) to encroach into sagebrush habitat. **Table 3.2I** displays data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). In this table, acres are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.2I
Acres of Sagebrush and Pinyon-Juniper Interface within
GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres of Interface ¹	Acres within GH	Acres within PH
BLM	163,300	97,300	66,000
Forest Service	1,000	500	500
Tribal and Other Federal	3,600	2,500	1,100
Private	83,900	43,100	40,800
State	21,100	7,100	14,000
Other	2,400	700	1,700

Source: Manier et al. 2013

¹ Includes the number of acres where sagebrush land cover occurs within 120 meters of pinyon-juniper land cover

Lower-elevation sagebrush also comprises the bulk of big game winter range and, as such, the sagebrush is often moderately to heavily hedged. Repeated heavy hedging eventually leads to more decadence (mature shrubs where approximately 25 percent or more of plant is dead) throughout sagebrush stands and even mortality of individual sagebrush shrubs.

Agriculture/Irrigated Meadows

Agricultural lands within GRSG habitat in the planning area largely consist of irrigated meadows. Irrigated meadows are mostly found on private lands not administered by the BLM or Forest Service. These agricultural lands occupy 10.2 percent of ADH and 9.9 percent of PH in the planning area. Irrigated meadows primarily consist of lower-elevation flat areas, including river bottoms, terraces, and benches that are mainly used for hay production in the summer and winter feeding areas for livestock. The major grasses used for hay production on the irrigated meadows include timothy (*Phleum* spp.), smooth brome (*Bromus inermis*), orchardgrass (*Dactylis glomerata*), American sloughgrass (*Beckmannia syzigachne*), meadow foxtail (*Alopecurus pratensis*), and redtop (*Agrostis gigantea*). Grass-like plants, such as sedges and rushes, are also found in these meadows, often on the bog-like sites.

Mountain Shrub

Mountain shrub vegetation occupies 8.4 percent of ADH and 6.4 percent of PH in the planning area. Mountain shrubland includes large stands of Gambel oak

and other more diverse associations with Gambel oak, mountain mahogany (*Cercocarpus* spp.), mountain snowberry (*Symphoricarpos* spp.), and serviceberry (*Amelanchier* spp.), with scattered sagebrush, rabbitbrush, bitterbrush, kinnikinnick (*Arctostaphylos* spp.), currant (*Ribes* spp.), shrubby cinquefoil (*Dasiphora fruticosa*), and skunkbush sumac (*Rhus trilobata*). The most common areas where mountain shrub vegetation communities are found are on northern exposures in snow pockets and along drainages where moisture is not a limiting factor. These areas are frequently located about mid-slope and may be associated with steep topography. Although thinly scattered, mountain shrub vegetation communities provide vital forage and habitat for wildlife and livestock. Grasses found in the community include needle and thread, basin wildrye (*Leymus cinereus*), Indian ricegrass, green needlegrass, Columbia needlegrass, thickspike wheatgrass, Idaho fescue, Thurber's fescue (*Festuca thurberi*), mountain muhly (*Muhlenbergia montana*), prairie junegrass (*Koeleria macrantha*), slender wheatgrass (*Elymus trachycaulus*), Sandberg bluegrass, Kentucky bluegrass (*Poa pratensis*), letterman's needlegrass (*Achnatherum lettermanii*), bottlebrush squirreltail, western wheatgrass (*Pascopyrum smithii*), beardless bluebunch wheatgrass, brome (*Bromus* spp.), and muttongrass. Common forbs include arrowleaf balsamroot (*Balsamorhiza sagittata*), buckwheat, Indian paintbrush, lupine (*Lupinus* spp.), penstemon, sego lily (*Calochortus nuttallii*), wild onion, larkspur (*Delphinium* spp.), violet (*Viola* spp.), bluebells (*Mertensia* spp.), and prickly pear cactus (BLM 2007b).

Desert Shrub/Scrub

Desert shrub/scrub vegetation occupies 5.5 percent of ADH and 3.5 percent of PH in the planning area, and only on BLM-administered lands. This system is comprised of arid to semi-arid shrublands on lowland and upland sites usually at elevations between 5,000 and 7,000 feet. Sites can be found on all aspects. Slopes are typically gentle to moderately steep but are sometimes unstable and prone to surface movement. Many areas within this system are degraded due to erosion and may resemble "badlands." Soil surface is often very barren in occurrences of this system. The interspaces between the characteristic plant clusters are commonly covered by a microphytic crust. Dominant shrubs found in this community are drought tolerant and include Gardner's saltbush (*Atriplex gardneri*), fourwing saltbush (*Atriplex canescens*), birdfoot sagebrush (*Artemisia pedatifida*), bud sagebrush (*Picrothamnus desertorum*), spiny hopsage (*Grayia spinosa*), greasewood (*Sarcobatus vermiculatus*), broom snakeweed (*Gutierrezia sarothrae*), Basin big sagebrush, rabbitbrush, and winterfat (*Krascheninnikovia lanata*) (BLM 2007b). Grasses associated with these sites are Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, bluebunch wheatgrass, needle and thread, and western wheatgrass (BLM 2007b). Forbs include wild onion, biscuitroot (*Lomatium* spp.), woody aster (*Xylorhiza* spp.), globemallow, and prickly pear cactus (BLM 2007b).

Grasslands

Grasslands vegetation occupies 2.8 percent of ADH and 3.6 percent of PH in the planning area. Native grasslands within the planning area generally consist of two distinct types: dry and moist/wet. The dry grasslands are found in small isolated areas, often on exposed ridges or hilltops, where winds reduce available moisture and prevent shrub growth. Soils at these sites are generally very shallow and include a high percentage of rocks or cobbles. Most of these areas are actively grazed by livestock and wildlife and are dominated by grasses like Colorado wildrye (*Leymus ambiguus*), saline wildrye (*Leymus salinus*), Indian ricegrass, bottlebrush squirreltail, western wheatgrass, beardless bluebunch wheatgrass, Sandberg bluegrass, brome, arrowleaf balsamroot, buckwheat, and penstemon (BLM 1994). Many lower-elevation grasslands are degraded and are dominated by cheatgrass.

Moist/wet grasslands exist primarily as high-mountain meadows. Plant communities here are typically productive and diverse. These grasslands can be found in areas with ample moisture and gentle topography, such as mountain valleys, swales, parks, and around pot holes. Numerous grass, grass-like, and forb species produce a lush variety of vegetation that provides significant amounts of summer feed for wildlife and livestock. Common grasses include Idaho fescue, Thurber's fescue, mountain muhly, needle and thread, prairie junegrass, slender wheatgrass, Sandberg bluegrass, Kentucky bluegrass, and letterman's needlegrass (BLM 1994). Lowland grassland species that are also found at these elevations include Indian ricegrass, bottlebrush squirreltail, western wheatgrass, beardless bluebunch wheatgrass, brome, arrowleaf balsamroot, buckwheat, muttongrass, and penstemon.

Forest and Woodlands

The forest and woodland cover type found at the lowest elevation in the planning area is pinyon-juniper woodlands, and the highest is spruce-fir forest. Other forest types are found at various elevations in between, and include quaking aspen (*Populus tremuloides*), Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), and lodgepole pine (*Pinus contorta*) communities. Herbaceous cover within woodlands is generally very low, although some areas with openings could have a substantial understory (including shrubs).

Pinyon-juniper woodlands vegetation occupies 6.4 percent of ADH and 2.3 percent of PH in the planning area. Pinyon-juniper woodlands are mostly found between 5,200 and 8,000 feet on somewhat xeric ridgetops (BLM 1994). These woodlands vary from an open to closed canopy with a highly variable understory of shrubs and herbaceous plants. Old growth pinyon-juniper and areas with a greater dominance of juniper generally have less understory vegetation (BLM 2007b). Dominant plants in this community include pinyon pine, Utah juniper, Gambel oak, sagebrush, mountain mahogany, and many of the herbaceous species listed under the sagebrush steppe community.

Other forests and woodland vegetation occupies 3.2 percent of ADH and 2.5 percent of PH in the planning area. Ponderosa pine forests are generally found between 6,000 and 8,000 feet (BLM 2007b). They are generally found on higher mesas and mountain slopes, and could contain substantial amounts of Douglas-fir, aspen, or pinyon-juniper woodlands. Healthy ponderosa pine forests have somewhat open canopies and contain a substantial understory of shrubs and grasses. This type of structure provides more year-round forage for wildlife than most other coniferous forest types. Herbaceous plants found in this community typically include many of those listed for mountain shrubland.

Lodgepole pine forests exist between 8,000 and 10,000 feet (Kingery 1998). This community represents an early successional stage and is the result of past stand-replacing fires. In these stands, the community is usually dominated by dense monocultures of trees of similar age, but understory species such as kinnikinnick and others from the mountain shrubland community could be found in more open areas.

Spruce-fir forests are usually found between 7,000 and 11,000 feet. These areas typically have shallow soils and contain dense stands of Engelmann spruce (*Picea engelmanni*), Douglas-fir, and subalpine fir (*Abies lasiocarpa*) with a closed canopy. Openings in the forest support many herbaceous and woody plants that are found in the mountain shrublands and grassland communities.

Aspen forest communities are usually found between 7,000 and 10,000 feet. This community is early successional and consists of open to dense stands of aspen in sometimes isolated pockets in higher elevations (BLM 1994). Understory vegetation is highly variable and depends mostly on available moisture and canopy closure. Many aspen forests are very productive and contain a lush understory, whereas others could have somewhat sparse understories. Plant species commonly found in the aspen trees in this community include those listed under the mountain shrubland community.

Subalpine Meadow

Rocky Mountain subalpine mesic meadows are restricted to sites where finely textured soils, snow deposition, and/or wind-swept dry conditions limit tree establishment. These meadows are typically found above 9,800 feet in elevation in the southern part of its range, and above approximately 5,000 feet in the northern part. Typically, this vegetation type is forb-rich, with forbs contributing more to overall herbaceous cover than grasses (BLM 2011). This vegetation type covers 0.7 percent of ADH and 0.7 percent of PH within the planning area.

Riparian and Wetland Vegetation

Riparian and wetland vegetation occupies 0.8 percent of ADH and 0.8 percent of all PH in the planning area. Riparian areas in the planning area are generally small and account for a small proportion of the total acreage, but are highly productive and provide forage and cover for nearly all wildlife species at some point in their life cycle. A variety of vegetation types containing riparian zones

and wetlands exist with the planning area, such as evergreen riparian forests and woodlands, mixed coniferous and deciduous forests and woodlands, deciduous dominated forests and woodlands, tall willow shrublands, short willow shrublands, non-willow shrublands, and herbaceous vegetation (Carsey et al. 2003). Riparian areas and wetlands are important because they improve water quality in watersheds by buffering open waterways from surface runoff that could contain sediment, toxicants, or other undesirable constituents.

The steeper-gradient riparian systems typically support aspen, willows (*Salix* sp.), red-osier dogwood (*Cornus sericea*), thinleaf alder (*Alnus incana* ssp. *tenuifolia*) and currant. Lower-gradient streams and lakes support predominantly herbaceous communities of sedges (*Carex* spp.), rushes (*Juncus* spp.), tufted hairgrass (*Deschampsia cespitosa*), and redtop with some narrowleaf cottonwood trees (*Populus angustifolia*). These riparian areas provide important brood-rearing habitat for GRSB because they support large populations of insects.

Other

Other vegetation covers in GRSB habitat within the planning area occupy 0.6 percent of ADH and 0.5 percent of PH within the planning area. This category includes developed and disturbed landscapes, non-specific barren lands, open water, and recently burned, logged, mined or quarried lands.

Noxious Weeds

A noxious weed is a plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the US. Invasive vegetation species, as defined in Executive Order 13112, are “nonnative plants whose introduction does, or is likely to, cause economic or environmental harm or harm to human health.”

Weed invasion continues to be a primary concern in western lands. Noxious weeds pose an ever-increasing threat to native plant communities, wildlife habitat, agricultural lands, and human recreation. As populations of noxious weeds and other invasive, nonnative plants increase in size and frequency, they often displace native plants, especially on recently disturbed sites, reducing the diversity of surrounding native plant communities, altering species composition and community structure, increasing potential for soil erosion, reducing water quality and quantity, losing long-term riparian area function, reducing habitat quality for wildlife and forage for livestock, increasing control costs, and affecting the aesthetic quality of the landscape.

The Noxious Weed Control and Eradication Act of 2004 requires the Secretary of Agriculture to provide assistance to eligible weed management entities in order to control or eradicate noxious weeds on public and private land. In 2004, Colorado amended the Noxious Weed Control and Eradication Act to list 72 species in 3 categories: A, B, and C. List A includes 18 species in

Colorado that are designated by the Commissioner for eradication. List B includes 40 species for which a State Noxious Weed Management Plan is being, or will be, developed and implemented in order to stop the continued spread. List C includes 14 species that build from the goals of List B species, and for which additional education, research, and biological control will be provided to jurisdictions that chose to require management.

Of the weeds on the State of Colorado Noxious Weed List, those which are commonly found in GRSG habitat include houndstongue (*Cynoglossum officinale*), Canada thistle (*Cirsium arvense*), whitetop (*Cardaria draba*), and cheatgrass. Several other weed species have been found in small, isolated patches. Another invasive nonnative, Kentucky bluegrass is of concern. While this grass is not on the Colorado weed list, it is capable of outcompeting native, cool-season grasses under heavy grazing pressures, and is therefore an indicator of declining habitat quality in rangelands and riparian areas.

Cheatgrass is of particular concern in lower elevation and degraded areas within the planning area. Degradation into cheatgrass-dominated areas is most commonly associated with historic overgrazing, drought, and/or fire. Once established, the presence of cheatgrass increases the intensity and size of wildland fires, which leads to further vegetative degradation (BLM 2008). **Table 3.22** displays data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). In this table, acres with cheatgrass potential are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.22
Acres of Cheatgrass Potential within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres ¹	Acres within GH	Acres within PH
BLM	1,488,200	624,100	864,100
Forest Service	9,100	4,700	4,400
Tribal and Other Federal	42,500	17,400	25,100
Private	1,783,800	612,900	1,170,900
State	244,200	62,700	181,500
Other	35,900	5,900	30,000

Source: Manier et al. 2013

¹ Acreage comprised of areas with a high potential for cheatgrass occurrence

Conditions on BLM-Administered Lands

Upland Vegetation

Acres of each vegetation community on BLM-administered lands within ADH and PH are presented in **Table 3.23**.

Table 3.23
Vegetation Communities on BLM-Administered Lands in GRSG Habitat

Vegetation Community	PH		ADH	
	Acres	Percent	Acres	Percent
Sagebrush steppe	722,300	78.4	1,143,300	66.0
Agriculture/Irrigated meadow	10,200	1.1	18,600	1.1
Mountain shrub	35,700	3.9	105,600	6.1
Desert shrub/scrub	61,800	6.7	176,800	10.2
Grasslands	29,500	3.2	43,500	2.5
Subalpine meadow	5,000	0.5	8,300	0.5
Pinyon-juniper	35,900	3.9	179,800	10.4
Other forest and woodland	13,100	1.4	40,500	2.3
Riparian and Wetlands	1,800	<1	3,300	<1
Other	6,300	<1	11,800	<1
Total	921,600		1,731,500	

Source: BLM 2013

In 1997, the BLM adopted the Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado) (BLM 1997a). These standards and guidelines were developed to guide the BLM and public land users to maintain or achieve rangeland health. During the permit renewal process, allotments are assessed for compliance with the standards and guidelines by a BLM interdisciplinary team that visits the site and determines the health of the allotment. For livestock grazing allotments, a goal is for the vegetation to meet or be moving toward compliance with the following standard:

- Standard 3—Plant and Animal Communities: Healthy productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes.

Only limited spatial data for land health assessments is available for BLM-administered lands throughout the planning area. Of the 581,000 acres of PH on BLM-administered lands in the planning area for which spatial land health data are available, 308,700 acres (53 percent) were found to meet land health standards. Of the 1,121,900 acres of ADH on BLM-administered lands in the planning area for which spatial land health data are available, 503,900 acres (45 percent) were found to meet land health standards. Note that these figures do not include any lands in the BLM's KFO or WRFO. In areas that were not achieving or making progress toward achieving Standard 3, historic grazing practices and weed invasion (e.g., cheatgrass [*Bromus tectorum*]) were the most common indicated causal factors for these determinations (see **Appendix K**,

BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado).

Riparian/Wetland Vegetation

Proper Functioning Condition is an inventory methodology the BLM uses to assess the physical functioning of riparian areas and wetlands. The Proper Functioning Condition assessment provides a consistent approach for assessing the physical functioning of riparian areas and wetlands through consideration of such factors as hydrology, vegetation, and soil/landform attributes. The assessment synthesizes information that is foundational to determining the overall health of riparian areas and wetlands. Proper functioning condition is a state of resiliency that will allow riparian areas and wetlands systems to hold together during a 25- to 30-year flow event, sustaining that system's ability to produce values related to both physical and biological attributes.

Proper Functioning Condition assessments have been performed on most riparian areas on BLM-administered lands within the planning area. Streams rated "Functioning at Risk" are functional, but at risk. Within the planning area, most of the "Functioning at Risk" streams are streams where the use levels place the area at risk for degradation, especially if such use levels continue. Desired plant communities that can help stabilize the stream are starting to be replaced by communities that tolerate moderate-to-heavy use. Areas rated "Non-Functioning" no longer provide the basic riparian area/wetlands values due to current on-site conditions. There is a need for better inventory of wetlands within the planning area.

Noxious Weeds

The BLM has a proactive weed management program that includes conducting education, inventorying weeds, developing partnerships, coordinating weed control efforts, and monitoring effectiveness of treatments. Some basic inventory data are available on invasive species present within on BLM-administered lands as a result of Land Health Assessments and general plant inventories; however, the location and actual number of infested acres by species and specific location is unavailable for all BLM-administered lands within the entire planning area. The BLM conducts annual weed treatments, with the exact acreage depending on funding, priorities, and available resources. Weed treatments conducted by oil and gas operators have increased markedly in the past decade, partly due to the dramatic increase in surface disturbances associated with oil and gas development (and a resulting increase in weeds becoming established).

Conditions on National Forest System Lands

Upland Vegetation

Acres of each vegetation community on National Forest System lands within PH and GH are presented in **Table 3.24**.

Table 3.24
Vegetation Communities on National Forest System Lands in GRSG
Habitat

Vegetation Community	PH		ADH	
	Acres	Percent	Acres	Percent
Sagebrush steppe	4,400	84.1	15,100	75.5
Agriculture/Irrigated meadow	30	<1	900	4.5
Mountain shrub	200	3.0	600	3.0
Desert shrub/scrub	0	0	40	<1
Grasslands	0	0	200	1.0
Subalpine meadow	50	<1	200	1.0
Pinyon-juniper	20	<1	200	1.0
Other forest and woodland	200	4.5	2,100	10.5
Riparian and Wetlands	300	4.9	600	3.0
Other	80	1.5	80	<1
Total	5,200		20,000	

Some localized areas are recovering from prior management (spraying to promote grasses and intensive grazing). However, the vast majority of rangelands on the National Forest (including shrublands, riparian areas, and aspen forest) are in satisfactory condition with a stable or upward trend. Sagebrush stands within GRSG habitat vary in species composition and other characteristics among sites. On shallower soil sites, shorter species such as black sagebrush and three-tip sagebrush dominate. On the more moist sites, bitterbrush is co-dominant with big sagebrush. Canopy cover of sampled sites within GRSG habitat areas generally vary from 8 to 25 percent. Bare ground measurements on these sites range from 1 to 18 percent. The herbaceous layer on most sites is dominated by native bunchgrasses and native perennial forbs.

Riparian/Wetland Vegetation

Riparian areas, because of their high ecological value, are managed under an extensive set of standards, guidelines, and best management practices. They are managed with the objective of meeting or moving toward Proper Functioning Condition as a part of meeting allowable forage utilization guidelines. Most of the acres of rangeland found to be in unsatisfactory condition are found in riparian zones. In that category, First Creek and Elkhead Creek in California Park are the two riparian areas on the National Forest most in need of continued improvement.

Noxious Weeds and Other Invasive Plants

There are 15 species of state-listed noxious weeds documented on the Routt National Forest. Ongoing inventories indicate the presence of just over 35,000 acres infested by all noxious weed species. The most common noxious weeds found on the National Forest are leafy spurge, yellow toadflax, houndstongue, tarweed, three species of knapweeds, hoary cress (whiteweed), musk thistle, Canada thistle, and cheatgrass (downy brome). In addition to the state-listed noxious weeds, numerous other invasive nonnative species are found in the

area. One of the more notable effects of the drought was the increased spread of several species, especially yellow toadflax and houndstongue, and cheatgrass stands in locations where it had not been seen before or where only scattered plants had previously been observed.

Most cheatgrass infestations are on steep south-facing slopes in drier shrublands up to 9,500 feet in elevation. They occupy relatively small areas in comparison to total shrubland acres on the National Forest, but cheatgrass readily colonizes burned areas and other disturbed sites. Patches of cheatgrass commonly infest sagebrush communities in GRSG habitat areas.

Noxious weeds are treated annually using a variety of methods, and a number of prevention measures are in place; however, weed control funding levels and available labor are not adequate to treat or inventory all weed populations. Annual treatment has averaged nearly 900 acres over the last 5 years. New weed populations become established every year. Overall, weed control efforts do not keep pace with growth of existing populations of many species or establishment of new populations.

Treatment of cheatgrass has only occurred on a limited basis in a few locations. Most of the infestations are very difficult to safely and effectively treat by ground application of herbicide because they are on steep, rocky slopes. The best herbicide for controlling cheatgrass must be applied at a very low, even rate either early in the spring or in the fall when negative effects on non-target species are avoided because they are dormant. This is only feasible via aerial application. The Routt National Forest cannot aerially apply pesticides without first completing an EIS; that effort is underway.

3.5.2 Trends

Trends on BLM-Administered Lands

Upland Vegetation

The density and cover of shrubby vegetation have consistently increased in rangelands throughout the Rocky Mountain West since the onset of wildfire control and livestock grazing in the late 19th century. This is most commonly observed in big sagebrush vegetation types (Beetle and Johnson 1982) and is apparent in much of the planning area. Trends in the percentage of desirable species present in the planning area rangeland communities are mixed, with many areas in stasis, some areas with increases in desirable species, and other areas with decreases in desirable species and increases in undesirable species.

Lower-elevation sagebrush communities in GRSG habitat within the planning area appear to be in a downward trend due to pinyon-juniper encroachment, a gradual increase in cheatgrass, and in some areas, heavy browsing pressure that has resulted in decadence (mature shrubs where 25 percent or more of plant is dead) or mortality of shrubs.

Forest and woodlands in Colorado have been affected by drought, insects, and disease. Pinyon ips beetle, mountain pine beetle, spruce bark beetle, and balsam fir beetle have all been increasing in population. Many lodgepole, Douglas-fir, and spruce-fir forest communities are mature even-aged stands with increasing density. Increased stand density magnifies competition among species and decreases tree vigor. Low-vigor stands are more susceptible to insect and disease infestation. Aspen within the planning area are in varying stages of growth, although in overall decline with many stands exhibiting signs of rot (Colorado State Forest Service 2005). Drought is also a factor in the extensive mortality of mature aspen in the Piceance Basin, although these stands continue to regenerate. Lack of regeneration in the aspen, possibly associated with livestock and big game management, is also a contributing factor to the decline observed in the planning area.

Pinyon and juniper woodlands have expanded and have increased fuel loading in much of the western US, including in GRSG habitat within the planning area (Hood and Miller 2007).

Vegetation management objectives include improving upland health and habitat for GRSG and other sagebrush-dependent species and reducing hazardous fuels, particularly in the wildland-urban interface. In order to achieve these objectives, the BLM has been implementing numerous vegetation management actions, and range improvements have been made through the grazing permit renewal process. Many recent vegetation treatments have targeted sagebrush stands within GRSG habitat. The vegetation treatments have included selective removal of pinyon pine and Utah juniper trees in sagebrush habitat, brushbeating of small patches of sagebrush, and the use of prescribed fire to create a mosaic of age-classes and improve herbaceous understory.

Because plant communities respond to many environmental influences, such as wildlife and livestock foraging, drought, disease, wildfire, and prescribed burns, it is difficult to forecast their health. Where the BLM has primary authority to manage livestock grazing and where grazing is the primary activity that is potentially diminishing vegetation health, the BLM will continue to act to restore the health of plant communities through managing for desired plant communities and adjusting the number and seasonal distribution of livestock. Where other agencies or private landowners share or have primary authority over factors causing the decline of vegetation health, the forecast is less clear because the situation is more complex. At best, resolution of landscape health issues is likely to progress slowly over the planning period.

Riparian/Wetland Vegetation

Continued population growth within the surrounding areas has increased the use of BLM-administered lands, which threatens riparian areas and wetlands. New trails, paths, and road crossings, or travelling within riparian areas and wetlands, can disrupt hydrology, introduce weeds, and compact or rut soils.

Continued population growth and land sales may result in more agricultural water rights being converted to municipal and industrial uses, or used in ways that do not offer indirect benefits to riparian areas and to wetlands. Currently, there are water rights that are leased to agricultural users until they are needed by municipal and industrial users. Changes in use may greatly affect the hydrology of streams, riparian areas, and wetlands on BLM-administered lands, as there are several acres of public wetlands that are supported or created by the current private irrigation practices.

The riparian and wetland condition in many portions of the planning area has been improved through adjustment and implementation of grazing systems. Monitoring data, such as utilization, photo-points, and general observations, along with land health assessments, indicate that riparian and wetland conditions in many areas are improving, and progress is being made in meeting land health standards; however, some issues remain in some riparian-wetland areas. Wildlife and livestock concentrations and high forage utilization rates have led to the development of small hummocks that eventually alter surface flow patterns. Increased soil compaction of moist soils increases surface runoff and damages the riparian system. Lotic riparian areas with headcuts can lead to excessive drainage out of the system, decreasing the capability of the system. Fluctuating water levels resulting from climatic conditions and water diversions contribute to these areas not meeting Standard 2 of the Colorado Standards for Public Land Health (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado). In arid environments, lack of perennial surface water, presence of sandy channels, and excessively salty soils limit the capability of some watersheds to support diverse and extensive riparian systems.

Noxious Weeds

Within the planning area, especially in the last 10 years, there has been an increase in noxious and invasive weeds, including salt cedar (tamarisk), halogeton, Russian thistle, Canada thistle, and cheatgrass. These problems are most evident in oil and gas production fields and other locations where native vegetation has been disturbed. Trends in rangeland health are managed by adjusting livestock, recreation, wild horse, and wildlife usage, as well as by controlled burns, brush beatings, and weed control. These actions manipulate plant composition with the goal of maintaining desirable plant species and communities that, on average, represent mid- to upper seral stages of development. Weed treatments and other efforts, such as cooperative agreements with local agencies, have helped reduce and prevent the spread of weeds in localized areas.

Trends on National Forest System Lands

Routt National Forest

Sagebrush dominated areas of GRSG habitat on the National Forest has undergone a significant transition over the last 60 years, from the targeted spraying of sagebrush to reduce its presence and promote grass production to a focus on restoration of sagebrush habitats in these historically impacted areas. Many acres of big sagebrush were sprayed from the late 1950s through the early 1980s to remove or thin sagebrush stands, intended to increase forage production for livestock. Virtually all of California Park was consistently sprayed from the early 1950s to the early 1990s to control the presence of *Wyethia* (mule's ears), some populations of which increased after sagebrush-control efforts of that same time. Tarweed infested and greatly increased in many areas of the California Park after the treatments for reduction of mule's ears. Tarweed has had a significant effect on amounts of native grass species there since it is an allelopathic plant that releases inhibitory chemicals that negatively affect the growth and development of neighboring plants. This resulted in areas dominated by bare ground with little value to wildlife or domestic grazing animals. The Forest Service has been involved in active restoration of these degraded areas of GH in the California Park area beginning around 2000 and continuing to present. The active restoration has mostly focused on re-seeding, planting and resting degraded areas. With an end result of an improving condition of GH in the California Park area. The rest of the GRSG habitat on the Routt National Forest has had a fairly stable vegetation condition and is in a mid to late seral condition in the sage-brush type.

3.5.3 References

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3.6 WILDLAND FIRE ECOLOGY AND MANAGEMENT

Fire is an inherent component of ecosystems and historically has had an important role in promoting plant succession and the development of plant community characteristics. Control of fires and other land use practices during the last century has changed plant communities by altering the frequency, size, and severity of wildfires.

BLM and Forest Service management practices include the control of wildfires in some areas, the use of fire through prescribed burning or the management of wildfires in order to meet land management goals, and the treatment of vegetation so that fires are more controllable in areas where values at risk are higher. Wildland fire management on BLM-administered and National Forest System lands is guided by a Fire Management Plan that considers the three elements mentioned above, as well as firefighter and public safety and cost effectiveness.

The two types of wildland fire are unplanned ignitions and planned ignitions (prescribed fire). Wildfire describes unplanned ignitions or prescribed fires that are declared wildfires (2009 Guidance for Implementation of Federal Wildland Fire Management Policy). Wildland fires occur from natural causes, such as lightning, or are caused by humans either accidentally or with the intent to cause damage. Prescribed fire is used in a controlled manner under a specific prescription and planned effort for beneficial purposes such as reducing hazardous fuel accumulation. Wildland fires are sometimes managed to achieve resource objectives.

Fire may be used to maintain or increase age class diversity within vegetation communities (e.g., big sagebrush/grassland); rejuvenate fire-dependent vegetation communities (e.g., aspen); maintain or increase vegetation productivity, nutrient content, and palatability; and maintain or improve wildlife habitat, rangeland, and watershed condition. Fire is also considered a management tool for timber slash disposal, seedbed preparation, hazardous fuel reduction, disease or insect control, grazing management, thinning, or species manipulation in support of forest management objectives. The full range of fire management activities can be used to help achieve ecosystem stability, including its interrelated ecological, economic, and social components.

3.6.1 Existing Conditions

Conditions of the Planning Area

Fire plays a critical role in shaping vegetative characteristics throughout the planning area. Fire suppression practices of the twentieth century have pushed some ecosystems outside their historic range of variability due to increased fuel accumulations, higher densities of trees and shrubs, and increased ladder fuels. As a result, these areas are prone to higher-intensity wildfires than historically experienced.

Fire regimes describe fire frequency (average number of years between fires) and fire severity (effect of the fire on the dominant overstory vegetation—low, mixed, or stand replacement). These regimes represent fire intervals prior to Euro-American settlement and are calculated and classified by analyzing natural vegetation, known fire cycles, and fire history data. Fire regime condition class (FRCC) indicates the degree of departure from the historic fire regime (Hann and Bunnell 2001) (**Table 3.25**).

Fires within the planning area are both naturally occurring and are used as a management tool. Naturally occurring fires are widely distributed in terms of frequency and severity. While regional and annual variations may occur, the fire season for GRS habitat within the planning area normally extends from late April to early November. The most critical fire conditions are often present from mid-June until late summer, when monsoonal moisture pushes into the area, and again from late August through October, before season-ending winter weather arrives. The highest potential for human-caused wildfire is during the September to October hunting season.

Table 3.25
Fire Regime Condition Classes

FRCC	Attributes
Condition Class 1	<p>Fire regimes are within or near an historical range. The risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.</p>
Condition Class 2	<p>Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range.</p>
Condition Class 3	<p>Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been significantly altered from their historical range.</p>

Source: Interagency FRCC Guidebook Version 3.0, September 2010

Table 3.26 and **Table 3.27** display data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). This information provides a relatively coarse estimate of acres of wildland fire in GRSG habitat within the planning area. In each table, acres are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.26
Acres of Wildland Fire within GRSG Habitat in the Planning Area

Management Agency	Total Acres ¹	Acres within GH	Acres within PH
BLM	11,000	5,800	5,200
Forest Service	0	0	0
Tribal and Other Federal	2,000	1,900	100
Private	5,200	1,100	4,100
State	1,000	300	700
Other	0	0	0

Source: Manier et al. 2013

¹ Acres calculated from wildland fires occurring between 2000 and 2012

Table 3.27
Acres with High Probability for Wildland Fire within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres with High Probability for Wildland Fire ¹	Acres within GH	Acres within PH
BLM	352,600	177,300	175,300
Forest Service	200	200	0
Tribal and Other Federal	2,600	1,700	900
Private	410,900	169,300	241,600
State	31,600	12,600	19,000
Other	9,700	1,300	8,400

Source: Manier et al. 2013

¹ Derived from Forest Service Fire Simulator burn data

Conditions on BLM-Administered Lands

Fire Regime Condition Class

While the fire regime of a particular area is not likely to change except in the very long term, the condition class can be changed through fire management and other vegetation management actions. Extreme departure from the historic fire regime results in changes to one or more of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency,

severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, grazing, and drought).

More recently, in some parts of the planning area (e.g., GJFO) the combination of wildfire suppression and changing land use patterns has altered the natural cycle and role of fire. Suppression actions have resulted in large, unnatural fuel loads that are continuous across the landscape. Wildland fires burn with greater intensities and spread more rapidly, consuming more acres than in the past under these altered landscape conditions.

Table 3.28 summarizes the current condition class of all BLM-administered lands within GRSG habitat in the planning area.

Table 3.28
Acres by Fire Regime Condition Class within GRSG Habitat on BLM-Administered Lands

FRCC	CRVFO	GJFO	KFO	LSFO	WRFO	Total
1	39,900	16,100	163,200	25,100	0	244,300
2	75,900	38,900	646,300	2,179,200	1,201,200	4,141,500
3	8,900	4,100	82,900	87,200	475,300	658,400

Source: BLM 2013

Fire Occurrence

Lightning fires have traditionally been an integral factor in the formation and arrangement of vegetation types in GRSG habitat. The primary fuel type within GRSG habitat in most of the planning area is sagebrush and grass, with some areas supporting a low density of pinyon-juniper and pockets of mountain shrub (see **Section 3.5**, Vegetation, for further descriptions).

Table 3.29 displays the size and number of fires by size class in GRSG habitat and within a 1-mile buffer of this habitat for that timeframe on BLM-administered lands. **Table 3.30** displays the size and number of fires by size class in the GRSG PH and within a 1-mile buffer of this habitat for that timeframe on BLM-administered lands. These tables show that the majority of large fires occur in PH. This is largely a result of greater fuel continuity in the PH that allows fires to spread unchecked by natural barriers.

Table 3.29
Fire Occurrence within GRSG Habitat on BLM-Administered Lands (1992–2011)

Size Class	Number of Fires	Acres Burned	Average Fire Size
A: 0 to 0.25 acres	1,809	200	0.1
B: 0.26 to 9.9 acres	507	1,000	1.7
C: 10 to 99 acres	151	5,200	40
D: 100 to 299 acres	52	8,800	130
E: 300 to 999 acres	40	23,700	430
F: 1,000 to 4,999 acres	23	53,400	910

Table 3.29
Fire Occurrence within GRSG Habitat on BLM-Administered Lands (1992–2011)

Size Class	Number of Fires	Acres Burned	Average Fire Size
G: 5,000+ acres	7	82,300	4,000
Total	2,589	174,600	5,510

Source: Wildland Fire Management Information 1992 to 2012

Table 3.30
Fire Occurrence within PH on BLM-Administered Lands (1992–2011)

Size Class	Number of Fires	Acres Burned	Average Fire Size
A: 0 to 0.25 acres	706	80	0.1
B: 0.26 to 9.9 acres	254	500	1.5
C: 10 to 99 acres	90	3,100	30
D: 100 to 299 acres	32	5,600	130
E: 300 to 999 acres	30	17,400	310
F: 1,000 to 4,999 acres	14	32,500	780
G: 5,000+ acres	7	82,300	4,000
Total	1,133	141,480	5,250

Source: Wildland Fire Management Information 1992 to 2012

Conditions on National Forest System Lands

Routt National Forest

The planning area encompasses three Routt National Forest Ranger Districts, including Hahns Peak/Bears Ears, Yampa, and Parks. Vegetation communities that are susceptible to fire include sagebrush, shrubland, and grassland communities at the lower elevations; mixed mountain shrub, aspen, and conifer stands at mid-elevations; and subalpine fir and Engelmann spruce and the highest elevations. In mixed conifer stands, fuel sources include dead and down, as well as standing timber with heavy fuel loading, due to past management actions, drought, insect and disease. Although aspen are not as susceptible to fire as are conifers, they will burn and carry fire during the late fall and during drought conditions.

Fuels management activity in the planning area is shown in **Table 3.31**.

Table 3.31
Acres of Harvest Activity and Fuels Reduction in GRSG Habitat on the Routt National Forest

Activity Description	Year	GRSG Habitat Type	Acres
Pile Burning	1998	General	400
Stand Clearcut	1992	General	<0.5

Table 3.31
Acres of Harvest Activity and Fuels Reduction in GRSG Habitat
on the Routt National Forest

Activity Description	Year	GRSG Habitat Type	Acres
Shelterwood Preparatory Cut	1991	General	4
Shelterwood Preparatory Cut	1992	General	5

Source: Forest Service 2012 Forest Activities Database (FACTS)

Most fires on the Routt National Forest occur in July and August, after the wetter months of May and June. Some fires will occur in the early spring (pre green-up) and in the fall after curing. Green-up begins in spring (April), curing in mid-summer (July to August), and freezing temperatures may be expected in early fall (late September). Continuous snow cover is generally 5 months in duration.

The primary fire cause is lightning, and many of these fires remain small because most lightning storms are accompanied by rain. Large fires can occur during dry thunderstorm events with wind. Most of these fires are single burning period events in the sagebrush/grass fuel type, but can be longer if they occur in or burn into timber.

Fire occurrence statistics for wildland fire are included in **Table 3.32**.

Table 3.32
Fire Starts in GRSG Habitat on the Routt National Forest (1970–2012)

Ranger District	Location	Fire Year	Fire Size (Acres)	Start Date	GRSG Habitat Type
Hahns Peak/ Bears Ears	California Park	1970	181	701002	GH
Hahns Peak/ Bears Ears	California Park	1976	0.1	761031	GH
Parks	Pinkham Area (south of Snowy Range)	1980	0.1	800828	PH
Hahns Peak/ Bears Ears	California Park	1980	0.1	800821	GH
Hahns Peak/ Bears Ears	California Park	1994	1	940612	GH

Source: Routt National Forest 2013

Fire starts from the FireHistoryPoint Spatial Layer that intersects GRSG habitat on the Routt National Forest. No polygons from the FireHistoryPolygon layer intersect GRSG habitat.

3.6.2 Trends

Trends on BLM-Administered Lands

Over the past century, the combination of wildfire suppression and changing land use patterns has altered the natural cycle and role of fire. Suppression actions have resulted in large, unnatural fuel loads that are continuous across the landscape. Due to the decrease in fire-return interval, there has been an

increase in fuel loading across the landscape. Wildland fires burn with greater intensities and spread more rapidly, consuming more acres than in the past.

The main structural change in what were historically sagebrush shrub lands is the encroachment of pinyon and juniper, other conifers, and other woody shrubs into sagebrush. Over time the encroachment will increase the fuels loading, causing an upward shift in fire behavior. This leads to an increase resistance to control, thereby decreasing firefighting effectiveness.

Sagebrush within this habitat is also transitioning to older age class that is more decadent (mature shrubs where 25 percent or more of plant is dead) with high fuels loading that can support large, severe wildfires. These increased fuels loadings are leading to higher severity fires that require more post-fire rehabilitation.

Human activities and management practices have also resulted in the spread of nonnative species. Incursion of nonnative annual grasses, primarily cheatgrass, can increase wildfire risk. This is primarily an issue in the sagebrush, grass, and pinyon-juniper fuel types. Changing climate conditions may also impact the spread of these species.

Some portions of the planning area are adjacent to timber stands in poor health with mortality from bark beetle and other insects and diseases. There is high fire potential in these stands. However, only a small portion of the BLM-administered lands within GRSG habitat in the planning area is in or near these areas.

The majority of fires within the planning area over the past 20 years have been caused by lightning. Percentage of fires caused by humans has averaged 16 percent (**Table 3.33**).

Table 3.33
Causes of Fire in Planning Area GRSG Habitat

	CRVFO	GJFO	KFO	LSFO	WRFO	Planning Area Average
Human Caused	16%	8%	43%	6%	9%	16%

Source: BLM Wildland Fire Management Information Data, NPS Wildland Fire Management Information Data, KCFast Data 1992 through 2012

It should be noted that acreage burned may not correlate with percentage of fire. For example, in the LSFO, only 6 percent of fires were human caused, but those resulted in more than 25 percent of total acres burned in the last 20 years. As human activity increases, there is more potential for human-caused fires. The location of GRSG habitat in remote areas can lead to long response times for ground-based fire response.

Trends on National Forest System Lands

Routt National Forest

In the last 43 years, there has been very little fire activity in PH or GH on the Routt National Forest with the only noticeable fire burning 200 acres in 1970. In the 42 years following, there have been occasional starts that are most often limited to less than 1 acre. The wildfire trend on the Routt National Forest is stable with no significant fires occurring for several decades.

The mountain pine beetle epidemic has resulted in a significant fire hazard on the Routt National Forest that could result in impacting adjacent GRSG habitat if a wind-driven wildfire were to start in these areas of pine mortality and spread to adjacent areas.

3.6.3 References

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3.7 MINERALS (LEASABLE)

Leasable minerals, as defined by the Mineral Leasing Act (February 1920) and 43 CFR 3000-3599 (1990), include the leasable fluid and leasable solid minerals. Leasable fluid minerals present in Northwestern Colorado include oil, natural gas (including methane, coalbed natural gas, and carbon dioxide), and geothermal resources. Leasable solid minerals in Northwestern Colorado include coal, oil shale, sodium, and uranium (which can be either a leasable or locatable mineral).

Fluid Leasable Minerals

The process of leasing and developing federal fluid mineral resources is described at 43 CFR Part 3100. Oil and gas leases are periodically made available for sale through a competitive bidding process within each BLM state office. Provisions of the lease documents in relation to surface and subsurface resources and resource uses are dictated by the RMPs in use at the time for each field office within which leases are offered. In general, these RMPs specify types of restrictions on fluid mineral leasing within each field office boundary. These include:

- Management of lands closed to leasing for fluid minerals
- Management of lands available for leasing for fluid minerals subject to differing levels of protective stipulations attached to the leases
 1. NSO—Prohibits any occupancy or other use of the surface that results in ground-disturbing activities.. Use of occupancy of the land surface for fluid mineral exploration or development would be prohibited to protect identified resource values.
 2. TL—Prohibits occupancy or other use of the surface during a specified season or other period; For oil and gas, applies to construction, drilling, and completion activities, including road travel in support of such purposes, but does not apply to production and maintenance
 3. CSU—Allows the BLM and Forest Service to apply special requirements, such as those related to location, design, and reclamation/monitoring of proposed facilities.
 4. Standard stipulations—Sets general parameters for development of a lease.

Most but not all stipulations attached to leases at the time of sale have a provision, specified in the individual RMPs, for granting exceptions, modifications, or waivers. An exception is a one-time exemption from a stipulation, such as allowing drilling through a big game winter range TL. A modification is a permanent change in the specifics of a stipulation, such as changing the dates of the big game winter range TL or changing the areas mapped as winter range based on research conducted by CPW. A waiver is a permanent dissolution of a stipulation, such as eliminating protections for a particular species when it is removed from the federal list of threatened or endangered species.

In addition to the management and stipulations described above, federal regulations give the BLM and Forest Service the authority to ensure that oil and gas activities are conducted in a manner that minimizes impacts on other resources and use and protects human health and safety. These protections are

accomplished through the BLM and Forest Service's inspection and enforcement program, as well as through the attachment of COAs to each project. This is in conjunction with the NEPA process and during review of individual applications for permit to drill and of Sundry Notices submitted in conjunction with proposed changes in well pad design and operation. These COAs typically include BMPs and other required mitigation measures, including attachment of TLs up to 60 days in duration.

Oil and Gas

Colorado is the seventh largest gas producer, has the third largest gas reserves, and has the largest reserves of coalbed natural gas in the nation. Oil production from Colorado accounts for about one percent of the annual US total. Northwest Colorado has three major oil and gas producing basins in the planning area: Piceance, Sand Wash and North Park basins. Carbon dioxide is produced in Northwest Colorado in the North Park basin.

Coalbed Natural Gas

Coalbed natural gas is methane gas that can be extracted from coal seams. Water permeates the coalbed and the pressure causes the methane to be absorbed into the grain surfaces of the coal. To produce this resource, the water must first be removed, which causes a pressure reduction that allows methane to be desorbed from the coal and flow into the well bore. Since most coalbed natural gas is associated with coals at shallow depth, exploration, well drilling, completion, and production costs are considerably lower than for conventional deep gas production.

Geothermal Resources

Geothermal resources are a source of energy that uses the natural heat of the Earth's interior, carried to the surface by steam or hot water. Geothermal resources have been used in Colorado since the early 1900s. Although geothermal potential exists in the planning area, there has been no interest in commercial development. Therefore, geothermal resources are not discussed further in this section.

Solid Leasable Minerals

Coal

The process of leasing and developing federal coal resources is described in the federal regulations at 43 CFR, Part 3400. Coal leases are made available for sale through a competitive bidding process in each BLM state office. Provisions of the lease documents in relation to surface and subsurface resources and resource uses are dictated by the then-current RMPs for each field office within which leases are offered. In general, these RMPs specify types of restrictions on coal leasing within each field office boundary as follows:

- Identification of lands with potentially developable coal resources

- Determination of lands found suitable for coal leasing using the 20 criteria listed in Section 522 of the Surface Mining Control and Reclamation Act
- For lands found suitable for coal leasing, an evaluation of whether those lands are acceptable or unacceptable for further consideration for coal leasing, including an analysis of multiple use conflicts

Coal leases are subject to readjustment of their stipulations. The first readjustment would occur 20 years after the initial date of issuance and then every 10 years thereafter. For lands found suitable for leasing, analysis of acceptability for leasing would consider the protective measures identified in the then-current RMP. Depending on the particular field office, these protections may include design, reclamation, and mitigation of proposed measures analogous to oil and gas lease stipulations, including the following or their equivalent:

- NSO—Prohibits any occupancy or other use of the surface that results in ground-disturbing activities with other than a temporary impact
- TL—Prohibits occupancy or other use of the surface during a specified season or other period
- CSU—Specifies that the BLM may require special design or reclamation standards to avoid or minimize significant adverse impacts on certain resources and resource use

Most but not all protections are attached to leases at the time of sale, and the protections may identify exception criteria for granting temporary or permanent relief from a specific measure. In addition, federal regulations give the BLM the authority to ensure that coal is developed in a manner that minimizes impacts on other resources and use and is protective of human health and safety. These protections are accomplished through the attachment of COAs to each project in conjunction with the NEPA process and during review of individual permit application.

In 2011, Colorado was ranked 9th in US coal production. There are currently three surface mines and eight underground mines located in Colorado. These mines collectively produce about 27 million tons of coal annually. Colorado coal is mostly bituminous and sub-bituminous, and characterized as a high heat content, low sulfur, low to medium ash, and low mercury coal. There are two surface mines and three underground mines in the Northwest Colorado District Planning area, Trapper, Colowyo, Deserado, and Foidel Creek (Twentymile), and Sage Creek.

BLM-administered lands are acceptable for coal leasing only after the lands have been evaluated through the BLM's multiple-use planning process (CFR 3420.1-4). In areas where development of coal resources may conflict with the

protection and management of other resources or land uses, the BLM may identify mitigating measures which may appear on leases as either stipulations or operational restrictions.

Oil Shale

Oil shale is an organic-rich sedimentary rock consisting of calcareous shale with a large amount of organic material consisting of shale with a large amount of mixed organic compounds known as kerogen. Oil shale is prevalent in the western states of Colorado, Utah and Wyoming. The resource potential of these shales is estimated to be the equivalent of 1.5 to 1.8 trillion barrels of oil in place (Bartis et al. 2005 [from WRFO RMPA]). Resource potential within the Piceance Basin totals approximately 1.0 trillion barrels of oil in place (Smith 1980 [from WRFO RMPA]). Oil shale resources in the planning area are fully analyzed in the Oil Shale and Tar Sands Programmatic EIS (BLM 2013b).

Sodium

The Piceance Basin contains the world's largest and most economically significant nahcolite resource (naturally occurring sodium bicarbonate).

3.7.1 Existing Conditions

Conditions of the Planning Area

Fluid Leasable Minerals

Oil and Gas

Major Oil- and Gas-Producing Basins and Formations. There are three major oil and gas producing basins within the planning area, the Piceance, Sand Wash and the North Park Basins.

Piceance Basin – The Piceance Basin is a part of the greater Uinta-Piceance Basin, which extends into northwestern Colorado from northeastern Utah and southwestern Wyoming and currently has production in conventional gas, tight sands, shale gas and oil. The Piceance Basin is an elongated structural depression trending northwest - southeast located in western Colorado. The basin is more than 100 miles long and has an average width of over 60 miles, encompassing an area of approximately 7,110 square miles. The Piceance structural basin encompasses varying portions of Moffat, Rio Blanco, Garfield, Mesa, Pitkin, Delta, Gunnison, and Montrose counties. The Piceance basin contains six of the top one hundred natural gas reserves in the US one of the top one hundred oil reserves (Colorado Geological Survey – online).

Sand Wash Basin – The Sand Wash Basin is part of the Greater Green River Basin which extends into northwestern Colorado. The Sand Wash Basin covers approximately 5,600 square miles, primarily in Moffat and Routt counties. Coalbed natural gas resources in the Sand Wash Basin have been estimated at 101 trillion cubic feet, approximately 90 percent within the Williams Fork

formation. The economic viability of recovery of the gas is limited by the presence of large volumes of water in most coalbeds.

North Park Basin – The North Park Basin occupies approximately 2,250 square miles in north-central Colorado and includes oil and natural gas resources primarily in the form of coalbed natural gas, carbon dioxide, and recent interest in the resource potential of the Niobrara shale formation. See **Figure 3-7** in **Appendix A**, Figures.

Oil and Gas Potential. Potential for oil and gas development exists across the planning area and is described in detail in individual RFDS for each field office (BLM 2006a, 2007, 2008a, 2008b, 2008c, 2010b, 2012a).

Table 3.34 shows oil and gas potential in the range-wide planning area and where that potential exists compared to GRS habitat.

Table 3.35 and **Table 3.36** display data compiled in a baseline environmental report produced by the US Geological Survey and BLM (Manier et al. 2013). In each table, acres are presented by surface management agency and their presence within GH and PH in the planning area. Also see **Figure 3-8** in **Appendix A**, Figures.

Table 3.34
Acres of Oil and Gas Potential on Planning Area GRS Habitat

Habitat Type	Oil and Gas Development Potential (Acres)			
	High	Medium	Low	Total
	Total Planning Area (All minerals)	7,168,400	1,609,200	5,113,800
Total Planning area (federal minerals) includes federal surface/federal minerals and fee surface/federal minerals	4,865,700	1,100,800	3,847,700	9,814,200
PH all minerals	1,649,800	231,900	396,000	2,277,700
PH federal minerals	937,100	115,400	237,500	1,290,000
ADH all minerals	2,918,100	417,800	584,700	3,920,600
ADH federal minerals	1,726,200	224,200	347,500	2,297,900

Source: BLM 2013a

Table 3.35
Acres Open and Closed to Oil and Gas Leasing within GRS Habitat in the Planning Area

Surface Management Agency	Acres Closed to Oil and Gas Leasing			Acres Open to Oil and Gas Leasing		
	Total	GH	PH	Total	GH	PH
	BLM	96,100	65,300	30,800	1,500,300	641,600
Forest Service	0	0	0	19,400	14,200	5,200
Tribal and Other Federal	1,300	0	1,300	39,700	16,400	23,300
Private	200	0	200	600,900	222,500	378,400

Table 3.35
Acres Open and Closed to Oil and Gas Leasing within GRSG Habitat in the Planning Area

Surface Management Agency	Acres Closed to Oil and Gas Leasing			Acres Open to Oil and Gas Leasing		
	Total	GH	PH	Total	GH	PH
State	300	0	300	50,100	13,300	36,800
Other	0	0	0	17,000	4,200	12,800

Source: Manier et al. 2013

Table 3.36
Acres of Oil and Gas Leases within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres	Acres within GH	Acres within PH
BLM	552,600	221,100	331,500
Forest Service	300	300	0
Tribal and Other Federal	200	0	200
Private	221,700	81,800	139,900
State	25,500	5,600	19,900
Other	1,500	700	800

Source: Manier et al. 2013

Carbon Dioxide

Currently within the planning area, a small amount of carbon dioxide (with condensate oil) is produced in the North and South McCallum fields within the KFO. A liquid carbon dioxide plant near the North McCallum headquarters facility buys carbon dioxide produced from the oil and gas lessee and ships it by truck to markets. The presence of recoverable CO₂ is coincident with existing oil and gas in the KFO.

Solid Leasable Minerals

Oil Shale

Oil shale is found in the Green River Formation in Colorado, Wyoming and Utah including the planning area. The ROD for Oil Shale would make nearly 700,000 acres available in Colorado, Utah and Wyoming available for research and development of oil shale. In the planning area, there are currently two leases for research design and development within the WRFO. Neither of the oil shale research, development, and demonstration leases overlap PH.

Sodium

The Piceance Basin of northwestern Colorado and adjacent states contains the world's largest and most economically significant deposit of a nahcolite, an evaporite mineral consisting of naturally occurring sodium bicarbonate. Within the planning area, all of the sodium resources are found in the Parachute Creek Member of the Green River Formation. The sodium resource in the basin was estimated at 32 billion short tons (Dyni 1974) and 29 billion tons (Beard et al.

1974) The sodium resource exists solely within the WRFO within the planning area. See **Figure 3-9** in **Appendix A**, Figures.

Coal

Along with oil and gas, coal is an important energy resource being actively developed in the planning area. Colorado coal has the second highest quality (low impurity content) in the nation. Most of the Colorado coals are bituminous and subbituminous.

The largest coal resources and active mining in the range-wide planning area are in the LSFO, followed by the WRFO and GJFO. Although the in-place coal resources in the CRVFO area are estimated at approximately 1.6 billion tons, the potential for commercial development of this resource is very low. The Green River Coal Region, which occupies most of Moffat County and the western portion of Routt County, is the largest coal-producing region in the planning area. Coal production in Routt and Moffat Counties accounts for more than 30 percent (16.5 million tons) of the total coal produced in the State (Carroll 2004).

Table 3.37 shows active coal mines in the Northwest Colorado District.

Table 3.37
Active Coal Mines on BLM-Administered Lands

Mine Name	BLM Field Office	County	Coal Field	Formation	Mine Type	Annual Production (tons)
Colowyo	LSFO	Moffat	Danforth Hills	Williams Fork	Surface	2.3 million
Trapper	LSFO	Moffat	Yampa	Williams Fork	Surface	2 million
Twentymile	LSFO	Routt	Yampa	Williams Fork	Underground, Longwall	7.6 million
Sage Creek	LSFO	Routt	Yampa	Williams Fork	Underground, Longwall	N/A
Deserado Mine	WRFO	Rio Blanco	White River Field	Williams Fork	Underground	4.9 million

Source: BLM Mineral Potential Reports for WRFO and LSFO

Conditions on BLM-Administered Lands

The following subsections describe existing conditions on BLM-administered lands within the range-wide planning area and provide information on acres within the decision area that are open or closed to leasing and, if open, the acres of various lease stipulations that would apply. The descriptions address existing conditions relative to leasable fluid and solid minerals in relation to mapped PH and ADH for the GRSG. Detailed information on existing conditions of leasable minerals and coal are provided in Chapter 3 and supporting appendices in each BLM field office's RMP.

The BLM manages 2,472,900 acres of federal mineral estate (1,744,100 acres of BLM-administered land with federal minerals and 728,800 acres of private or state surface with federal minerals, also known as “split-estate”) in the range-wide planning area. Within PH, the BLM manages 1,290,000 acres of federal minerals identified as having potential (56 percent). **Table 3.38** breaks down federal mineral estate by surface ownership.

Table 3.38
Mineral Status in the Planning Area

Land Status	Acres
BLM/Federal Minerals	4,828,700
Private Surface/Federal Minerals	2,068,200
Forest Service/Federal Minerals	4,533,900
State/Federal Minerals	44,400
National Park Service/Federal Minerals	271,300
National Recreation Area/Federal Minerals	72,800
National Wildlife Refuge/Federal Minerals	32,100
State Forest/Federal Minerals	5,500
Department of Defense	200
Total	11,857,100

Source: BLM 2013a

Fluid Leasable Minerals

Oil and Gas

Oil and gas resources on BLM-administered or National Forest System lands in the planning area by GRSG habitat are described in the tables.

Table 3.39 summarizes this information for the five BLM field offices within the planning area. Approximately 1,094,000 acres of federal mineral estate are leased within the decision area (**Table 3.40**). The table also provides information on the amount of each category within PH and GH for the GRSG. Note that GH does not include habitat connectors. ADH areas, including PH and GH plus habitat connectors, total nearly 1.1 million acres of leased and 764,200 acres of unleased lands with high potential for oil and gas.

Table 3.41 breaks down the acres within the decision area by whether they are open or closed to leasing and what stipulations are applied to leases.

Table 3.39
Acres of Federal Mineral Estate by PH and GH—Fluid Leasable Minerals

Field Office	BLM Surface		Other Surface		Leased		Unleased—High Potential for Oil and Gas	
	PH	GH	PH	GH	PH	GH	PH	GH
CRVFO	22,800	16,200	17,400	10,300	0	29,800	0	0
GJFO	5,500	8,900	4,100	4,500	3,900	8,400	1,600	500
KFO	185,200	18,300	115,900	25,500	118,100	6,200	52,200	800

Table 3.39
Acres of Federal Mineral Estate by PH and GH—Fluid Leasable Minerals

Field Office	BLM Surface		Other Surface		Leased		Unleased—High Potential for Oil and Gas	
	PH	GH	PH	GH	PH	GH	PH	GH
LSFO	554,000	239,700	463,900	134,100	358,900	197,700	333,700	187,400
VRFO	121,900	175,300	75,800	81,600	135,100	154,400	59,500	73,200
TOTAL	889,400	458,400	677,100	256,000	616,000	396,500	447,000	261,900

Table 3.40
Acres of Leased and Unleased Federal Mineral Estate in GRSG Habitat—Fluid Leasable Minerals

Colorado Management Zone	Currently Leased		Unleased - High Potential - Federal Minerals		Unleased - Medium Potential - Federal Minerals	
	PH	GH	PH	GH	PH	GH
1	0	0	0	0	0	0
2	34,300	10,200	6,800	1,300	4,700	1,400
3	78,700	94,500	83,000	74,400	1,000	34,200
4	48,000	8,300	66,600	32,800	200	0
5	80,700	4,100	73,700	4,400	0	0
6	20,600	23,600	30,800	21,800	0	3,000
7	26,200	2,300	8,000	20,200	0	500
8	10,700	5,100	16,300	7,400	0	900
9	67,800	63,000	42,900	25,500	53,200	11,800
10	55,100	65,000	1,400	51,200	0	1,500
11	108,500	1,700	52,200	800	5,600	200
12	0	0			0	0
13	9,700	4,500			200	5,100
14	0	1,000	6,100	300	34,500	15,900
15	0	0	400	1,400	400	5,900
16	7,600	3,700	70	0	0	0
17	69,800	102,400	28,500	10,400	2,400	2,000

Colorado MZs 18-21 represent linkage/connectivity habitat and do not contain PH but would be managed as GH.

linkage/connectivity habitat are represented in ADH

	Currently Leased	Unleased - High Potential Federal Minerals	Unleased - Medium Potential Federal Minerals
18		11,400	6,700
19		69,300	44,600
20		1,700	3,900
21		4,800	0

Table 3.41
Acres of Oil and Gas Leasing Categories in Decision Area PH and GH

Colorado Management Zone	Field Office or National Forest	Federal Minerals	Unleased Federal Minerals	Closed to Leasing	NSO	CSU	ROW Exclusion BLM Surface	ROW Avoidance BLM Surface	TL	Total Acres in Zone
1	LSFO	12,700	9,000	3,700	400	2,600	1,100	0	1,100	15,200
2	LSFO	137,800	62,900	30,800	9,100	39,500	9,600	15,900	88,600	172,800
3	LSFO	487,800	270,700	51,900	5,900	130,200	600	20,700	266,400	547,400
4	LSFO	155,500	99,600	0	6,000	28,700	0	0	118,000	244,400
5	LSFO	162,400	78,100	0	5,600	20,100	0	0	75,200	258,300
6	LSFO	99,400	55,600	1,200	11,000	64,200	0	0	95,400	307,900
7	LSFO	47,800	19,500	0	2,400	10,500	0	0	27,400	71,600
7	Routt National Forest	9,300	9,300	0	500	3,700	0	0	7,100	11,700
8	LSFO	40,400	24,700	0	4,400	30,900	0	0	23,300	252,300
9	WRFO	32,000	9,500	0	1,000	6,900	50	300	24,500	50,800
9	LSFO	236,100	125,500	4,500	36,100	106,700	1,400	1,700	181,900	372,400
10	WRFO	239,200	116,000	4,700	46,100	160,700	11,000	24,800	217,600	282,000
10	LSFO	1,500	300	0	0	30	0	0	300	3,700
11	KFO	214,400	107,300	60	25,800	62,900	0	0	142,400	412,000
11	Routt National Forest	800	800	0	200	200	0	0	800	800
12	KFO	11,800	11,800	0	0	2,600	0	0	11,700	18,300
13	Routt National Forest	1,000	1,000	0	100	100	0	0	400	1,000
13	KFO	123,100	109,000	0	11,100	30,000	0	0	110,000	268,700
14	CRVFO	69,000	65,400	2,600	38,000	64,600	0	0	40,400	97,300
14	Routt National Forest	900	800	0	200	60	0	0	200	800
14	LSFO	9,900	9,900	0	500	2,900	0	0	3,300	50,200

Table 3.41
Acres of Oil and Gas Leasing Categories in Decision Area PH and GH

Colorado Management Zone	Field Office or National Forest	Federal Minerals	Unleased Federal Minerals	Closed to Leasing	NSO	CSU	ROW Exclusion BLM Surface	ROW Avoidance BLM Surface	TL	Total Acres in Zone
15	WRFO	12,100	12,100	0	5,700	5,400	0	1,000	12,000	47,600
16	WRFO	11,300	70	0	1,100	5,800	0	600	6,900	11,300
17	Roan Plateau	29,500	200	0	17,800	24,100	0	60	7,700	36,200
17	WRFO	160,300	30,100	0	12,000	74,900	300	6,300	86,200	228,000
17	GJFO	23,300	11,000	0	3,800	1,400	60	4,100	4,200	78,600
17	CRVFO	300	0	0	200	300	0	20	300	10,800
18	WRFO	18,000	6,700	0	12,400	14,400	0	7,600	9,600	19,200
19	Roan Plateau	2,100	1,500	0	1,900	1,900	0	10	1,100	3,900
19	WRFO	111,900	42,900	800	36,700	72,800	50	7,500	98,800	219,700
19	CRVFO	700	500	0	900	700	0	0	80	1,600
19	LSFO	10	10	0	0	0	0	0	0	50
20	LSFO	5,900	4,200	0	1,200	5,100	0	0	2,900	40,600
21	KFO	4,800	20	0	0	1,400	0	0	3,400	10,700
Total		2,473,010	1,296,000	100,260	298,100	976,290	24,160	90,590	1,669,180	4,147,850

Carbon Dioxide

Carbon Dioxide is produced in the KFO from the McCallum and McCallum South Fields. Both fields are currently producing and lie entirely within PH.

Solid Leasable Minerals

Oil Shale

Existing research, development and demonstration leases exist within the planning area in the WRFO but do not overlap with mapped GRSG habitat. For additional information, see the Oil Shale and Tar Sands Programmatic EIS (BLM 2013b).

Sodium

The WRFO is the only area of the planning area currently producing commercial quantities of sodium. There are presently eight sodium leases comprising approximately 16,600 acres on BLM-administered land in northwestern Colorado (BLM 2006b). Solution mining operations have been constructed on two of these leases in Rio Blanco County. One solution mining operation was closed in 2004 due to market issues. The other mine has been operating since 1991 and produces approximately 90,000 to 100,000 tons of sodium bicarbonate annually. None of the existing operations or any existing undeveloped leases are present within mapped PH or GH for the GRSG. However, a total of 500 acres of PH and 600 acres of GH are open to non-energy mineral leasing, including sodium.

Coal

Federal coal resources are administered by the BLM, regardless of surface estate ownership, through lease sales under the Mineral Leasing Act.

A total of 2,473,000 acres of federal mineral estate underlie federal, state, and private lands within the decision area's GRSG habitat. Of this area, 1,744,100 acres are associated with BLM-administered surface lands. Current federal coal leases comprise 11,000 acres of GRSG habitat, or 4 percent of the total federal mineral estate in the planning area. Unleased areas of federal mineral estate found to be suitable for coal leasing or managed as open for leasing comprise 518,600 acres of GRSG habitat, or 21 percent of the total federal mineral estate within the planning area.

There are existing coal mines in the LSFO and WRFO within GRSG habitat. **Table 3.42** displays data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). Acres are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.43 shows acres of existing and leases and acres acceptable for coal leasing in relation to PH and GH.

Table 3.42
Coal Potential within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres	Acres within GH	Acres within PH
BLM	1,067,900	434,600	633,300
Forest Service	10,500	10,400	100
Tribal and Other Federal	22,800	0	22,800
Private	1,186,400	400,500	785,900
State	162,200	43,300	118,900
Other	17,300	4,000	13,300

Source: Manier et al. 2013

Table 3.43
Acres of Federal Mineral Estate in GRSG Habitat—Coal

Field Office	BLM Surface		Other Surface		Currently Leased for Coal		Unleased—Suitable or Open for Coal Leasing	
	PH	GH	PH	GH	PH	GH	PH	GH
CRVFO	22,800	16,200	17,400	10,300	0	0	0	0
GJFO	5,500	8,900	4,100	4,500	0	0	0	700
KFO	185,200	18,300	115,900	25,500	0	0	45,000	0
LSFO	554,000	239,700	463,900	134,100	1,600	4,100	219,200	225,600
WRFO	121,900	175,300	75,800	81,600	0	5,300	10	28,100
Total	889,400	458,400	677,100	256,000	1,600	9,400	264,210	254,400

Conditions on National Forest System Lands

Limited development of leasable minerals, primarily oil and gas, has occurred on National Forest System lands within the planning area. Mineral resource use on the Routt National Forest has historically been widespread but sporadic. Mineral activity is presently concentrated in a few scattered areas. Activity has fluctuated with demand, and current low prices for many minerals make exploration and development uneconomical.

The principal leasable minerals in the areas that include GRSG habitat on the Routt National Forest are oil and gas, coalbed natural gas, and coal.

Fluid Leasable Minerals

Oil and Gas

Three large areas in the Routt National Forest have moderate potential, and five large areas have low potential for further conventional discoveries of oil and gas.

There are currently three oil and gas wells in the Routt National Forest, all of which are located on Yampa District. None of the wells are located in or near PH or GH. Also, there are three existing non-producing leases on the Routt National Forest, but they are entirely covered with an NSO stipulation.

Coalbed Natural Gas

One small area in the northwest part of the Routt National Forest where there is some GH in the Elkhead Mountains has moderate potential for coalbed natural gas.

Solid Leasable Minerals

Coal

There are no existing leases for coal on the Routt National Forest within GRSG habitat.

3.7.2 Trends

Trends on BLM-Administered Lands

Fluid Leasable Minerals

Oil and Gas

CRVFO. Drilling on federal mineral estate in the CRVFO is expected to continue and expand as industry continues to define reservoir boundaries and spacing limitations. Infill drilling and stepout drilling are anticipated to be the major portion of future activity. However, other technically recoverable resources are of interest to industry. These interests include coalbed natural gas plays, the Niobrara play, and the Mancos Shale resources, the latter two at greater depths than the primary Mesaverde and Wasatch plays and largely developable with horizontal drilling. It is estimated that 99 percent of the drilling will take place in the area identified as high potential for the presence of oil and gas resources. Approximately 1 percent of future drilling will occur in areas of medium and low potential, and no drilling is predicted in the areas identified as no known potential (BLM 2008a). The areas within the CRVFO which contain GRSG habitat are identified as low potential.

GJFO. Recently there has been an increasing interest in horizontal drilling in the Mancos/Mowry shale play. Approximately 50 percent of the drilling proposals received by the GJFO since 2010 have been for horizontal wells targeting the shale formation. GRSG habitat in the GJFO has moderate to high potential identified for shale gas. Mineral lessees indicate there will be little interest in development of conventional or shale gas at current prices. However, exploration is expected to continue.

KFO. According to oil and gas operators, exploratory drilling in the Niobrara shales could continue for the next 5 to 20 years if commercial production is realized. All of the high potential areas identified within the KFO overlap PH for GRSG.

LSFO. Recent trends in the LSFO toward increased numbers of wells per well pad, made possible by advances in directional drilling, are expected to continue.

The majority of the LSFO is identified as high potential for oil and gas and more than 1 million acres of federal mineral estate managed by the LSFO is identified as PH or GH for GRSG.

WRFO. The majority of the future wells would be constructed for gas production from the low permeability Mesaverde Group. New development would likely occur based on exploratory drilling programs now being implemented within the WRFO. A majority of the WRFO is identified as high potential for oil and gas and more than 300,000 acres of federal mineral estate managed by the WRFO is identified as PH or GH for GRSG.

Coalbed Natural Gas

Future leasing trends in the KFO will likely include blocking up producing area extensions and all of the area underlain by coalbeds with coalbed natural gas potential. Further coalbed natural gas development is likely in the KFO based upon the continued testing of the existing and permitted wells; the availability of the existing limited pipeline; and the construction of new, and increased, pipeline capacity. If positive results continue, and methods for allowable disposal of excess water are developed, considerable coalbed natural gas activity may occur over the 250,000 acres of subsurface coal in northeast North Park.

Based on current conditions, coalbed natural gas well spacing in the LSFO would be 80 acres during the dewatering stage and 160 acres during production phase. The spacing requirements might change as additional data become available to evaluate the appropriate spacing requirement to capture the maximum efficiency in gas production.

Carbon Dioxide

Carbon dioxide production occurs exclusively in the KFO. Existing carbon dioxide fields (McCallum and South McCallum) in the KFO have been fully developed. Additional gas pipelines out of the North Park Basin, enhanced carbon dioxide processing capability, or an increased market would be needed for significant future activity. The remaining fields in the decision area are on the decline, and most are reaching their ultimate life (BLM 2008b).

Solid Leasable Minerals

Oil Shale

In addition to the existing research, development, and demonstration leases in the WRFO, the BLM is in the process of identifying lands which would be made available for commercial leasing. Those lands would be identified through the Oil Shale and Tar Sands Programmatic EIS, which was released in November 2012. The technology for commercial production of oil shale is yet to be fully developed.

Sodium

The only potential development of sodium exists in the WRFO. Future development of sodium resources is likely to continue in the WRFO depending on the results of continued improvement of solution mining technology, and market-driven prices of sodium bicarbonate. The existing sodium mines do not overlap GRSG habitat.

Coal

The most important factors relating to coal development, other than its presence, include ease of access, development and production costs, and market demand. Coal production is expected to continue in the LSFO and WRFO. Future coal mining activities are likely in within GRSG habitat based on market-driven prices of coal and transportation.

No mining activity is likely in Middle Park or in the Coalmont area of North Park in the KFO in the foreseeable future. A considerable volume of mineable and marketable coal remains on federal lands in the McCallum area of North Park, but the lack of reasonable-cost transportation in the area hinders the use of this resource.

Trends on National Forest System Lands

Fluid Leasable Minerals

Oil and Gas/Coalbed Natural Gas

Market conditions will dictate interest in oil and gas exploration, but it is anticipated that future interest will be minimal; therefore, there would be little to no impacts on current mapped PH or GH. Additionally, there is a small amount of overlap with mapped GH and no overlap with mapped PH on the Routt National Forest.

3.7.3 References

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3.8 MINERALS (LOCATABLE)

Locatable minerals are minerals for which the right to explore or develop the mineral resource on federal land is established by the location (or staking) of lode or placer mining claims and is authorized under the General Mining Law of 1872. Locatable minerals include metallic minerals such as gold, silver, copper, lead, zinc, molybdenum, uranium, and non-metallic minerals such as fluorspar, asbestos, talc, and mica.

Acquisition of locatable minerals is executed by staking a mining claim over the deposit and acquiring the necessary permits to explore or mine. Within a mining claim, the surface lands remain open to the public for other multiple uses. Placer claims, which are for minerals found in geologic sediments rather than in veins, are also managed under the General Mining Law of 1872. Miners locate claims in order to acquire the right to develop the mineral values in a specified area. For operations other than casual use, the claimant is required to submit a Notice of Intent or a Plan of Operations. Regulations require the claimant to prevent unnecessary or undue degradation of the land. The BLM and the Forest Service may recommend closures to mineral entry (a land use planning decision) by petitioning the Secretary of the Interior to withdraw areas from further location of mining claims or sites. The Forest Service may also request that the BLM recommend closures to mineral entry.

The amount of area that would fall under restrictions outlined in **Chapter 2**, Alternatives, and the impact of those restrictions on locatable mineral development are considered in **Chapter 4, Section 4.9**, Minerals – Locatable, in the analysis of each alternative.

3.8.1 Existing Conditions

Gold and uranium are the primary mineral resources found in the planning area, and are therefore the focus of discussion for this section.

Conditions of the Planning Area

Table 3.44 displays data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). Acres are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.44
Acres of Locatable Mineral Claims within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres	Acres within GH	Acres within PH
BLM	32,900	13,500	19,400
Forest Service	0	0	0
Tribal and Other Federal	0	0	0
Private	17,500	6,900	10,600
State	1,700	1,500	200
Other	100	100	0

Source: Manier et al. 2013

Conditions on BLM-Administered Lands

The BLM manages 2,472,900 acres of federal mineral estate (1,744,100 acres of BLM-administered land with federal minerals and 728,800 acres of private or state surface with federal minerals, also known as “split-estate”) in the range-wide planning area. Within PH, the BLM manages 1,290,000 acres (56 percent) of the surface.

Approximately 124,800 acres of the total federal mineral estate for locatable minerals are withdrawn from location of mining claims in GRSG habitat. (**Table 3.45**). A total of 2,148,100 acres of the total federal mineral estate for locatable minerals are open to locatable mineral exploration and development.

Table 3.45
Locatable Minerals in the Planning Area

	Planning Area	PH	ADH
Withdrawn from locatable mineral entry (BLM surface/federal minerals)	917,300	40,600	124,800
Open to locatable mineral exploration or development (BLM surface/federal minerals)	2,148,100	1,125,500	2,148,100

Source: BLM 2013a

Gold

In the eastern portion of the CRVFO, there is one active claim within GRSG habitat. This placer claim is directly along the Colorado River and is less than 10 acres in size. The activity level of this claim is described as casual use, in which non-mechanized gold prospecting (panning) is carried out.

In the KFO, Independence Mountain in Jackson County includes two small individual gold placer claims. The Mitchell Placer Mine (including four small historic log cabins) is a small, early 20th century area of placer disturbances where no economic resources were found. Some casual use hand shoveling and panning/prospecting may continue to occur each year.

In the LSFO, the Eagle Mine (14 acres), operated by Jubilee Ventures, is a low potential, intermittent gold mine primarily producing gold ore. The production data for this mine is not available.

Uranium

In the KFO, there is a group of recently staked uranium mining claims on BLM-administered lands. These include claims in Jackson and Grand counties, and on National Forest System lands in Summit County.

The Troublesome area in Grand County included 502 uranium lode mining claims that were located as a group in 2005 on the Troublesome Formation (approximately 6 miles east/northeast of Kremmling). No mining or economic resources, and only trace mineralization, was discovered. These claims have since expired.

There is one notice for uranium exploration in the LSFO.

To date there has not been any development of potential uranium reserves within the WRFO. However, uranium mining claims have been staked recently in the northwestern portion of the WRFO, north of Rangely near US 40. Several claims have been staked encompassing approximately 44 square miles within two separate blocks of claims south of US 40.

Hard Rock

In 2003, 23 hard rock lode claims were located at the north end of Independence Mountain (the old Caprock claims) in Jackson County. This area was previously prospected and drilled for hard rock minerals (including molybdenum) in the late 1970s and early 1980s. Original claims by the Caprock Corporation lapsed in the late 1980s. The CeeArco Company has since filed claims at the same location as some of the previous claims.

Conditions on National Forest System Lands

Through an MOU with the BLM, the Forest Service manages most aspects of operation on National Forest System lands under the Mining Law of 1872 (as amended).

Gold

Placer gold was purported to be found in the eastern part of the planning area near the town of Steamboat Springs, at Hahn's Peak on National Forest System lands. The deposits are not within habitat for GRSG.

Uranium

Currently, there is one small mining operation on the Routt National Forest covered by a plan of operations.

The Routt National Forest has some areas with high-to-moderate potential for locatable minerals (Hausel and Sutherland 1999). The potential commercial production of these minerals is concentrated in a few areas. Much of the surface within the Routt National Forest was prospected during the late 1800s and early 1900s. Many areas show an almost continuous coverage by historic prospects and mines. Most mines and prospects were not developed to any great extent. A few mines yielded attractive base and precious metal assays and were developed into commercial ventures.

The Forest Service would work with the claimant to assure that standards and guidelines in the forest plan are met. The operation plan requires an environmental analysis and decision before the plan is approved.

3.8.2 Trends***Trends on BLM-Administered Lands***

Although the price of gold and uranium has risen in recent years, the current trend is downward, and there is little current interest in developing any ore deposits for these minerals in GRSG habitat within the decision area.

Trends on National Forest System Lands

While most of the non-wilderness lands on the Routt National Forest are available under the 1872 mining law, little to no interest in mineral activities has been shown. Historically, there has not been any interest in locatable minerals in GH or PH.

3.8.3 References

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3.9 MINERALS (SALABLE)

Salable minerals, also referred to as mineral materials, include common varieties of construction materials and aggregates, such as, sand, gravel, limestone aggregate, building stone, cinders (clinker), moss-covered rock (moss rock), roadbed, decorative rock, clay, and ballast material. Mineral materials are sold or permitted under the Mineral Materials Sale Act of 1947, as amended and regulated under 43 CFR 3600. The sale of mineral materials is discretionary.

Sand and gravel, as construction aggregate, is an extremely important resource. The extraction of the resource varies directly with the amount of development nearby – road building and maintenance, and urban development – as sand and gravel is necessary for that infrastructure development. Even more so than other resources, however, the proximity of both transportation and markets are key elements in the development of a deposit.

3.9.1 Existing Conditions

Mineral materials are sold at a fair market value or made available through free use permits to governmental agencies. Local government agencies and nonprofit organizations may obtain these materials free of cost for community purposes. County and State road construction divisions are the significant users of gravel and sand resources.

Conditions of the Planning Area

Sand and gravel are the primary mineral materials found in the planning area, and are therefore the focus of discussion for this section. **Table 3.46** displays data compiled in a baseline environmental report produced by the US Geological Survey and BLM (Manier et al. 2013). Acres are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.46
Acres of Mineral Material Disposal Sites within
GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres	Acres within GH	Acres within PH
BLM	35,900	14,600	21,300
Forest Service	0	0	0
Tribal and Other Federal	0	0	0
Private	17,900	6,900	11,000
State	1,700	200	1,500
Other	100	0	100

Source: Manier et al. 2013

Conditions on BLM-Administered Lands

Approximately 104,200 acres of the total federal mineral estate for mineral materials are closed to mineral material disposal (**Table 3.47**). Approximately 26,100 acres (25 percent) are within PH, and 40,400 acres (38 percent) are within GH. The balance of the federal mineral estate is open for consideration of mineral material disposal.

Table 3.47
Mineral Materials in the Planning Area

	Planning Area	PH	GH	Other Areas (Linkage/Connectivity Habitat)
Closed for consideration for mineral material disposal	104,200	26,100	40,400	37,652

Source: BLM 2013

There is no commercial development in the CRVFO within GRSG habitat, and there is low potential for salable minerals in the GJFO within GRSG habitat.

A small-to-moderate market for decorative stone and moss rock exists in the KFO, driven by primary and secondary home construction in the high value resort communities. High-quality decorative stone is not common in the planning area, but three separate rock collection areas are permitted for small sales.

Salable mineral development includes seven active free-use permits, mostly in Moffat County, the limestone quarry that produces road base on Juniper Mountain, and two common use areas for moss rock. In the LSFO, a small limestone quarry, operated by Moffat Limestone Company, is present on Juniper Mountain. The quarry supplies scrubbing materials to the power plants near Craig, Colorado. In 2011, the quarry produced 40,000 tons of mineral grade limestone and 31,000 tons of non-mineral grade limestone.

Sand and gravel are the only salable minerals found within the WRFO. Sand and gravel deposits are located along the White River and major tributary valleys. Other sources of sand and gravel in the WRFO include widespread colluvial deposits at the base of rock outcrops, and alluvial fans. There are large sand and gravel reserves near Meeker in the vicinity of Agency Park, and in the Little Beaver area.

Within the GRSG planning area, there are a total of 1,500 acres of mineral material sales locations in PH, and 500 acres of mineral material sales locations within GH.

Conditions on National Forest System Lands

On National Forest System lands, salable or mineral materials are processed by the Forest Service on an annual basis.

The Forest Service is responsible for administering mineral materials on The Routt National Forest. Salable minerals in the Routt National Forest include crushed aggregate, dimension stone, sand, and gravel.

Crushed Aggregate

Numerous sources of crushed aggregate are present in the Routt National Forest in the Elkhead Mountains, the Park and Medicine Bow Ranges, and the Flat Tops. Aggregate includes sandstone, volcanic rock, granite, basalt, landslide material, and glacial drift, which is typically used for roadway building, concrete, railroad ballast, rip rap, and fill. There is one historic gravel pit in the California Park area that is within GH. This pit is less than 5 acres in size and has been reclaimed and is currently closed. It is unlikely that development would ever expand beyond the current footprint of the existing pit and there are no current requests to extraction from this site.

Dimension Stone

Some decorative dimension stone is produced and sold locally in the Routt National Forest in the Park Range, Elkhead Mountains, and Flat Tops. Moss or lichen-covered granite and sandstone are used for interior or exterior facing in homes or buildings.

Sand and Gravel

Numerous deposits of sand and gravel are located along the Elk and Colorado Rivers and their major tributaries within the Routt National Forest. Uses include concrete work and products, fill material, plastering sands, and snow and ice control.

Moss rock and gravel have been the primary products sold from the Routt National Forest. The sale of mineral materials is specifically discretionary by the line officer (District Ranger). Any new pits must have a Pit Development Plan that covers all phases of development, including reclamation. The Pit Development Plan must also be prepared pursuant to the NEPA and receive a decision prior to being authorized.

3.9.2 Trends***Trends on BLM-Administered Lands***

In some areas, such as GJFO and CRVFO, it is unlikely there would be future mining for salable minerals in areas identified as PH or GH.

In the KFO, continuing trends of urbanization in eastern and southern Grand County and the concentration of ownership in agricultural lands into single large ranches in Grand and Jackson counties yield long-term concerns regarding the

availability of sand and gravel in future decades. Some of the Grand County Free Use Permit pits are in their last years of material supply. Closures and reclamation of the old pits and replacement with new permitting of federal sources for the Grand County Road and Bridge Department is anticipated. Jackson County, with its low population base and long and expensive haulage from the limited gravel operations, is handicapped by limited budget. The Jackson County Road Department continues to search for new federal sources of gravel on BLM-administered lands in Jackson County. Demands are expected to increase on BLM-administered lands for sand and gravel resources. Continuing demand for decorative stone will likely drive additional sales, and the permitting of new areas (as they are discovered or requested).

With the projected increase in oil and gas activities in the WRFO over the next 20 years, the need for additional sand and gravel resources for road improvements and other construction-related activities would likely increase.

In areas of high potential for sand and gravel, which are located near major highways (Hwy 40 between Craig and Steamboat Springs and Hwy 2 south of Steamboat Springs) and along the Little Snake River, it is likely that sand and gravel resources would be developed over the next 20 years.

Limestone

Production of limestone is expected to continue while the market for the product exists including Tri State Generation and Transmission Association, Craig Station, Craig, Colorado.

Trends on National Forest System Lands

Within GH and PH there has been a declining trend in the need for mineral materials on the Routt National Forest. There is only one development site within the GRSG habitat that was last used then closed and restored approximately 10 years ago.

3.9.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 2013. Geographic Information Systems Data. Unpublished data. BLM, various field offices.

Manier, D. J., D. J. A. Wood, Z. H. Bowen, R. Donovan, M. J. Holloran, L. M. Juliusson, K. S. Mayne, S. J. Oyler-McCance, F. R. Quamen, D. J. Saher, and A. J. Titolo. 2013. Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse (*Centrocercus urophasianus*). US Geological Survey Open-File Report 2013-1098. Ft. Collins, CO.

3.10 TRAVEL MANAGEMENT

Travel management is integral to many activities taking place on public lands. Consideration of a comprehensive travel and transportation network involves

all aspects of road and trail system planning and management taking into account road and trail locations, system users, and other natural resource management objectives.

The transportation system in the planning area consists of federal and state highways, paved and unpaved local roads, as well as unpaved primitive roads and trails.

3.10.1 Existing Conditions

Conditions of the Planning Area

The largest contiguous concentrations of GRSG habitat are located in Moffat, Jackson, and Grand Counties. GRSG habitat areas in the remainder of the planning area are generally smaller and less contiguous. Transportation routes are mainly concentrated around urban areas or where surface activities, such as mineral extraction, require access. Portions of the planning area are remote and rugged, limiting motorized travel on roads and trails in those areas.

Table 3.48 and **Table 3.49** display data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). This information provides a relatively coarse estimate of road/railroad mileage and acreage within the planning area. Each table presents miles and acres of roads by surface management agency and the presence of these roads within GH and PH in the planning area.

Table 3.48
Roads within GRSG Habitat in the Decision Area

Surface Management Agency	Miles of Roads			Acres of Roads		
	Total ¹	GH	PH	Total ¹	GH	PH
BLM	3,500	1,400	2,100	34,900	13,800	21,100
Forest Service	23	19.4	3.6	120	100	20
Tribal and Other Federal	200	100	100	1,400	500	900
Private	5,000	1,800	3,200	51,900	19,200	32,700
State	500	100	400	6,500	1,600	4,900
Other	100	0	100	1,100	200	900

Source: Manier et al. 2013

¹ Assumes footprint of 73.2 meters for interstate highways, 25.6 meters for primary and secondary highways, and 12.4 meters for other roads

Table 3.49
Railroads within GRSG Habitat in the Decision Area

Surface Management Agency	Miles of Railroads			Acres of Railroads ¹		
	Total ¹	GH	PH	Total ¹	GH	PH
BLM	18	9	9	70	30	30
Forest Service	0	0	0	0	0	0
Tribal and Other Federal	0	0	0	0	0	0

Table 3.49
Railroads within GRSG Habitat in the Decision Area

Surface Management Agency	Miles of Railroads			Acres of Railroads ¹		
	Total ¹	GH	PH	Total ¹	GH	PH
Private	82	24	58	300	90	200
State	2	2	0	7	7	0
Other	0	0	0	0	0	0

Source: Manier et al. 2013

¹ Assumes footprint of 9.4 meters

Table 3.48 and **Table 3.49** were compiled from data provided by the US Geological Survey using Tele Atlas ESRI StreetMap Premium data to provide an estimate of the distribution and acres of existing Interstates, major highways, primary and secondary routes, and railroads that are within GRSG habitat within WAFWA Management Zones II and VII. The data provides information that can extrapolate assumptive footprints and the potential indirect disturbance associated with each class of roadway and railroad. The footprint and intensity of use of each class of road may provide additional information that is useful in identifying indirect impacts. Data provided by the US Geological Survey was then used to estimate mileage and acres of existing Interstates, major highways, primary and secondary routes, and railroads that are within the Colorado MZs decision area. Approximately 53 percent of roads within the decision area are on private lands.

Railroad mileage within the decision area is considerably less than roadways and also has less of an assumptive footprint. The majority of the railroad mileage is within private property, accounting for approximately 80 percent of the total miles and footprint.

Conditions on BLM-Administered Lands

GRSG habitat is generally accessible on BLM-administered lands via an extensive network of roads and trails. Travel surfaces range from paved roads to primitive dirt roads only accessible by high clearance four-wheel drive vehicles and OHVs to single-track routes accessible by motorcycles, foot, mountain bike, and/or horseback.

OHV Designations

Executive Order 11644 and CFR (43 CFR Part 8340) both require the BLM to designate all BLM lands nationally as open, closed, or limited for OHV use. Per the BLM's regulations for OHV management, all BLM lands within the planning area have been designated in one of three OHV designation categories, open, limited or closed. Open areas are those where cross-country travel by OHVs is allowed. Limited areas are those where the BLM limits motorized use to existing roads and trails, designated roads and trails, particular types of vehicles, specific seasons of use, or other types of limitations. Closed areas are those where OHV use is prohibited.

Table 3.50 summarizes the acreage of open, limited, and closed OHV areas in GRSG habitat for each of the five field offices. As can be seen in this table, the vast majority of BLM-administered lands with GRSG habitat in the planning area are available for OHV use under either an open or limited designation. Only a small portion of the BLM-administered lands with GRSG habitat in the planning area is closed to OHV use.

Table 3.50
Travel Area Designations on BLM-Administered Lands within the Decision Area

Designation	Total Size (Acres)	Area in PH (Acres)	Area in GH (Acres)
CRVFO			
Open	5,800	2,800	3,000
Limited	61,100	21,600	39,500
Closed	2,600	200	2,300
GJFO			
Open	11,800	5,500	6,300
Limited	2,500	0	2,500
Closed	0	0	0
KFO			
Open	162,900	152,200	10,700
Limited	54,600	46,300	8,300
Closed	500	500	0
LSFO			
Open	805,600	413,600	392,000
Limited	224,500	138,500	86,000
Closed	20,000	18,400	1,600
WRFO			
Open	0	0	0
Limited	610,300	288,000	322,300
Closed	10,800	7,500	3,300
Total			
Open	986,100	574,100	412,000
Limited	953,000	494,400	458,600
Closed	33,900	26,600	7,200

Source: BLM 2013

Travel Management Planning

Within the BLM, travel management planning can be considered to take place in three phases: inventory, designation, and implementation. During the inventory phase, the BLM completes an inventory of all routes within a planning area. During the designation phase, the BLM designates a route system within a planning area through a NEPA process. The implementation phase includes route rehabilitation, signing, and enforcement. Within the planning area, two BLM field offices (LSFO and WRFO) are currently engaged in inventory and three BLM field offices (CRVFO, GJFO, and KFO) are currently engaged in

designation. Some specific areas within these BLM offices (e.g., SRMAs) are already in the implementation phase.

Travel Management by Field Office

Current travel management by field office is described below.

Colorado River Valley Field Office

Current management identifies 2,800 acres of PH as open to OHV travel, 200 acres as closed, and 21,600 acres as limited. Within GH, 3,000 acres are inventoried as open, 2,300 as closed, and 11,200 as limited. The area closed to OHV travel is extremely small in respect to PH lands available for fluid mineral leasing, representing only 0.1 percent of 22,800 total acres. Furthermore, most of these lands are mapped as low potential for oil and gas development. In relation to GH, the area closed to OHV travel represents 14 percent of 16,200 total acres. Closures would not apply to authorized oil and gas exploration and development.

Grand Junction Field Office

The mapped GRSG habitat is largely accessible via an extensive network of roads and trails in the area. Travel surfaces range from paved roads to primitive dirt roads accessible only by high-clearance four-wheel-drive vehicles, OHVs, on foot, or horseback. Currently, all of the BLM-administered lands within PH are managed as open to cross-country travel for all modes of transportation. Within PH, 17 miles of travel routes have been inventoried on BLM-managed lands. In GH, some 6,300 acres of BLM-administered lands are managed as open to cross-country travel, and 2,500 acres are managed with a seasonal closure (December 1 to May 1) to motorized use to protect wintering big game. During the rest of the year, motorized travel in that area is limited to existing routes. Within GH, 32 miles of existing travel routes have been inventoried. Vehicular traffic within the mapped GRSG habitat is generally very light. Traffic temporarily increases during oil and gas drilling and completion operations. Slight seasonal increases in traffic also result during fall hunting seasons.

Kremmling Field Office

Under Alternative A, a small portion of PH in Zone 11 and Zone 13 would be closed to OHV travel. Areas closed to OHV travel total 8,700 acres, or 0.02 percent of total BLM-administered surface estate within the KFO; a vast majority of these lands is outside of PH and GH. Any potential impacts on leasing and development of fluid minerals from travel management closures are negligible. Overall, most areas are open (307,300 acres; approximately 81 percent of BLM land within the KFO) to OHV travel, or limited to existing routes (7,300 acres, 0.019 percent) or designated routes (54,500 acres, 14.4 percent).

Exception criteria also apply that would allow administrative access with BLM authorization when travel is approved in areas closed or limited to existing or designated travel. For instance, exceptions may be granted when OHV travel is

necessary for valid existing rights or to access mineral and energy sites in areas where travel is not designated as open. Travel restrictions would primarily have an objective other than reducing adverse impacts on GRSG and their habitats. Routes could be constructed in PH and GH. A 3-percent disturbance cap would not be applied or affect construction of new roads.

Little Snake Field Office

Current management under the 2011 RMP includes designating areas as open, limited, or closed to vehicle use, consistent with the following guidelines:

- Enable access where needed
- Limits points of access to reduce the number of redundant roads and trails
- Reroutes, rehabilitates, or eliminates existing roads and trails that are damaging cultural or natural resources
- Reroutes roads and trails that are landlocked by private parcels
- Restricts access to meet resource objectives, such as seasonal road closures and installing gates
- Concentrates stream and riparian crossings
- Reduces habitat fragmentation
- Considers new construction and reconstruction of roads and trails
- Actively pursues access to specific parcels to improve access to BLM-administered lands for land management purposes

As an outcome of that process, the LSFO has made travel management designations for Colorado MZs within its boundaries. For both PH and GH, most lands are designated as limited (552,000 acres in PH, 451,200 acres in GH). Closed areas include 18,400 acres in PH and 8,700 acres in GH, while open areas comprise 30 acres of PH and 19,700 acres of GH.

White River Field Office

Under current management, no restrictions on travel in PH are proposed. BLM roads within the WRFO are open to public travel at all times, subject to any limitations or restrictions outlined in the 1997 White River RMP. Travel restrictions would primarily have an objective other than reducing adverse impacts on GRSG and their habitats. Existing routes in PH could be upgraded to a higher use category (e.g., from trail to primitive road or from primitive road to road). Routes could be constructed in PH. Restrictions on public vehicle access could be applied as outlined in the 1997 White River RMP. Methods restricting access include installing lockable gates, barricades, and other deterrents, installing signs, and reclaiming and abandoning roads or trails.

Within the WRFO, 1,100 miles of routes are designated as limited and 20 miles designated as closed in mapped PH. This translates to 288,000 acres of BLM-administered lands designated as limited and 7,500 acres designated as closed to motorized use in the PH. Within mapped GH, 1,300 miles are designated as limited and 10 miles designated as closed. This translates to approximately 322,300 acres of BLM-administered land designated as limited and 3,300 acres as closed to motorized use in GH. No areas within the WRFO are designated as open.

Conditions on National Forest System Lands

The 1997 Routt National Forest Land and Resources Management Plan (Forest Plan) provides guidance on the overall transportation management philosophy and objectives. The plan identifies trails as the major component of the Routt National Forest transportation system. Motor vehicle use off of the designated system is prohibited. Off-road and off-trail travel by snowmobiles is allowed in areas not otherwise closed provided there is sufficient snow cover.

Maps showing the designated motor-vehicle transportation system are referred to as Motor Vehicle Use Maps. Each of the three districts on the Routt National Forest has Motor Vehicle Use Maps.

There are approximately 1,600 miles of roads within the Routt National Forest, not including State or US highways that may pass through the Forest. About 450 miles are maintained to a standard suitable for passenger cars, the rest require a high-clearance vehicle or an OHV. All open Forest Service roads can be used by OHVs with proper licensing and adherence to state laws.

There are approximately 1,500 miles of trails identified in the Routt National Forest inventory. Note that a portion of these trail miles are overlays on existing routes, such as forest roads that become winter trails when they are groomed for snowmobiling, so the actual number of unique trail miles is closer to 850. Of the 1,500 inventoried miles, 862 miles are designated for nonmotorized uses only.

Snowmobilers and skiers may travel on and off trail in areas that are not otherwise restricted. A portion of the Forest around Rabbit Ears Pass, adjacent to Highway 40, has been zoned into winter motorized and nonmotorized areas to mitigate potential conflicts between skiers and snowmobile users (Forest Service 2005).

GRSG habitat exists in four Colorado MZs in the Routt National Forest. Transportation networks in the zones vary and are described below:

California Park and Slater Park area (Zone 7)

This zone contains the largest contiguous segment of GH on the Forest—about 6,700 acres within the California Park Special Interest Area. There is no PH in the area. California Park is bisected by State Route 80. The only other

motorized routes in the area are trails 1144 and 1147, which are open annually to vehicles 50 inches or less in width during the period July 1 to October 1. Non-motorized travel is permitted on these trails year-round. This area is used by snowmobiles and includes groomed snowmobile trails during the winter season.

Lower Camp Creek area (Zone 11)

This zone contains 800 acres of PH. Most of the habitat is located within an area bounded by the Platte River to the north and east, and by the Forest boundary to the south and west. The identified GRSG habitat is traversed by forest road 939, which is open to vehicles of all types from July 1 to December 1 each year. Most of the area within and adjacent to the identified habitat has seasonal access restrictions in place to protect deer and elk winter range. At the southern edge of the habitat area is a small developed recreation site with a parking lot, toilet, boat ramp, and information kiosk. This area is used most frequently in May and June for access to the Platte River for rafting.

South Hunt/Watson Creek and Western Gore Pass area (Zone 14)

This zone contains small areas of both GH and PH. A short section of road accesses private land in the South Hunt/Watson Creek area. The western Gore Pass area contains several short road segments that are open to all vehicle types from approximately June 15 to December 15 each year. No nonmotorized trails intersect or provide access to the habitat areas.

Lake Agnes and Pete Gulch/West Carter Creek/Diamond Creek areas (Zone 13)

This zone contains small areas of both GH and PH. A section of GH to the west is bordered by Highway 40 on the eastern side, and crossed by a short segment of road that accesses private land at Lake Agnes. No Forest roads or trails intersect or provide access to the small segments of habitat in the eastern portion of this area.

3.10.2 Trends

Trends on BLM-Administered Lands

The overall trends in travel management on BLM-administered lands within the planning area include an increase in OHV use, hiking, and mountain biking as populations increase within and adjacent to the planning area, and throughout Colorado. In years to come, it is expected that many areas currently designated as open to cross-country travel will need to be changed to limited or closed designations to minimize resource impacts.

Construction of new routes for oil and gas development is also expected to increase as demand for oil and gas resources increases. New oil and gas facilities will require new roads. Previously constructed roads may also require upgrading in width and ROW as drilling operations are converted to collection and production facilities. Recreationists will use these routes even though they are not designed to optimize recreation experiences.

Private property adjacent to BLM-administered lands will likely continue to be subdivided. Subdivision of private property has dramatically increased the number of adjacent property owners, and increased the number of new access routes to public lands within the planning area. The result is expected to be continued unauthorized creation of unmanaged user-created routes that impact other resources.

However, because of the remoteness of many areas within GRSG habitat, these areas have not yet experienced significant changes in travel routes and are not expected to in the near future.

Trends on National Forest System Lands

In the Routt National Forest, the overall extent (measured in terms of miles) of the transportation network has shrunk over the last decade. This is partially due to a purposeful effort to abandon and reclaim roads that have served their purpose and are no longer needed, and partially due to the persistent challenge of maintaining a large system of roads and trails with limited resources. The road system is likely to continue to shrink moderately due to aging drainage structures and bridges and shifting Forest priorities. The number and extent of Forest trails is likely to remain stable or increase moderately over the next 10 years. Snowmobiling as a winter recreational activity has increased considerably over the past 15 years on the Routt National Forest. This is most relevant to GRSG in the California and Slater Parks areas identified as GH. These areas, however, are seasonal GRSG habitat and do not provide winter habitat for GRSG.

3.10.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 2013. Geographic Information Systems Data. Unpublished data. BLM, various field offices.

Manier, D. J., D. J. A. Wood, Z. H. Bowen, R. Donovan, M. J. Holloran, L. M. Juliusson, K. S. Mayne, S. J. Oyler-McCance, F. R. Quamen, D. J. Saher, and A. J. Titolo. 2013. Summary of Science, Activities, Programs and Policies that Influence the Rangeland Conservation of Greater Sage-Grouse (*Centrocercus urophasianus*). US Geological Survey Open-File Report 2013-1098. Ft. Collins, CO.

Forest Service (United States Department of Agriculture, Forest Service). 2005. Final Environmental Assessment, Winter Recreation Management and Routt Forest Plan Amendment.

3.11 RECREATION

Conditions on BLM-Administered Lands

BLM recreation management focuses on three basic components of recreation opportunities on public lands: 1) types of recreation opportunities and

experiences that are provided, 2) the character of recreation setting within which they occur and retaining that character, and 3) services that can be provided by the BLM and its collaborating partners.

Recreation Management Areas

Recreation Management Areas are land units where recreation and visitor service objectives are recognized as a primary resource management consideration and specific management is required to protect the recreation opportunities. The Recreation Management Area identification is based on recreation demand and issues, recreation setting characteristics, resolving use/user conflicts, compatibility with other resource uses, and resource protection needs. The Recreation Management Areas are classified as either SRMAs or extensive recreation management areas (ERMAs).

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and distinctiveness, especially compared with other areas used for recreation.

ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMA is commensurate with the management of other resources and resource uses.

Special Recreation Permits

Under the authority of the Federal Lands Recreation Enhancement Act of 2004, the BLM uses the Recreation Permitting System to satisfy recreational demand within allowable use levels in an equitable, safe, and enjoyable manner while, at the same time, minimizing adverse resource impacts and user conflicts.

Heritage Tourism

Many organizations regularly conduct GRSG viewing tours in Colorado, including:

- GRSG viewing tours in Moffat County (<https://conservationco.org/2013/02/sage-grouse-tours/>)
- The Birding Wire SG Tour Promotion in Craig (<http://www.birdingwire.com/releases/281996/>)
- GRSG Initiative tours in Colorado (<http://sagegrouseinitiative.com/>) (<http://sagegrouseinitiative.com/events/11>)
- Extreme Birding GRSG Tour Promotion (<http://www.facebook.com/events/338755516170497/>)
- Yampa Valley Sustainability Council GRSG Tour promotion (<http://www.yvsc.org/have-you-seen-the-greater-sage-grouse-do-its-thing/>)

- CPW GRSG touring promotion (<http://dnr.state.co.us/newsapp/press.asp?PressId=8199>)
- Summit County GRSG Tours (<http://summitcountyvoice.com/2013/03/17/colorado-greater-sage-grouse-viewing-tours-offered/>)
- Wings Birding Tours in several FOs (<http://wingsbirds.com/tours/colorado-lekking-grouse/>)

Conditions on National Forest System Lands

The Multiple Use Sustained Yield Act of 1960 (16 USC 528, Public Law 86-517) directs the Forest Service to manage recreation as a resource on par with timber, water, and wildlife resources. As the science of outdoor recreation management has evolved, managers have placed more emphasis on providing for experience opportunities rather than specific recreation activities. Accordingly, a primary objective of National Forest recreation management is to provide and secure an environment for visitors to achieve desired experiences while balancing other social, economic and environmental factors.

The Recreation Opportunity Spectrum is a widely used planning and management tool used to delineate and define outdoor recreation settings and related experience opportunities. The Recreation Opportunity Spectrum arrays recreation settings on a spectrum from primitive to urban. A given Recreation Opportunity Spectrum class or category describes the level of development, use, and management that exists or is desired for the area where that class is prescribed.

There are seven Recreation Opportunity Spectrum classes described in the Forest Plan: Primitive, Semi-Primitive Nonmotorized, Semi-Primitive Motorized, Roaded Natural, Roaded Modified, Rural, and Urban. For each of these classes, the Forest Plan also describes maximum use level guidelines, defined in terms of People At One Time per trail mile and per acre. For winter recreation (activities that require snow cover) two general Recreation Opportunity Spectrum classes are used: motorized and nonmotorized.

3.11.1 Existing Conditions

Conditions of the Planning Area

Typical recreational activities within the planning area include camping, hiking, horseback riding, mountain biking, OHV use, and cross-country skiing. Migrating and resident wildlife provide plentiful opportunities for hunting, photography, and observation. Renowned local rivers, streams, and lakes offer boating and cold-water fishing opportunities.

Recreation visitors to the planning area come from national and international locations, the Denver metropolitan area and Colorado's Front Range, and other local communities. For Colorado visitors, the region is an easily accessible weekend getaway with a diversity of outdoor activity offerings and recreation

settings. Increased visitation to small towns and destination resorts contribute to the increased use of public lands within the planning area.

Hunting

Hunting, a popular activity throughout the planning area, is regulated in the planning area by CPW. Much of the hunting within the planning area takes place on BLM-administered and National Forest System lands. Elk hunting, in particular, attracts large numbers of hunters during the fall big game hunting season, which begins in late August and lasts into December. Hunting of GRSG is allowed during a fall hunting season, which lasts from September through January (according to regulations for the 2012-2013 hunting season). Possession of a small game permit allows hunters a possession limit of two to four birds, depending on the game unit in which the hunting occurs (CPW 2012). Game units where hunting of GRSG is permitted cover large portions of GRSG habitat in Moffat, Jackson, Grand, Routt, Summit, and Rio Blanco Counties (CPW 2012).

Conditions on BLM-Administered Lands

On BLM-administered lands in GRSG habitat within the planning area, recreational activities include camping, hiking, horseback riding, mountain biking, OHV use, and cross-country skiing. Migrating and resident wildlife provide plentiful opportunities for hunting, photography, and observation. Renowned local rivers, streams, and lakes offer boating and cold-water fishing opportunities.

Motorized recreation is an increasingly popular activity within the planning area. Of the 12 SRMAs that overlap with GRSG habitat, four are designated for OHV-related opportunities. Popular OHV recreation areas within GRSG habitat in the planning area include North Sand Hills SRMA and South Sandwash SRMA. Outside of SRMAs, OHV recreation is also a popular activity and is commonly associated with hunting.

Boating and camping are other popular activities within the planning area. Particularly high levels of visitation area are reported in the Upper Colorado River SRMA, which overlaps GRSG habitat in the BLM's KFO and CRVFO.

Recreation Management Areas

As mentioned above, SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and distinctiveness, especially compared with other areas used for recreation. There are 12 SRMAs in the planning area that overlap portions of GRSG habitat (**Table 3.51**):

- Bocco Mountain: provides motorized single-track opportunities
- Bull Gulch: provides primitive recreation opportunities
- Gypsum Hills: provides motorized recreation opportunities

Table 3.51
Special Recreation Management Areas on BLM-Administered
Lands within GRSG Habitat

SRMA	Total Size (Acres)	Area in GRSG Habitat (Acres)
Bocco Mountain (CRVFO)	1,400	300
Bull Gulch (CRVFO)	8,300	200
Gypsum Hills (CRVFO)	16,900	1,900
North Sand Hills (KFO)	1,500	800
Upper Colorado River (CRVFO)	20,700	2,000
Upper Colorado River (KFO)	12,200	2,100
Fly Creek (LSFO)	12,100	9,200
Serviceberry (LSFO)	12,400	6,600
Cedar Mountain (LSFO)	900	900
Little Yampa Canyon (LSFO)	27,900	27,900
Juniper Mountain (LSFO)	1,800	1,800
South Sandwash (LSFO)	35,600	33,400
Total	151,700	87,100

Source: BLM 2013

- North Sand Hills: provides OHV riding opportunities and dispersed camping
- Upper Colorado River (managed as two separate SRMAs in the CRVFO and KFO): provides fishing, float boating, tubing, kayaking, canoeing, and camping opportunities
- Fly Creek: provides backcountry nonmotorized hunting opportunities
- Serviceberry: provides backcountry, nonmotorized hunting, and heritage interpretation/education opportunities
- Cedar Mountain: provides hiking, nature interpretation, and picnicking opportunities
- Little Yampa Canyon: provides river boating, big game hunting, camping, wildlife viewing, and interpretation/education opportunities
- Juniper Mountain: provides boating, hunting, camping, and hiking opportunities
- South Sandwash: provides OHV riding opportunities

Within the planning area, there are 711,900 acres of ERMAs within PH and 686,300 acres of ERMAs in general habitat (**Table 3.52**). ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMA is commensurate with the management of other resources and resource uses.

Table 3.52
Extensive Recreation Management Areas on
BLM-Administered Lands within GRSG
Habitat

Field Office	Area in PH (Acres)	Area in GH (Acres)
CRVFO	23,300	41,900
GJFO	0	0
KFO	0	0
LSFO	566,600	464,200
WRFO	122,000	180,200
Total	711,900	686,300

Source: BLM 2013

In areas outside of Recreation Management Areas within the planning area, recreational visitation is low when compared to other parts of the planning area. Recreational activities in these areas include hunting, fishing, OHV use, and a small amount of foot, equestrian, and mountain bike use.

Developed Recreation Facilities

Within GRSG habitat in the planning area, developed recreation sites and facilities have been constructed in order to enhance recreational opportunities, protect resources, manage activities, and reduce recreation use conflicts. These infrastructure developments range from campgrounds to trailheads with simple bulletin boards to developed river access sites. Many of these developments are located within SRMAs, where the BLM has made a commitment to the unique values, importance, and distinctiveness of the recreational opportunities in these areas.

Special Recreation Permits

Within the planning area, Special Recreation Permits are issued for a variety of activities, including fund-raising, outfitters and guides, off-road vehicle tours, horse trail and wagon train rides, cattle drives, OHV races, horse endurance rides, mountain bike races, rodeos, poker runs, orienteering, land speed records, Eco-Challenge events, vendor permits, river outfitting, and upland hunting. The most common Special Recreation Permits in GRSG habitat within the planning area include river outfitting (particularly in the Upper Colorado River SRMA) and upland hunting. These Special Recreation Permits often support the achievement of recreation objectives, and help BLM Colorado achieve its commitment to offering outstanding recreation opportunities to the public while ensuring good stewardship of public lands.

Conditions on National Forest System Lands

Routt National Forest

The Routt National Forest is located less than 150 miles from the Denver metropolitan area and is a popular destination for area residents and visitors

from around the world. Attractions on the Forest include 30 campgrounds, 10 picnic grounds, a destination ski area and resort, approximately 850 miles of trails, and abundant dispersed (not associated with a specific developed site) recreation opportunities.

According to the National Visitor Use Monitoring Program, during fiscal year 2007 (October 2007-September 2008) the Routt National Forest supported an estimated 1,632,000 recreation visits (Forest Service 2012). About 1,000,000 of those visits were associated with downhill skiing, primarily at Steamboat Ski Resort. Spending associated with all recreation visits was estimated at \$219,399,000 (expressed in 2007 dollars). In addition to downhill skiing, the most popular recreation activities on the Forest include viewing natural features, viewing wildlife, hiking, and walking. Other popular activities include, but are not limited to, driving for pleasure, fishing, developed camping, OHV use, horseback riding, backcountry skiing, and snowmobiling.

Recreation use patterns vary substantially across the different geographic areas of the Forest. In general, the only areas of GRSG PH or GH that support recreation use are the California Park and Slater Park area (Zone 7) and the Lower Camp Creek area (Zone 11). The other areas of the National Forest with GRSG habitat are not functional recreation areas because they are very small areas, they lack specific recreation attractions, or they are on private lands or have other factors that limit public access. More details are provided in the specific area discussion below.

California Park and Slater Park area (Zone 7)

This zone contains the largest contiguous segment (6,700 acres) of GRSG GH on the Forest. There is no PH in the area. The California Park Special Interest Area is identified in the Forest Plan as an area of 23,000 acres, which is managed to protect its unique geological, zoological, historical, paleontological, and scenic values. Forest Plan management direction for the special interest area calls for allowing recreation use that emphasizes interpretation and education when it does not threaten the values for which the area was identified.

The general recreation management direction for this zone is to provide for relatively low-density motorized and nonmotorized activities in a natural setting. The predominant Recreation Opportunity Spectrum classes are semi-primitive nonmotorized, semi-primitive motorized, and roaded natural. There is a campground and a youth camp in the western portion of the area, but there are no developed recreation facilities within or near identified GRSG habitat. Summer motorized use is limited to trails 1144 and 1147 and open roads, as depicted on the Hahns Peak/Bears Ears District Motor Vehicle Use Map (Forest Service 2011). Winter motorized use occurs on groomed snowmobile trails as dispersed recreation across this area.

The general recreation use pattern in this area is one of light to moderate summer activity, including sightseeing, fishing and dispersed camping along

National Forest Roads 110, 116, and 118, with much higher levels of big-game hunting-related use occurring from late August through late October. Eight outfitter/guides, operating under special use permits issued by the Forest, facilitate public hunting activities in the area.

Lower Camp Creek area (Zone II)

This area contains 800 acres of GRSG PH. Most of the habitat is located within an area bounded by the Platte River to the north and east, and by the Forest boundary to the south and west. Most recreation activity within and near the area of PH is concentrated in the Platte River corridor, and specifically at the Routt Access developed recreation site, which functions as a put-in for Platte River float trips and access to the Platte River Wilderness.

The Routt Access site includes a parking lot, toilet, and kiosk/information board. The estimated People At One Time capacity at this site is 300 people, although peak use does not approach that number. Visitors who begin their river trips here must navigate a narrow canyon with technical rapids. In most years, the rapids are only navigable for a short period from late May through June when flow levels are optimal. Most use of this site occurs during that period. Visitor activity is generally limited to the immediate vicinity of the river put-in.

Recreation activity in the broader area is restricted in the winter and spring to protect deer and elk winter range. In the summer, the most popular recreation activity outside the river corridor is motorized travel on the designated system of forest roads. Motorized uses are restricted to open roads and trail segments identified in the Parks District Motor Vehicle Use Map (Forest Service 2011).

3.11.2 Trends

Trends on BLM-Administered Lands

Colorado's population grew significantly (56 percent) between 1990 and 2010 (Colorado State Demography Office 2012), and an increasing number of people are living near, or seeking out, BLM-administered lands for a diversity of recreational opportunities characterized by the "mountain resort or outdoor lifestyle." The planning area is a year-round place to live and work; as a result BLM-administered lands are absorbing the increasing recreational demand and use.

Visitation and use near local communities is expected to continue to grow. Many local communities have public lands bordering them that are used as "backyard" recreation areas by local residents. Outside of the fall big game hunting seasons, when visitation is high everywhere, the greatest number of visitors to the planning area is near communities. This use continues to grow, accompanied by rapid growth in the communities themselves. OHV use, in particular, continues to increase across the planning area.

In more remote portions of the planning area, recreation use is not expected to change as dramatically as in more accessible areas. Hunting has been, and continues to be, the predominant recreational activity in these remote and less-developed areas. Interest in hunting these areas has generally remained steady and impacts on hunting opportunities in the planning area have been primarily from oil and gas development, which have caused changes to wildlife habitat and animal behavior patterns. Additionally, hunting opportunities for private hunters have been impacted by changes in land ownership, which have sometimes resulted in more difficult access to public lands. Some landowners in the area have implemented management strategies to improve and enhance wildlife habitat, which results in improved hunting opportunities. These trends are expected to continue.

River use has also been fairly consistent, with decreases in use during years of low river flows as a result of drought. This trend is expected to continue.

It is unlikely the demand for Special Recreation Permits in the planning area will change over the planning period. Permitted outfitter and guide use has remained consistent for the past 5 years.

Trends on National Forest System Lands

Routt National Forest

National trends in outdoor recreation suggest the likely direction of change for recreation use on the Routt National Forest. A comprehensive Forest Service publication (Cordell 2012), prepared in support of the 2010 Renewable Resources Planning Act Assessment, identifies the following national trends:

- Between 2000 and 2009, the number of people that participated in nature-based, outdoor recreation grew by 7.1 percent.
- In the West, the majority of outdoor recreation activity takes place on public lands.
- Participation in activities related to “viewing and photographing nature” grew substantially over the last decade, while participation in hunting and fishing declined.
- Participation in summer and winter motorized activities grew during the first half of the decade and then declined to about the same level as in 2000.
- The five activities expected to grow the fastest in per capita participation over the next 50 years are developed and undeveloped skiing, challenge activities, equestrian activities, and motorized water activities.

- Activities expected to decline in per capita participation are visiting primitive areas, motorized off-road activities, motorized snow activities, hunting, and fishing.

It is important to note that even activities with declining per capita participation can show growth in the number of participants due to population increases. For the Routt National Forest, located in the growing Rocky Mountain West, participation in outdoor recreation activities is likely to continue to increase at or slightly above the national rate. Most evidence suggests that the Forest can continue to support modest increases in recreation use without unacceptable impacts on natural resources or experience opportunities. Maintaining deteriorating recreation infrastructure with limited resources is likely to be the biggest challenge over the next 10 years.

3.11.3 References

- BLM (United States Department of the Interior, Bureau of Land Management). 2007f. Draft Oil Shale and Tar Sands RMP Amendments to Address Land Use Allocations in Colorado, Utah, and Wyoming and Programmatic Environmental Impact Statement. US Department of the Interior, Bureau of Land Management. Washington, DC.
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3.12 RANGE MANAGEMENT

The BLM administers public land grazing in accordance with the Taylor Grazing Act of 1934, while the Forest Service administers livestock grazing allotments according to the Multiple Use and Sustained Yield Act of 1960. Both agencies also administer livestock grazing allotments in accordance with the Wilderness Act of 1964, the NEPA, the Wild Free-Roaming Horse and Burro Act of 1971, the Clean Water Act of 1972, the ESA, and the Public Rangelands Improvement Act of 1976.

Both the BLM and the Forest Service issue livestock grazing permits for a period of up to 10 years that are generally renewable if it is determined that the terms and conditions of the permit are being met and the ecological condition of the rangelands are meeting the fundamentals of rangeland health. Forage is allocated on the basis of AUMs, which is the amount of forage necessary for the sustenance of one cow and its calf or its equivalent for a period of 1 month.

BLM Grazing Standards and Guidelines

In response to public concern about the management of livestock grazing on western public lands, the BLM began developing new regulations for livestock grazing administration. This process, which was characterized by the preparation of an EIS and extensive public involvement, resulted in new livestock grazing regulations which became effective August 21, 1995. One of the requirements of the regulations was that each BLM State Director would, in consultation with a Resource Advisory Council in the state, develop standards for public land health and guidelines for livestock grazing management. The BLM Colorado's Standards and Guidelines were approved by the Secretary of the Interior on February 3, 1997 (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado).

Standards describe conditions needed in order to sustain public land health, and relate to all uses of the public lands. Standards, based upon their associated indicators, are applied on a landscape scale and relate to the potential of the landscape. These include:

- *Standard 1.* Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor and minimized surface run-off.
- *Standard 2.* Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance (such as fire, severe grazing, or 100-year floods). Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.

- *Standard 3.* Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species' and the habitats' potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes.
- *Standard 4.* Special Status, Threatened, and Endangered Species (state and federal), and other plants and animals (and their habitats) officially designated by the BLM are maintained or enhanced by sustaining healthy, native plant and animal communities.
- *Standard 5.* The water quality of all water bodies, including groundwater where applicable, located on or influenced by BLM-administered lands achieves or exceeds the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under state law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.

Guidelines are the management tools, methods, strategies, and techniques, such as best management practices, designed to maintain or achieve healthy public lands as defined by the standards. Grazing management practices must promote plant health by providing for one or more of the following:

- Periodic rest or deferment from grazing during critical growth periods
- Adequate recovery and regrowth periods
- Opportunity for seed dissemination and seedling establishment

The Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM Standards) are directed at improving resource conditions for soils, riparian systems, upland vegetation, wildlife habitat, Threatened and Endangered Species, and water quality (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado). The Standards are implemented through land health assessments, determination documents, environmental analysis documents, permit renewals, and other permit changes.

Management practices for livestock grazing have been focused on achieving BLM standards and meeting objectives for other resources (such as those associated with vegetation and soils) established for allotments. This has been accomplished by improving conformance with the guidelines for livestock management, such as changing the duration of grazing use and season of use, reducing AUMs, and improving grazing distribution. Generally, reducing the duration of grazing use, including rest or deferment grazing plans, and improving

livestock distribution are the key to meeting rangeland objectives, especially those associated with riparian areas and wetlands. Grazing management has been improved by a variety of actions, such as adjustments in grazing permits (including adding terms and conditions designed to maintain or improve riparian zones and wetlands, utilization, herding and riding requirements, and placing salt and supplemental feed away from riparian zones), constructing water developments and pasture fencing, and ensuring compliance with maintenance of range improvements and grazing permits.

The BLM also administers the Wild Horse and Burro Program. Existing conditions for wild horses and burros in the planning area are discussed in **Section 3.13, Wild Horse Management.**

3.12.1 Existing Conditions

Conditions of the Planning Area

Management practices for livestock grazing on public lands in the planning area are focused on achieving standards and meeting objectives for other resources (such as those associated with vegetation and soils) established for allotments. Generally, reducing the duration of grazing use, including rest or deferment grazing plans, and improving livestock distribution are the key to meeting rangeland objectives, especially those associated with riparian areas and wetlands. Grazing management has been improved by a variety of actions, such as adjustments in grazing permits (including adding terms and conditions designed to maintain or improve riparian zones and wetlands, utilization, herding and riding requirements, and placing salt and supplemental feed away from riparian zones), constructing water developments and pasture fencing, and ensuring compliance with maintenance of range improvements and grazing permits.

Table 3.53 through **Table 3.55** display data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). This data provides a rough estimate across GRSG habitat in the planning area. More accurate data are provided below for BLM-administered and National Forest System lands within GRSG habitat in the planning area. In each table, acres and miles are presented by surface management agency and their presence within GH and PH in the planning area.

Table 3.53
BLM Grazing Allotments Not Meeting Land Health Standards
within GRSG Habitat

Surface Management Agency	Total Acres of Allotments Not Meeting Land Health Standards ¹	Acres within GH	Acres within PH
BLM	390,200	224,100	166,100
Tribal and Other Federal	1,100	1,100	0

Table 3.53
BLM Grazing Allotments Not Meeting Land Health Standards
within GRSG Habitat

Surface Management Agency	Total Acres of Allotments Not Meeting Land Health Standards ¹	Acres within GH	Acres within PH
State	29,900	5,800	24,100
Other	700	700	0

Source: Manier et al. 2013

¹ Only includes allotments not meeting Land Health Standards with grazing as the causal factor. Land health assessments are not a requirement of the Forest Service.

Table 3.54
Cropland within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres ¹	Acres within GH	Acres within PH
BLM	2,100	1,000	1,100
Forest Service	0	0	0
Tribal and Other Federal	0	0	0
Private	67,700	34,900	32,800
State	4,300	2,400	1,900
Other	100	0	100

Source: Manier et al. 2013

¹ Based on data provided by the National Agricultural Statistics Service

Table 3.55
Fences within GRSG Habitat in the Planning Area

Surface Management Agency	Total Miles ¹	Miles within GH	Miles within PH
BLM	2,300	800	1,500
Forest Service ²	N/A	N/A	N/A
Tribal and Other Federal	0	0	0
Private	2,400	800	1,600
State	300	100	200
Other	0	0	0

Source: Manier et al. 2013

¹ Derived from a dataset that identifies pasture and allotment borders on BLM and Forest Service land as potential fences.

² Data not available.

Conditions on BLM-Administered Lands

The BLM manages livestock grazing on 997 allotments comprising approximately 4,205,600 acres on BLM-administered land in the planning area (**Table 3.56**). Of the 997 allotments managed in the planning area, 792 include some lands within GRSG habitat. A total of 317,469 AUMs are currently permitted on these 792 allotments, with a total of 757 leases/permits.

Table 3.56
BLM-Administered Grazing Allotments within GRSG Habitat

Field Office	Number of Allotments	Acres			Permitted AUMs
		Non-habitat	PH	ADH	
GJFO	33	253,200	5,400	31,200	10,919
WRFO	139	1,159,900	121,500	695,700	111,516
CRVFO	61	150,900	24,300	31,200	21,631
LSFO	277	382,600	552,400	1,716,500	141,661
KFO	232	205,600	189,600	393,800	31,742
Total	792	2,152,200	893,200	2,868,400	317,469

Source: BLM 2013

The livestock that graze on BLM-administered lands in GRSG habitat in the planning area are primarily cattle but also include sheep, bison, and some domestic horses. The season of use within the planning area is generally from May through October, with much of the use in spring (May and early June). Spring use occurs on the lower benches and is designed to coordinate with the end of calving on private lands and transitions from private land to Forest Service permits. Summer and fall use (late June through October) generally occurs at higher elevations.

In addition to the presence of livestock on BLM-administered land is the presence of range improvements. Range improvements include fences (and associated gates and cattle guards), corrals, and water developments. Fences are typically three- to four-strand barbed wire, one-strand barbed wire with net, or “sheep” wire. Fence posts are either wood or metal, typically spaced 12 to 16 feet apart and may include one to two metal or wooden stays between the posts. In some areas, high-tensile smooth wire fences have replaced barbed wire. Water developments vary widely, consisting of earthen ponds that fill by catching precipitation runoff, developed springs, and wells. Developed springs and wells commonly include short (tens or hundreds of feet) or long (thousands of feet) pipeline systems that distribute water to one or more metal, fiberglass, or rubber-tire tanks. Earthen ponds and developed springs are typically located in drainages and depressions while wells and their associated delivery tanks are typically located on uplands.

Active grazing use authorization, management actions, and long term rangeland health in each allotment are monitored and evaluated, based on existing data. Adjustments are made by agreement or decision in accordance with legislation, regulations, and policy to ensure that public land resources are maintained or improved for future commodity and non-commodity values. Resource specialists use a variety of tools to monitor rangeland health including a series of rangeland health indicators that help them make determinations regarding the relationship between livestock grazing and the Colorado Standards for Public Land Health (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado).

In 1982, the BLM developed three selective Management Categories to prioritize grazing allotments according to management needs:

- *Improve (I)*. Managed in order to improve current unsatisfactory resource conditions or resolve potential resource conflicts and receive the highest priority for funding and management actions
- *Maintain (M)*. Managed in order to maintain current satisfactory resource conditions and actively managed in order to ensure that resource values do not decline
- *Custodial (C)*. Managed custodially while, at the same time, protecting existing resource values

These categories are designed to concentrate public funds and management efforts on allotments with the most significant resource conflicts, and the greatest potential improvement. The grazing allotments within the planning area were prioritized for management according to one of the three levels. The criteria used for placing allotments in a Management Category were the presence of resource conflicts or problems and the potential for improvement, as outlined in the BLM's Selective Management Policy. Allotment management plans provide greater detail in terms of livestock management objectives than the terms and conditions in the general grazing permit or lease. The allotment management plans are generally prioritized for those allotments designated for improvement but can also be developed for allotments in the maintenance or custodial categories

Conditions on National Forest System Lands

Routt National Forest

The Hahns Peak/Bears Ears, Parks, and Yampa Ranger Districts of the Routt National Forest manage grazing allotments in six counties of northwest Colorado (Garfield, Grand, Jackson, Moffat, Rio Blanco, and Routt). There are 159 grazing allotments on the Forest. Types of domestic livestock under permit include cattle, sheep, and horses. GRSG habitat (both PH and GH) falls within 24 different allotments as shown in **Table 3.57**. The total amount of GRSG habitat on the Routt National Forest adds to 17,400 acres; a total of 13,500 acres are located within the 24 grazing allotments.

All allotments on the Routt National Forest are managed under allotment management plans and annual operation instructions that implement livestock grazing standards and guidelines of the Routt National Forest Revised Forest Plan ROD (Forest Service 1998).

Maximum allowable use guidelines in the Forest Plan are moderate. This means that no more than 50 percent use of forage under a deferred rotation system and no more than 55 percent use of forage under a rest rotation system are

Table 3.57
National Forest System Grazing Allotments within GRSG Habitat

Ranger District	Number of Allotments	Acres			Permitted AUMs
		Non Habitat	PH	ADH	
Yampa	5	31,000	600	800	3,329
Hahns Peak/Bears Ears	13	49,900	0	9,900	11,762
Hahns Peak/Bears Ears and Parks	5	23,200	200	1,000	3,245
Parks	1	16,600	800	800	1,146
Total	24	120,600	1,600	12,500	19,482

Source: Forest Service INFRA database 2012

Acres may not always add up due to database rounding errors in individual land ownership categories.

permitted. Lower allowable use guidelines (40 to 45 percent) are applied to rangelands in unsatisfactory condition. Additional guidelines for riparian areas include leaving four to 6 inches of residual stubble in riparian areas at the end of the grazing season.

Of the 24 allotments within GRSG habitat, 10 of the allotments are sheep allotments, 11 are cattle allotments, and 2 are dual use (available to be used by both). The Clover Valley sheep allotment is presently vacant. Two of the cattle allotments currently under permit are stocked with yearling cattle, while the others are stocked with cow/calf pairs.

All of the cattle grazing allotments overlapping with GRSG habitat are managed under rotational grazing systems, and managed by riders, fenced pastures, or both. With the exceptions of South Hunt Creek and California Park, season-long grazing management systems include rotational grazing, deferred rotation between two to four pastures, deferred grazing, and rest rotation grazing (Long Park). All have grazing seasons that fall between the last week of May and early October.

Removal of livestock from grazing allotments is required when maximum allowable use is reached on key areas within the allotments. A key area is a portion of rangeland selected because of its location, grazing or browsing value or use. It serves as a monitoring and evaluation point for degree of grazing use and therefore guides the general management of the entire area of which it is a part. On cattle allotments, key areas are generally riparian areas and wet meadows because they are preferred by cattle, of high ecological value, and most susceptible to reaching allowable use soonest. In general, when key areas in a pasture reach maximum allowable use and cattle are removed, upland shrublands, including sagebrush habitats, are grazed well below allowable use levels. In most shrub sites on slopes greater than 15 to 20 percent or more than 0.25-mile from water sources, forage utilization by livestock is light to very light, averaging 25 percent or less. Localized heavy use of mountain shrublands and, occasionally, sagebrush stands can occur in areas where salt blocks are placed around water developments and at some fence corners to achieve needed

livestock distribution. These sites are generally extremely small in extent relative to total acreage of greater sagebrush habitat.

There are 68 small stock water ponds and spring developments within GRSG habitat (67 in GH and 1 in PH), mostly on the cattle allotments. In addition, there are 13 other small ponds and spring developments near (within 0.25 to 0.5-mile) of GRSG habitat, including 7 in GH and 6 in PH. Stock water ponds are not fenced and are generally less than 0.25-acre in size. Spring developments consist of a fenced spring with collection box and a pipeline to a watering tank. Water tanks are equipped with devices to allow for escape of small mammals and birds, though they vary in design, and not all would be considered suitable for large birds such as GRSG.

GRSG habitat on the Routt National Forest, with the exception of the GH area in California Park, is located at the lower elevation margins of the allotments and is therefore all adjacent to National Forest Boundary fence and sometimes also interior pasture fences. Much of the Forest boundary was fenced between the late 1930s and the 1960s. Most of the fence is four-strand barbed wire with wood posts, steel posts, or a mix of wood and steel. There are also some segments of wood buck and pole fence.

3.12.2 Trends

Trends on BLM-Administered Lands

In general, livestock grazing has decreased in the planning area. Trends in livestock grazing reflect changes in livestock species, in permittees and their perspectives, and in permitted use and/or season of use.

Absentee ownership of base property associated with many of the allotments has increased, as has the number of permittees that do not rely on livestock grazing for their primary source of income. Changes in the types of permittees that run livestock in the planning area have resulted in diversification of perspectives. Some permittees have shifted the focus of their management to habitat improvement for wildlife and recreation as an alternative source of income. Trends in livestock grazing have also resulted from competition for forage by wildlife, increased gas development, and increased recreation demand. Of these trends, increased gas development and wildlife competition for forage have been the most important trends impacting livestock grazing operations and rangeland management in GRSG habitat on BLM-administered lands in the planning area.

Trends on National Forest System Lands

Routt National Forest

Trends in livestock use of areas with GRSG habitat have been declining over the last several years, with voluntary reductions in AUM's on many allotments. These reductions were mostly as a result of the range condition resulting from

drought and additional pressure from elk. However, there has been little change in permitted use and when range conditions improve, AUMs may increase in these areas.

3.12.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 1997. BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado. BLM, Colorado State Office, Lakewood, CO. February 3, 1997.

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3.13 WILD HORSE MANAGEMENT

The BLM protects, manages, and controls wild horses in accordance with the Wild Free-Roaming Horses and Burros Act of 1971 (PL 92-195, as amended by Congress in 1976, 1978, 1996, and 2004). The FLPMA directs the BLM to manage wild horses and burros as one of numerous multiple uses including mining, recreation, domestic grazing, and fish and wildlife. Wild horse and burro management is governed by 43 CFR subpart 4700. One of the BLM's top priorities is to ensure the health of the public lands so that the species depending on them, including the nation's wild horses and burros, can thrive. The BLM policies and regulations also direct that wild horses and burros are to be managed as self-sustaining populations of healthy animals.

Following passage of the Wild Free-Roaming Horses and Burros Act, herd areas were identified in the planning area as displayed on **Figure 3-10** in **Appendix A**, Figures.

Herd areas are locations where wild horse and burro populations were found when the Act was passed. HMAs are areas within the herd areas where it was decided through LUPs that there was enough forage, water, cover, and space to support a healthy wild horse or burro population.

3.13.1 Existing Conditions

Conditions of the Planning Area

Table 3.58 displays data compiled in a baseline environmental report produced by the US Geological Survey and the BLM (Manier et al. 2013). Acres are presented by surface management agency and their presence within GH and PH in the planning area. There are no wild burros in the planning area.

Table 3.58
Acres of Wild Horse Areas within GRSG Habitat in the Planning Area

Surface Management Agency	Total Acres ¹	Acres within GH	Acres within PH
BLM	161,300	68,200	93,100
Forest Service	0	0	0
Tribal and Other Federal	0	0	0
Private	18,300	11,900	6,400
State	3,200	1,800	1,400
Other	0	0	0

Source: Manier et al. 2013

¹ Includes Herd Areas and Herd Management Areas

Conditions on BLM-Administered Lands

Three herd areas fall within the planning area: North Piceance, West Douglas, and Douglas Mountain. The Douglas Mountain Herd Area contains no wild horses. As outlined in **Table 3.59** both occupied herd areas contain GH totaling 21,000 acres. There is no PH in the two occupied herd areas.

Table 3.59
Herd Areas within GRSG Habitat on BLM-administered Lands

Herd Area	BLM Field Office	Acres		
		Total	GH	PH
North Piceance	WRFO	76,300	13,600	0
West Douglas	WRFO	123,400	7,500	0
Douglas Mountain	LSFO	65,800	9,700	60

Source: BLM 2013

The BLM manages two HMAs in the planning area, the Piceance-East Douglas HMA and the Sand Wash Basin Wild Horse HMA, both of which contain GH and PH. The third HMA is Little Book Cliffs Wild Horse Range. Little Book Cliffs does not have any of the GRSG habitat. Wild horse and burro populations in HMAs are managed within appropriate management levels and corresponding forage allocations (AUMs). The appropriate management level for each HMA is expressed as an acceptable range. Forage allocations for horses in the HMA are based on the maximum number of the appropriate management level range. Appropriate management levels, as well as the boundaries of each HMA, were established through previous LUPs to ensure that public land resources, including wild horse habitat, are maintained in satisfactory, healthy condition and

that unacceptable impacts on these resources are minimized. Appropriate management levels are based on best available science and rangeland monitoring studies. HMA acreages by habitat type along with current appropriate management levels are shown in **Table 3.60**.

Table 3.60
Herd Management Areas within GRSG Habitat on BLM-Administered Lands

Herd Management Area	BLM Field Office	Acres			Appropriate Management Level
		Total	GH	PH	
Piceance-East Douglas	WRFO	158,200	6,900	31,800	135-235
Sand Wash Basin HMA	LSFO	153,100	62,035	91,100	163-362

Source: BLM 2013

Piceance-East Douglas Herd Management Area

The 1975 White River Resource Area Management Framework Plan identified two wild horse units: the Piceance Basin and the Douglas Herd Unit. The Douglas Herd Unit included what is now the East Douglas portion of the Piceance-East Douglas HMA and the West Douglas Herd Area. The East and West Douglas areas were physically separated by completion of a State Highway 139 ROW fence in 1983. In 2007, the BLM completed the West Douglas Herd Area Plan Amendment to the 1997 White River RMP to discontinue maintaining the wild horse population in the West Douglas Herd Area. The wild horses are presently distributed among the Piceance-East Douglas HMA, the West Douglas Herd Area, and the North Piceance Herd Area. A wild horse management plan for the Piceance-East Douglas HMA was approved in June 1981 (BLM 1981).

The wild horse population within the Piceance-East Douglas HMA is managed with an appropriate management level of 135 to 235 adult wild horses. The estimated population of wild horses within the HMA was 183 in the spring of 2012 based on a helicopter inventory. Various factors including drought conditions, historic grazing, wildfires, and wild horse population growth may adversely affect habitat and in some instances herd health. The appropriate management level, objectives, and management actions may be modified in future multiple use decisions for the grazing allotments contained within an HMA. Wild horses that establish home ranges outside of HMA or Herd Area boundaries are removed during gathers. Wild horses are removed from private lands at the request of the landowner and after reasonable efforts to keep the animals off private lands have failed.

Sand Wash Basin Herd Management Area

The wild horse population within the Sand Wash HMA is managed with an appropriate management level of 163 to 362 adult wild horses. The most recent count of the HMA showed 327 adult horses. The HMA is gathered when the high end of the appropriate management level is exceeded and the population is reduced to 163 adult animals.

Conditions on National Forest System Lands

Routt National Forest

There are no wild horse and burro management areas or populations present in the Routt National Forest planning area.

3.13.2 Trends

Trends on BLM-Administered Lands

Current conditions within the planning area show that wild horse populations continue to grow, often exceeding appropriate management levels. Wild horses will continue to be removed to maintain appropriate management levels and rangeland health.

3.13.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 1981. BLM-Little Snake Field Office, Piceance-East Douglas HMA Herd Management Plan. June 1981.

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3.14 SPECIAL DESIGNATIONS

Special designations on BLM-administered and National Forest System lands identify locations of unique value that require special management attention. Designations such as ACECs are specific to the BLM. Others, including Wilderness Areas, WSAs, Wild and Scenic Rivers, National Scenic and Historic Trails, Scenic Byways, and Watchable Wildlife Areas, are common designations used by both the BLM and Forest Service. Special designation areas are found throughout the planning area and have the potential to influence BLM and Forest Service management decisions relative to GRSG on those lands.

Areas of Critical Environmental Concern

The BLM uses the ACEC designation to highlight areas where special management attention is necessary to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes [43 CFR 1610.7-2(b)]. The ACEC designation may also be used to protect human life and safety from natural hazards.

Wilderness, Wilderness Study Areas, and Inventoried Roadless Areas

The Wilderness Act of 1964 (Public Law 88-577) established the National Wilderness Preservation System. Wilderness areas are natural environments that have not been significantly modified by human activity; provide opportunities for solitude and/or primitive and unconfined recreational experiences; and are important for maintenance of species diversity, protection of threatened and endangered species, protection of watersheds, scientific research, and various social values. Wilderness areas are protected from development, timber cutting, and the operation of motorized vehicles and equipment.

On BLM-administered land, the FLPMA directs the BLM to inventory, study, and recommend which lands under its administration should be designated as wilderness. The result is an inventory of WSAs. A WSA is a roadless area greater than 5,000 acres designated by the BLM as having wilderness characteristics, thus making it worthy of consideration by Congress for designation as a National Wilderness Area. During the time Congress considers whether to designate a WSA as permanent wilderness, the BLM is required to manage the WSA in a manner designed to prevent the impairment of the area's suitability for wilderness designation. The BLM's authority to conduct wilderness reviews, including the establishment of new WSAs, expired on October 21, 1993, pursuant to Section 603 of the FLPMA.

Inventoried Roadless Areas are undeveloped areas of National Forest System land typically exceeding 5,000 acres that meet the minimum criteria for wilderness consideration under the Wilderness Act. Inventoried Roadless Areas may contain improvements such as motorized trails, fences, outfitter camps, and evidence of historical logging activities. As required by 36 CFR 219.17, Inventoried Roadless Areas are identified during Forest Plan development or revision and are qualified for study if they are 5,000 acres in size or larger or, if less than 5,000 acres, contiguous to an existing Wilderness Area and contain no classified roads, which are roads intended for long-term highway vehicle use.

Wild and Scenic Rivers

In order to accomplish the goal of protecting wild and scenic waterways, Congress established the National Wild and Scenic Rivers System (National System) through the Wild and Scenic Rivers Act of 1968. To qualify for nomination to the National System, a waterway, waterway segment, or tributary must be in a free-flowing condition and must be deemed to have one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.

The Wild and Scenic Rivers Act directs all federal agencies to give consideration to potential national wild, scenic, and recreational river areas in all planning for use and development of water and related land resources and that each waterway in the National System be administered in a manner that protects and

enhances its outstandingly remarkable value. The existing uses of a waterway are allowed to continue, and future uses may be considered so long as existing or proposed uses do not conflict with the goal of protecting waterway values.

National Scenic and Historic Trails

The National Trails System Act of 1968 (Public Law 90-543, as amended) authorized the creation of a National Trail System composed of National Scenic Trails, National Historic Trails, and National Recreation Trails. Only Congress can designate National Scenic Trails and National Historic Trails. National Recreation Trails are designated by the Secretary of the Interior or the Secretary of Agriculture.

Scenic Byways

Scenic Byways include All-American Roads, National Scenic Byways, Colorado State Scenic and Historic Byways, and BLM-designated Backcountry Byways. The program seeks to recognize, preserve, and enhance selected roads throughout the US.

Watchable Wildlife Areas

The federal Watchable Wildlife Program is a cooperative nationwide effort among 13 organizations, including the BLM and Forest Service, designed to foster the conservation of wildlife and wildlife habitats. There are 201 Watchable Wildlife Areas in the State of Colorado, and approximately 60 are found within the planning area.

Special Interest Areas

The Forest Service uses the special interest area designation to identify areas of National Forest System land with unusual characteristics, such as scenic, historical, geological, botanical, zoological, or paleontological characteristics. Management emphasis is on protecting or enhancing, and where appropriate, developing and interpreting for public education and recreation. Many uses are allowed in special interest areas, including recreation, livestock grazing, mineral leasing, and road construction, as long as the uses do not degrade the characteristics for which the areas are designated. The California Park Special Interest Area, which includes Slater park, was designated in large part due to the zoological values of the area, specifically including GRSG and Columbian Sharp-Tailed Grouse. A management plan for the California Park Special Interest Area was prepared in 2003 and it includes management goals for GRSG within the Special Interest Area (Forest Service 2003).

Research Natural Areas

Research Natural Areas provide a spectrum of relatively undisturbed areas representing a wide range of natural variability within important natural ecosystems and environments. Research Natural Areas can also be areas with special or unique characteristics or scientific importance. Research Natural Areas are also selected to:

- Serve as reference areas for evaluating the range of natural variability and the impacts of management in similar environments
- Maintain representative and key elements of biological diversity at the genetic, species, population, community, and landscape levels
- Serve as areas for the study of ecosystems and ecological processes including succession
- Provide on-site and extension educational activities
- Serve as baseline areas for measuring ecological change

3.14.1 Existing Conditions

Conditions of the Planning Area

GRSG habitat is widely distributed throughout the planning area. The highest concentrations of PH and GH are found in the Wyoming Basin Management Zone, with particularly large and contiguous habitat areas in Moffat, Jackson, and Grand counties. Habitat areas in the remainder of the field offices and National Forest are generally smaller and less contiguous. See **Table 3.61** and **Figure 3-11**.

Table 3.61
Special Designations in ADH

Designation	Agency	Total	Area within ADH
ACECs	BLM	16	33,200 acres
WSAs	BLM	12	13,600 acres
Wild and scenic river segments (eligible and suitable segments only)	BLM/Forest Service	27	52 miles
Special Interest Areas	Forest Service	2	24,200 acres
Inventoried Roadless Areas	Forest Service	4	62,400 acres
National Scenic and Historic Trails	BLM/Forest Service	1	1.7 miles
Watchable Wildlife Areas	BLM/Forest Service	0	0

Source: BLM 2013

Conditions on BLM-Administered Lands

ACECs

There are 16 ACECs on BLM-administered lands in the planning area (the Forest Service equivalent designation of an ACEC is a Zoological Area). Each BLM ACEC is designated for the purpose of protecting unique values in that area. **Table 3.62** summarizes the size and values unique to each ACEC.

Table 3.62
ACECs within GRSG Habitat on BLM-Administered Lands

ACEC	BLM Field Office	Total Acres	Acres within PH	Acres within ADH	Relevant and Important Values
Anvil Points	CRVFO	5,000	0	200	Scenic, botanical, wildlife values, and natural processes
Blacks Gulch	WRFO	800	0	50	Paleontology
Blue Hill	CRVFO	3,700	300	900	Cultural resources, erosive soils
Bull Gulch	CRVFO	10,400	0	200	Scenic qualities and botanical values
Deer Gulch	WRFO	1,800	0	1,700	Sensitive plants and remnant vegetation associations
East Douglas Creek	WRFO	47,600	800	1,900	Important biologically diverse plant communities, riparian habitats, and Colorado River cutthroat trout habitat
East Fork Parachute Creek	CRVFO	6,600	0	5,000	Scenic qualities, fish and botanical resources, and natural processes
Irish Canyon	LSFO	5,700	2,800	6,500	Endangered plant species, cultural resources, scenic qualities
Kremmling Cretaceous Ammonite ACEC/Research Natural Area	KFO	200	200	200	Significant marine invertebrate fossils
Moosehead Mountain	WRFO	8,900	6,200	8,600	Important biologically diverse plant communities, riparian habitats, and cultural resources
North Park Natural Area ACEC/Research Natural Area	KFO	300	300	300	Endangered plant species
Raven Ridge ¹	WRFO	5,000	0	300	Threatened, endangered, and sensitive plants, remnant vegetation associations, fragile soils, and paleontology
South Cathedral Bluffs ¹	WRFO	1,300	300	300	Sensitive plants and remnant vegetation associations
Trapper/Northwater Creek ²	CRVFO/WRFO	4,800	0	4,600	Fish resources and natural processes

Table 3.62
ACECs within GRSG Habitat on BLM-Administered Lands

ACEC	BLM Field Office	Total Acres	Acres within PH	Acres within ADH	Relevant and Important Values
White River Riparian	WRFO	1,000	0	100	Important biologically diverse communities and critical habitat
Yanks Gulch/Upper Greasewood Creek	WRFO	2,700	0	2,500	Threatened, endangered, and sensitive plants, and remnant vegetation associations
Total		105,800	10,900	33,350	

Source: BLM 2013

¹ Includes additions designated in the 1997 White River ROD and Approved RMP.

² Approximately 1,066 acres of ADH within the Trapper/Northwater Creek ACEC are managed by the WRFO. The remaining 3,526 acres of ADH are managed by the CRVFO.

Anvil Points ACEC

This ACEC was designated in the 2007 Roan Plateau ROD/RMP for its scenic, geologic, wildlife, and botanical values (BLM 2007a). The qualities and character of the area's scenic viewshed are both locally and regionally important. Wildlife and botanical values within the ACEC include crucial habitat for peregrine falcons, golden eagles, and Townsend's big-eared bat, as well as two Candidate and two BLM sensitive plant species that are globally and regionally rare.

Blacks Gulch ACEC

This ACEC was designated in the 1997 White River ROD/RMP (BLM 1997) for paleontological values and is coincident with Colorado's Black's Gulch Natural Area. It is within the Wasatch Formation, which is characterized as a Potential Fossil Yield Class 5, meaning that it is a highly fossiliferous geologic unit that consistently and predictably produces either vertebrate or scientifically significant invertebrate or plant fossils. The area is the best fossil vertebrate locality of Lysite age (middle early Eocene) in Colorado and has produced hundreds of good specimens.

Blue Hill ACEC

This ACEC was designated in the Glenwood Springs 1984 ROD/RMP (BLM 1984). This ACEC is a sensitive area for cultural and Native American resources with the potential to yield information important to the understanding of prehistory and history. The area is also classified as a critical watershed because of the severe erosion hazard of the area's soils and the negative impact they could have on cultural resources and water quality.

Bull Gulch ACEC

This ACEC was designated in the Glenwood Springs 1984 ROD/RMP for its scenic qualities due to its unique and diverse topography, unique geological

forms, and sharp contrasting colors (BLM 1984). This ACEC also supports several sub-occurrences of Harrington's penstemon (*Penstemon harringtonii*), a BLM sensitive plant.

Deer Gulch ACEC

This ACEC was designated in the 1997 White River ROD/RMP to protect the area's sensitive plants and remnant vegetation associations (BLM 1997).

East Douglas Creek ACEC

This ACEC was designated in the 1997 White River ROD/RMP (BLM 1997) to protect important biologically diverse plant communities, riparian habitat, and Colorado River cutthroat trout habitat. Colorado River cutthroat trout, a BLM Sensitive species, occupy several streams within the East Douglas Creek ACEC, including East Douglas Creek, Bear Park Creek, Cathedral Creek, Lake Creek, and Solider Creek. These creeks are all small headwater streams but do persist in supporting self-sustaining populations of trout.

East Fork Parachute Creek ACEC

This ACEC was designated in the 2007 Roan Plateau ROD/RMP for its scenic qualities, fish and botanical resources, and natural processes (BLM 2007a). The area contains a scenic 200-foot-high waterfall and box canyon, Colorado River cutthroat trout habitat, a BLM sensitive plant species, a Green River Shale endemic plant, and four significant plant communities (BLM 2008).

Irish Canyon ACEC

This ACEC was designated as a Natural Area by the Colorado Natural Areas Program in 1990. The canyon supports populations of several plant species of special concern: Yampa beardtongue, ligulate feverfew, tufted cryptanth, and woodside buckwheat. The presence of mountain clover in Irish Canyon is the only such occurrence in the LSFO. High-quality examples of northwestern Colorado plant communities are found on the floor and canyon walls, and Irish Lakes represent one of the few natural playa lakes in Colorado. Rock art and other archaeological sites are also found in the canyon (BLM 2010).

Kremmling Cretaceous Ammonite ACEC/Research Natural Area

This ACEC is managed for research and preservation of fossil resources. The area contains a rich fossil assemblage of giant ammonites and other extinct species of marine fauna. In addition to the geologic importance of the Kremmling Cretaceous Ammonite ACEC/Research Natural Area, the area contains substantial habitat for GRSG (BLM 2007b).

Moosehead Mountain ACEC

This ACEC was designated in the 1997 White River ROD/RMP (BLM 1997) to protect biologically diverse plant communities, riparian habitats, and cultural resources. To prevent damage to watershed resources and wildlife habitat, 77 percent of the Moosehead Mountain ACEC is closed to motorized vehicle use.

North Park Natural Area ACEC/Research Natural Area

This ACEC was designated in order to protect North Park phacelia (*Phacelia formosula*), a federally endangered plant. The population is critically imperiled globally and within the State of Colorado due to its rarity (CNHP 2007).

Raven Ridge ACEC

This ACEC was designated in 1985 through the Raven Ridge Amendment to the White River Management Framework Plan (BLM 1985) and was expanded in the 1997 White River ROD/RMP (BLM 1997). It is coincident with Colorado's Raven Ridge Natural Area. The Raven Ridge ACEC was designated to protect special status plants, remnant vegetation associations, fragile soils, and paleontological resources. The area is located near the boundary between the Piceance and Uinta Basins. Raven Ridge effectively links the endemic floras of these two physiographic basins, resulting in a rich collection of rare endemic plants. The White River beardtongue is a currently a candidate for listing under the ESA and Graham's beardtongue is proposed for listing. BLM Sensitive species include the Debris milkvetch, Rollins' cryptantha, and Ephedra buckwheat. Portions of the ACEC are within the interface between the Wasatch and Green River Formations, which is classified as a Potential Fossil Yield Class 5. About 15 to 20 vertebrate fossil localities, primarily early primate specimens, have been documented within the Raven Ridge ACEC.

South Cathedral Bluffs ACEC

This ACEC was designated in 1987 through the Piceance Basin RMP (BLM 1987) and was expanded in the 1997 White River ROD/RMP (BLM 1997). It is also coincident with Colorado's South Cathedral Bluffs Natural Area. The area was designated for sensitive plant species, including the Cathedral Bluff dwarf gentian, the Piceance bladderpod, and the Cathedral Bluff meadow-rue. In addition, the area is the type locality for both the Cathedral Bluff meadow-rue and the Piceance bladderpod. A type locality is the location where a species was first discovered and is scientifically important because it is used as a reference site.

Trapper/Northwater Creek ACEC

This ACEC was designated in 2008 through the Roan Plateau RMPA (BLM 2007a) and is managed by both the WRFO and the CRVFO. Both Trapper Creek and Northwater Creek contain genetically pure populations of naturally reproducing Colorado River cutthroat trout. The ACEC also contains a Colorado endemic plant, the hanging garden sullivantia. Rare plant communities, including the Indian ricegrass shale barrens community and the mountain big sagebrush/Thurber fescue community, are also found within the area.

White River Riparian ACEC

This ACEC was designated in the 1997 White River ROD/RMP (BLM 1997) and consists of numerous small parcels managed by the BLM within the 100-year floodplain of the White River. These areas contain important biologically diverse communities associated with riparian habitats and provide nesting and roost

habitat for bald eagles, a BLM Sensitive species. The White River Riparian ACEC also contains designated critical habitat for the endangered Colorado pikeminnow below the Taylor Draw Dam.

Yanks Gulch/Upper Greasewood Creek ACEC

This ACEC consists of three distinct parcels that were designated in 1987 through the Piceance Basin RMP (BLM 1987) and carried forward in the 1997 White River ROD/RMP (BLM 1997). The Yanks Gulch/Upper Greasewood Creek ACEC is coincident with Colorado's Yanks Gulch Natural Area. The area was designated as an ACEC to protect special status plants, including occupied habitat for federally threatened Dudley Bluffs bladderpod and Dudley Bluffs twinpod. The area also contains four high quality examples of remnant plant communities representative of pre-settlement vegetation in the Piceance Basin. Two of these remnant plant communities are known to grow only on the Green River Formation.

Wilderness and Wilderness Study Areas

There are 12 WSAs on BLM-administered lands within GRSG habitat in the planning area. These WSAs comprise 13,600 acres of habitat, of which 4,800 acres fall within PH. Until Congress considers whether to designate a WSA as permanent wilderness, the BLM is required to manage the WSA in a manner designed to prevent the impairment of the area's suitability for wilderness designation. See **Table 3.63**.

Wild and Scenic Rivers

There are no designated wild and scenic rivers in the planning area. There are, however, 24 river segments on 12 different rivers or creeks on BLM-administered lands in GRSG habitat that have been determined to be eligible for inclusion in the National Wild and Scenic Rivers System, based on an initial evaluation. These eligible segments account for 32.6 miles on BLM lands within the planning area. There are 3 additional segments on the Yampa River that have been found suitable for inclusion in the National Wild and Scenic Rivers System, accounting for 19.1 miles on BLM-administered land within GRSG habitat in the planning area. See **Table 3.64**.

A final suitability determination of Wild and Scenic Rivers occurs through the RMP/EIS process. One BLM field office within the planning area, the LSFO, has completed suitability determinations. The other four BLM field offices within the planning area have yet to complete suitability determinations, but have identified eligible segments within their field offices. Rivers identified as suitable will then be managed to protect identified outstandingly remarkable values until Congress either approves or rejects the recommendation for their inclusion in the National Wild and Scenic River System. Only Congress can designate a Wild and Scenic River. Decisions in the RMP simply identify segments that are suitable for inclusion in the system, and provides for management to preserve the values that made them eligible or suitable.

Table 3.63
WSAs within GRSG Habitat on BLM-administered Lands

Name	BLM Field Office	Vegetation	Acres within PH	Acres within ADH
Bull Canyon WSA	WRFO	Pinyon-juniper, sagebrush, riparian vegetation	1,100	1,200
Bull Gulch WSA	CRVFO	Pinyon-juniper, aspen, Douglas fir, blue spruce, ponderosa pine	0	1,500
Castle Peak WSA	CRVFO	Grasslands, sagebrush, aspen, spruce-fir forest	200	1,100
Cross Mountain WSA	LSFO	Pinyon-juniper, sagebrush	700	800
Diamond Breaks WSA	LSFO	Pinyon-juniper, sagebrush	900	1,800
North Sand Hills Instant Study Area ¹	KFO	Sagebrush, aspen	50	50
Peterson Draw WSA	LSFO	Pinyon-juniper, ponderosa pine, sagebrush, native grass communities	0	200
Platte River Contiguous WSA	KFO	Pinyon-juniper, Douglas fir, sagebrush	10	10
Vale of Tears WSA	LSFO	Pinyon-juniper, ponderosa pine, sagebrush, native grass communities	0	600
West Cold Spring WSA	LSFO	Pinyon-juniper, sagebrush, grasses, Douglas fir, limber pine, riparian vegetation	1,500	3,600
Willow Creek WSA	WRFO	Douglas fir, riparian vegetation, pinyon-juniper, sagebrush, saltbush, greasewood, grasses	400	1,900
Windy Gulch WSA	WRFO	Douglas fir, pinyon-juniper, sagebrush	0	800
Total			4,860	13,560

¹ The FLPMA directed the BLM to identify and study for wilderness characteristics. Section 603 of the FLPMA included those areas that were formally identified as natural or primitive areas prior to November 1, 1975, which then were also identified as "Instant Study Areas." These areas are sometimes referred to as "603 WSAs" (Manual 6330 – Management of Wilderness Study Areas [BLM 2012d]).

Table 3.64
Eligible and Suitable Stream Segments within GRSG Habitat on BLM-Administered Lands

River or Creek	BLM Field Office	Number of Stream Segments	Eligible or Suitable	Length on BLM within PH or GH (total miles of all segments)	Preliminary Classification	Outstandingly Remarkable Values
Blue River ¹	KFO	3	Eligible	1.14	Recreational	Wildlife, Recreational, Biodiversity
Colorado River, Segment 6	CRVFO	1	Eligible	2.76	Recreational	Scenic, Recreational, Wildlife, Botanical
Colorado River	KFO	4	Eligible	3.83	Recreational	Recreational, Scenic, Geologic, Wildlife, Historic
East Fork Parachute Creek	CRVFO	2	Eligible	4.49	Wild	Scenic, Fish, Scenic, Botanic
East Middle Fork Parachute Creek	CRVFO	1	Eligible	0.42	Wild	Fish, Botanic
Egeria Creek	CRVFO	1	Eligible	0.36	Recreational	Historic
First Anvil Creek	CRVFO	2	Eligible	0.39	Wild	Scenic, Fish, Botanic
Golden Castle Creek	CRVFO	1	Eligible	1.05	Wild	Fish, Botanic
JQS Gulch	CRVFO	1	Eligible	1.14	Scenic	Fish, Botanic
Muddy Creek	KFO	1	Eligible	3.43	Recreational	Wildlife
Northwater Creek	CRVFO	1	Eligible	2.80	Wild	Fish, Botanic
Second Anvil Creek	CRVFO	2	Eligible	1.77	Wild	Recreational, Botanic
Sulphur Gulch	KFO	1	Eligible	3.04	Recreational	Paleontologic
Trapper Creek	CRVFO	3	Eligible	5.98	Wild	Recreational, Scenic, Fish
Yampa River Segment 1	LSFO	1	Suitable	1.9	Recreational	Fish population, Recreation
Yampa River Segment 2	LSFO	1	Suitable	13.9	Scenic	Fish population, Recreation
Yampa River Segment 3	LSFO	1	Suitable	3.3	Wild	Fish population, Recreation, Geologic, Scenic
Total		27		51.7		

Source: BLM 2013

¹ One (1) additional segment along the Blue River was originally identified as eligible (Blue River Segment 1). A re-examination of the land ownership and management status revealed that Segment 1 of the Blue River is on National Forest System land rather than on BLM-administered lands. As a result, this segment has been dropped from consideration by the BLM, and is not studied for suitability in this report.

National Scenic Byways

Portions of three scenic byways, the Colorado River Headwaters National Scenic Byway, the Dinosaur Diamond Prehistoric Highway, and the Cache La Poudre-North National Scenic Byway, traverse GRSG habitat in the planning area.

The 69-mile Colorado River Headwaters National Scenic Byway bisects the planning area, following the Colorado River from Grand Lake west to State Bridge.

The 101-mile-long Cache la Poudre-North Park National Scenic Byway begins east of Walden on Colorado Highway 14 and extends east to downtown Fort Collins. The byway was once a transit corridor for Native Americans and early Euro-American explorers (US Department of Transportation 2013). The 480-mile Dinosaur Diamond Prehistoric Highway traverses the planning area near the community of Rangely, Colorado.

Watchable Wildlife Areas

There are no formal Watchable Wildlife Areas on BLM-administered lands in the planning area. The Hebron Waterfowl Management Area in the KFO is promoted as a Watchable Wildlife Area; however, no formal management plan exists.

Conditions on National Forest System Lands*Routt National Forest*Special Interest Areas

Special Interest Areas on the Routt National Forest are managed to protect or enhance their unique characteristics, to maintain their special interest values, and to provide interpretative opportunities, where appropriate. While there are seven special interest areas scattered across the National Forest, only two of them contain GH or PH (Table 3.65).

Table 3.65
Special Interest Areas within GRSG Habitat
on National Forest System Lands

Name	Total Acreage	Acreage within GH	Acreage within PH
California Park	23,000	6,700	0
Camp Creek	1,200	0	10
Total	24,200	6,700	10

Source: Forest Service 2013

California Park (Colorado MZ 7). This special interest area is a large, high-mountain park located in the northwest portion of the National Forest, about 20 miles north of Hayden, Colorado. The area was designated as a special interest area because of its geological, zoological, historical, paleontological, and scenic values. Many species exist in the area, such as greater sandhill crane,

sharp-tailed grouse, and boreal toads. The area also contains unique features such as sulphur springs, fossils, and buffalo skulls. Roughly 29 percent of this special interest area is located in GH.

Camp Creek (Colorado MZ 11). This special interest area is located in the northeast portion of the Forest, roughly 15 miles north of Walden, Colorado. This area was designated as a special interest area because of its geological, botanical, zoological, and historical values. The area supports a highly diverse ecosystem, including old growth Douglas fir, limber pine, and ponderosa pine. Willow and aspen communities also exist, which support a wide variety of Neotropical migratory songbirds as well as moose. Approximately 1 percent of the western edge of the special interest area is located in PH.

Research Natural Areas

Research Natural Areas on the National Forest are selected to provide a spectrum of relatively undisturbed areas representing a wide range of natural variability within important natural ecosystems and environments and areas with special or unique characteristics of scientific importance. There are three Research Natural Areas scattered across the National Forest; however, none of them contain PH or GH.

Inventoried Roadless Areas

Inventoried Roadless Areas on the Routt National Forest were identified as having special values for semi-primitive recreation opportunities and biological diversity. There are 32 Inventoried Roadless Areas on the National Forest that collectively comprise roughly 502,200 acres (37 percent) of the land base. Of the 32 Inventoried Roadless Areas, four contain GH (**Table 3.66**).

Table 3.66
Inventoried Roadless Areas within GRSG Habitat on National Forest System Lands

Name	Total Acreage	Acreage within GH	Acreage within PH
Nipple Peak South	13,800	400	0
Shield Mountain	10,200	800	0
Sugarloaf North	15,100	1,000	0
Sugarloaf South	23,300	700	0
Total	62,400	2,900	0

Source: Forest Service 2013

Nipple Peak South (Colorado MZ 7). This Inventoried Roadless Area is located in Routt County northwest of Steamboat Springs on the Hahns Peak Ranger District. Cover types within the area include spruce-fir (19 percent), lodgepole pine (17 percent), aspen (50 percent), shrubs (less than 1 percent), grass/forb (9 percent), non-vegetated (3 percent), and water/wetland (2 percent). The area is used primarily for dispersed recreation (primarily big game hunting with some snowmobile use in the winter) and seasonal livestock grazing. The entire area

has medium potential for oil and gas; however, no current leases exist. The entire area has low potential for locatable minerals, and no salable mineral sites exist. Approximately 400 acres (2.6 percent) of the Inventoried Roadless Area are located within GH.

Shield Mountain (Colorado MZ 7). This Inventoried Roadless Area is located in Routt County north of Steamboat Springs on the Hahns Peak Ranger District. The primary vegetation type is aspen, with some lodgepole pine and open parks at lower elevations. Higher elevations on northern aspects are stocked with over-mature spruce and lodgepole pine. The predominant use of the area is livestock grazing, with roughly 13,800 sheep grazing for 26,504 sheep months and 82 cows grazing for 219 cow months on a seasonal basis. Recreation use is low in the summer, while use in the fall hunting season is high due to the abundance of big game. There is little to no winter use due to the difficulty of access. Approximately 800 acres (7.6 percent) of the Inventoried Roadless Area are located within GH.

Sugarloaf North (Colorado MZ 7). This Inventoried Roadless Area is located in Routt County northeast of Craig, Colorado, on the Hahns Peak Ranger District. The primary vegetation type is spruce-fir with pockets of aspen and lodgepole pine intermixed, along with their associated understory vegetation. The area contains numerous grass/forb meadows, many of which are wet and are associated with streams or ponds. The eastern portion of the area is used for nesting and rearing grounds by sandhill cranes, a state-listed endangered species. A seasonal road closure is in effect on Forest Development Road 150 to protect the cranes during the critical nesting and rearing periods. Recreational use of the area is generally low, except during the big game hunting season when it is high. Livestock grazing occurs on a seasonal basis. The majority of the area has high potential for oil and gas; however, no leases exist. Although the entire area has low potential for locatable minerals, the area contains three salable mineral sites. Approximately 1,000 acres (6.8 percent) of GH are located in the Inventoried Roadless Area.

Sugarloaf South (Colorado MZ 7). This Inventoried Roadless Area is located in Moffat and Routt Counties northeast of Craig, Colorado, on the Hahns Peak Ranger District. The predominant vegetation type in the area is aspen with small pockets of spruce. Open parks of sagebrush and rabbit brush are also characteristic of the area. The area is used primarily by sheep herders and fall hunters seeking a remote hunting experience. Approximately 700 acres (3 percent) of the Inventoried Roadless Area are located in GH.

Wilderness Areas

Wilderness Areas on the Routt National Forest are managed to protect natural conditions and to offer varying degrees of solitude where natural processes and conditions have not been significantly influenced by human use. The Routt

National Forest manages seven Wilderness Areas, or portions thereof, for a total of 265,100 acres of wilderness. None of these areas contain GH or PH.

Wild and Scenic Rivers

There is no GH or PH within any Wild and Scenic River segments on the Routt National Forest.

National Scenic and Historic Trails

A short portion (1.7 miles) of the Continental Divide National Scenic Trail crosses GRSG habitat in the planning area. The vast majority of this portion of the National Scenic Trail occurs on private lands, with a short segment on National Forest System lands. This National Scenic Trail is officially administered by the Secretary of Agriculture in consultation with the Secretary of the Interior (*Federal Register* 150, August 5, 1981, page 39867).

Portions of the Continental Divide National Scenic Trail cross the planning area. The trail traverses the KFO from west to east, roughly following the southern Jackson County boundary. At US Route 34, it turns south along the eastern edge of the planning area. The trail is primarily on National Forest System lands, with very little crossing BLM-administered lands. A multi-agency effort is underway to complete the Muddy Pass section of the trail between Rabbit Ears Pass and Indian Creek. The potential routes may incorporate BLM-administered lands. Currently, trail users hike along Jackson County Road 53 near Indian Creek, which bisects public lands, in order to access the next designated portion of the trail. The trail is officially administered by the Secretary of Agriculture in consultation with the Secretary of the Interior (*Federal Register* 150, August 5, 1981, page 39867).

3.14.2 Trends

Trends on BLM-Administered Lands

Areas of Critical Environmental Concern and Wilderness Study Areas

Over the past 25 years, an increasing human population in the region and the associated increases in land use and development have increased impacts on natural systems, recreation opportunities, and cultural resources throughout the region, including the areas of mapped GRSG habitat. The primary impacts in the planning area have resulted from energy development activities, residential development, and recreation activities. A growing awareness of these impacts has led to more focused efforts to protect and manage diminishing resources. Special designations have become a primary tool for this focused management. ACEC inventories and designations are being actively pursued by the BLM field offices to identify and protect natural, recreational, and cultural resources in the area.

Oil and gas development is expected to challenge the characteristics for which many ACECs in the planning area were established. Lease stipulations on

activities authorized prior to the establishment of the special designation areas may allow surface-disturbing activities. These activities will conflict with the unique resources for which the areas were designated. The popularity of recreational OHV use due to the uniqueness of landscapes in the planning area is expected to continue to draw OHV users.

Should any WSAs be released from wilderness consideration by Congress, subsequent planning documents would prescribe how these lands would be managed.

Wild and Scenic Rivers

River-related recreation is increasing in parts of the planning area, including along the Colorado River. River-based recreation relies on certain flow rates to support the activity. For example, fishing requires a certain flow rate to support the fisheries, and whitewater boating relies on certain flow rates to create a whitewater experience. Flow rates that are necessary to support river-related recreation may become at risk as demand for additional water diversions occurs at upstream locations to satisfy growing populations on the Western and Eastern Slopes. It is generally difficult, however, for the BLM to ensure the protection of outstandingly remarkable values in fragmented stream segments.

National Scenic and Historic Trails and Scenic Byways

Driving for pleasure is expected to increase along the Colorado Headwaters National Scenic Byway. The BLM is collaborating with the Colorado Headwaters National Scenic Byway Committee to educate the public about, advertise, and develop an interpretive plan for the byway (BLM 2007c).

Trends on National Forest System Lands

Routt National Forest

The overall acreage of the special designation areas on the National Forest has remained stable over the last decade. This is partially due to limited motorized access, as well as existing management restrictions that are in place either locally (via Forest Plan direction) or nationally. In 2012 there was a slight increase (approximately 100 acres) in the amount of GH in the California Park Special Interest Area as a result of a land donation to the Forest Service.

3.14.3 References

- BLM (United States Department of the Interior, Bureau of Land Management). 1987. Draft Piceance Basin Resource Management Plan and Environmental Impact Statement.
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3.15 WATER RESOURCES

Water on public lands is regulated by the Clean Water Act, Safe Drinking Water Act, Public Land Health Standards, the Watershed Conservation Practices Handbook and other laws, regulations, and policy guidance at the federal, state, and local levels. The Clean Water Act (33 USC 1251 etc.) requires maintenance and restoration of the physical, biological, and chemical integrity of waters of the US. Sections 208 and 319 of the Clean Water Act recognize the need for control strategies for nonpoint source pollution. Soil and water conservation practices and best management practices are recognized as the primary control mechanisms for nonpoint source pollution on BLM-administered and National Forest System lands. The US EPA supports this perspective in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

Water resources include surface and ground water sources, including streams, water bodies, riparian areas, and wetlands. Factors such as the amount of precipitation and run-off, water storage and withdrawals, pollution from outfalls, soil erosion, and overall conditions of the uplands and riparian areas affect surface water resources. Recharge, withdrawal, and infiltration of contaminants affect groundwater resources. The BLM and Forest Service management decisions regarding energy development, lands and realty actions, grazing, recreation, and forestry can result in potential impacts on water resources.

3.15.1 Existing Conditions

Conditions of the Planning Area

The planning area is split into several hydrological units. **Table 3.67** displays the level three hydrological units, or basins, within the planning area and within GRSG habitat. The largest tracts of land within PH in the planning area fall within the White-Yampa basin, followed by the Colorado Headwaters, North Platte, and Upper Green basins.

Table 3.67
Hydrologic Basins in the Planning Area

Level 3 Basin	Acres within the Planning Area	Acres within PH	Acres within ADH
North Platte	1,310,400	384,200	449,700
White- Yampa	6,180,400	1,432,100	2,741,200
Upper Green	506,400	129,900	367,300
South Platte	178,100	0	0
Lower Green	49,000	10,100	14,600
Colorado Headwaters	6,213,100	410,100	575,700
Upper Arkansas	1,700	0	0
Gunnison	384,900	0	0
Upper Colorado – Dolores	501,000	0	0

Freshwater is scarce and therefore extremely valuable in semi-arid western Colorado. Surface water is the primary source of fresh water in the planning area. The major sources of surface water in the planning area are the Colorado River and its tributaries, the North Platte River, Laramie River, Yampa River, Little Snake River, Green River, and White River. About 862 miles of rivers exist in the planning area, of which 177 miles fall within GRSG habitat. The rivers within GRSG habitat in the planning area are the White, Colorado, North Platte, Yampa, and Green Rivers, as well as a small portion of Plateau Creek. **Table 3.68** displays the rivers within the planning area for which some portion falls within GRSG habitat.

Smaller watercourses in the planning area include streams that can be ephemeral, intermittent, or perennial. About 8,705 miles of streams exist in designated GRSG habitat within the planning area.

Table 3.68
Rivers in GRSG Habitat within the Planning Area

River Name	Miles within Planning Area	Miles within PH	Miles within ADH
White River	94	0	31
Colorado River	259	22	33
Plateau Creek	23	0	2
North Platte River	35	26	27
Yampa River	147	29	70
Green River	32	0	15

Lakes, wetlands, ponds, and reservoirs are also important sources of water within the planning area. Lakes can be permanent or temporary. Wetlands and floodplains vary in extent and depth throughout the year. Permanent waters can also be in the form of ponds and reservoirs developed for human or livestock consumption.

Conditions on BLM-Administered Lands

Surface Water Sources

Due to the semi-arid nature of BLM-administered lands within the planning area, surface waters are extremely valuable. There are 3,169 miles of streams and 31 miles of rivers in GRSG habitat on BLM-administered lands within the planning area. Of these miles, 1,613 miles of stream and 13 miles of rivers fall within PH. Surface water flow volumes differ greatly throughout the year and across the planning area. Flows in unregulated rivers and streams have large seasonal variations, with the largest flows generally occurring during spring or early summer as a result of snowmelt and after intense summer and fall thunderstorms. Snowmelt in spring and summer rainstorms provide the major source of runoff for perennial streams, with groundwater inflow along gaining stream segments being a contributor during the remainder of the year. Interrupted and intermittent streams in the planning area are common. Some streams have significant flows in the alluvial aquifer with only limited surface expression. Although these watersheds are large with high water yields, surface expression of the creeks is limited to high stormwater runoff or to areas where permeability of the alluvium is reduced and water is forced to the surface. Perennial streams contain some water all year for an average water year. Most of the streams on BLM-administered land in the decision area are intermittent and flow from March to July. However, streams can still contain water during other months due to stored water being fed to the streams from shallow groundwater sources or floodplains.

Ephemeral streams do not flow during an average water year, but do flow in response to large precipitation events. Large ephemeral stream segments in the planning area generally have their headwaters at lower elevations (i.e., below 8,000 feet) and do not have gaining reaches from groundwater sources.

Frequently these ephemeral drainages occur as steep and relatively straight channels that are actively incising across upper reaches. Many of these systems are tributaries to intermittent and perennial streams. Intermittent streams flow during spring runoff for an average water year but dry up later in the summer.

Riparian areas are ecosystems that exist along rivers, streams, or waterbodies. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Typical riparian areas are lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers, streams, and shores of lakes and reservoirs with stable water levels. Excluded are such sites as ephemeral streams or washes that do not exhibit vegetation dependent on free water in the soil. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and which, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, lakeshores, sloughs, bogs, wet meadows, estuaries, and riparian areas. A description of current conditions in riparian and wetland areas within the planning area can be found in **Section 3.5, Vegetation**. Healthy surface water sources, such as ponds, lakes, and wetlands, provide habitat for insects and animals that are predators of mosquitos. Areas that both have standing water and do not support predators of mosquitos can be areas where mosquito populations increase.

Water developments can be important sources of surface water for wildlife. Water developments can function for multiple uses. They provide additional and alternative sources of water for wildlife and livestock and can decrease use of riparian areas. Within the planning area, most of the water developments are intended for livestock, followed by water developments intended for agriculture. However, wildlife will often take advantage of available water developments.

Surface water availability can be impacted on BLM-administered lands in the planning area by a number of factors occurring on or upstream of BLM lands. These include industrial uses such as oil and gas, agriculture, and large-scale diversions, as well as naturally occurring climactic variations.

Surface Water Quality

Water quality typically varies as a function of flow conditions and can be impacted by water uses (e.g., agriculture, oil and gas development, and surface disturbance), vegetation, groundwater interaction, and pollutants discharged into water bodies from point and non-point sources. The quality of runoff in ephemeral and intermittent stream channels is largely dependent upon the amount of salts, sediments, trace elements, and organic materials that accumulate in dry stream channels between flow periods. Periodic flushing of accumulated salts, trace elements, and sediments occurs during peak flow events, which often represent the only time that water quality samples can be collected. Factors that could govern the accumulation of salt, trace elements,

and sediments include physical properties of the watershed (e.g., topography, geology, and climate), land use in the watershed, and seasonal fluctuations in temperature and precipitation.

Water quality classifications in the planning area are established by the Colorado Department of Public Health and Environment, Water Quality Control Division to maintain and improve the quality of Colorado's surface waters. These classifications are based on current conditions and the beneficial uses of each particular river or stream (e.g. agriculture, aquatic life, and recreation). Classifications result in basic numerical and site-specific narrative standards that define the chemical, biological, and physical qualities of waters needed. Aquatic life beneficial uses can be for warm or cold water and are based on the abundance of species present. Recreation beneficial use is protected based on human health and current and expected recreational uses of surface waters. Agriculture beneficial use is protective for irrigating crops and livestock watering. Domestic water supply beneficial uses are for any surface waters that are suitable or intended to become suitable for potable water supplies. Surface water quality standards are reviewed and revised every 2 years by the Colorado Department of Public Health and Environment, Water Quality Control Division, the most recent of which occurred in 2012. Since then, CDPHE has updated the list of surface water quality standards and stream segments that are impaired or in need of additional monitoring for waters within BLM-administered lands. This list is called the Section 303(d) List of Water-Quality-limited Segments Requiring Total Maximum Daily Loads or the Monitoring and Evaluation List.

There are 1,196 miles of segments on BLM-administered lands within the planning area on the Section 303(d) list, of which 51 miles fall within identified GRSG habitat, and 14 miles fall within PH. For the segments within identified GRSG habitat, the most common impairments cited are for sediment, selenium, and iron (BLM 2010; BLM 2012).

Ground Water

The Safe Drinking Water Act presumes that aquifers are underground sources of drinking water, unless they are specifically exempted or if they have been shown to fall outside the definition of are underground source of drinking water. The geology of an area determines the occurrence, movement, and chemical characteristics of groundwater. Groundwater quality and chemistry depends on the lithology and mineral composition of the aquifer and any upgradient formations that the groundwater flowed through. Aquifer properties such as hydraulic conductivity and primary and secondary porosity also influence water quality based on the residence time of the groundwater in the subsurface. In the planning area, much of the surficial geology consists of consolidated sedimentary formations with water-bearing properties that are largely dependent on secondary porosity from faults, fractures, and joints. The mineral content of several of the sedimentary formations underlying the range-wide planning area includes relatively high amounts of soluble minerals and salts.

These soluble zones include sodium bicarbonate (nahcolite) and sodium chloride (halite) deposited in lacustrine mudstones. Groundwater recharge primarily occurs at higher elevations where precipitation exceeds evapotranspiration. This excess precipitation remains at the surface as overland flow, or recharges groundwater systems.

Groundwater near the land surface is available for plants and can contribute to the alluvium of stream systems. Alluvial aquifers are present along the larger perennial, intermittent, and interrupted flow segments and are generally composed of coarse sand and gravel deposits alternating with layers of clay, silt, and sand (Van Liew and Gesink 1985). The alluvial aquifers also serves as either a recharge or discharge zone for underlying bedrock aquifers. Groundwater discharge occurs as a result of permeability changes at or near the ground surface (geologic contacts between formations or rock units) or from the surface expression of faults, fractures, or joints in underlying bedrock aquifers. These discharge areas are often manifested as groundwater springs or gaining stream segments.

Surface expression of groundwater occurs naturally through springs that originate from confined bedrock aquifers and unconfined alluvial aquifers. Springs from confined aquifers typically arise from relatively deep groundwater that follows fractures, old well bores, faults, or joints to the surface. Variations in permeability across alluvial aquifers in the Piceance Creek Basin could be responsible for the groundwater-dominated hydrographs of Piceance and Yellow Creeks. In the planning area, perched groundwater zones occur locally within the Uinta Formation and other formations. These perched groundwater zones manifest themselves as springs and seeps above the valley floors in outcrop areas (Weeks and Welder 1974; Cole et al. 1995).

Conditions on National Forest System Lands

Water, riparian, and wetland existing conditions vary by the different geographic areas that contain GRSG habitat. **Table 3.69** lists information for perennial and intermittent streams on National Forest System lands in the range-wide planning area, and **Table 3.70** lists information for ponds and lakes on National Forest System lands in the range-wide planning area.

Table 3.69
Streams on National Forest System Lands

Stream Name: Intermittent or Perennial	Miles		
	GH	PH	Total
Perennial Streams	25.2	0.4	25.6
Intermittent Stream	37.9	2.6	40.5
Ditches	4.4	0	4.4

Source: Data from GIS, from the National Hydrography Dataset, high resolution flow lines, with attribute adjustments to correct ditch/stream errors done by the Medicine Bow - Routt National Forests, 2013

Table 3.70
Freshwater Ponds and Lacustrine on National Forest System Lands

Water Body Name	Acres		
	GH	PH	Total
Perennial Lake/Pond	7.2	4.0	11.2
Intermittent lake/pond	0.7	0	0.7
Reservoir	0	0	0
Swamp/Marsh	1.0	0	1.0

Source: Data from GIS, from the National Hydrography Dataset, high resolution waterbodies, 2013

Streams on National Forest System lands typically peak in the spring in response to snowmelt, and slowly decline to base flow in late July or August. Summer thunderstorms can result in short-term increases in stream flow during the summer months. While perennial streams generally flow year-round, the intermittent streams frequently run dry following spring peak flows. Ditches in the analysis area typically divert water for irrigation. Ditches can significantly affect stream flows by diverting most or all of the water out of a perennial or intermittent stream. Occasionally ditches can augment stream flows by delivering water diverted out of one stream into another stream. Ditches used for irrigation typically start diverting in the spring, may stop diverting during haying operations, and then may begin diverting again in the fall depending on the agricultural practices of the water user.

Lakes and ponds on the Forest Service lands may reflect stock water developments, large beaver complexes, or naturally occurring lakes and ponds. Perennial lakes and ponds rarely go dry while intermittent lakes and ponds fill up in response to snowmelt and then typically go dry with the progression of summer. All of these features are used by wildlife and livestock for watering, and may provide some aquatic habitat.

Surface water quality standards are reviewed and revised every 2 years by the Colorado Department of Public Health and Environment, Water Quality Control Division, the most recent of which occurred in 2012. The list of water quality standards and stream segments was updated in 2012. No impaired streams are present on National Forest System lands within GRSG habitat.

The fact that no streams are listed as impaired by the State of Colorado in GRSG habitat indicates that all streams and water bodies are currently meeting State Water Quality Standards, and that there are no known water quality impacts.

Each general geographic location of National Forest System lands is discussed in further detail below.

California Park and Slater Park Area. Water resources in the analysis area reflect 1) natural geologic processes of the area (soils and geology), 2) the effects of beaver, and 3) past and present management impacts. Bedrock geology consists

primarily of volcanic dikes and outcroppings that form the ridgetops and high points. These high points overlay sedimentary layers comprised primarily of interbedded shales and sandstones. Due to the nature of the shales and sandstones, mass movement is visible throughout the park, frequently referred to as 'mobile real estate.' The mobile real estate often impinges on stream channels delivering large quantities of sediment to the stream system, and causing continuous adjustment of the channels. Adjustments include lateral migration and erosion of slump blocks that impinge on the channel. Similar to the effects of mass movement, beaver dams can also cause lateral channel migration, downcutting through sediments deposited in old beaver dams, and affect riparian condition by reducing the shrub component. Beavers can also benefit streams by creating ponds that slow down stream velocities and bank erosion, provide fish habitat, and banks that promote riparian vegetation growth. The effects of past and present beaver activity can be seen throughout the stream system.

As a result of the shale and sandstone bedrock geology, many of the stream banks are composed of clay soils with little rock content. The lack of rock fragments means that the stream banks are highly dependent on riparian vegetation to stabilize the stream banks and make them resistant to erosion during high flows. Stream banks in much of California Park, particularly in lower First Creek and lower Elkhead Creek, are highly dependent on riparian vegetation to maintain stream bank stability.

It is believed that historical grazing practices and vegetative treatments, including spraying, have significantly affected the upland vegetation, increased bare soil, and resulted in increased surface runoff and channel instability. Stream channels develop the width, depth, and gradient necessary to transport the water and sediment supplied by the watershed. Altering the natural hydrologic regime through increased water yield can cause channel instability.

There is evidence of historic downcutting throughout the entire stream system in the California Park area. The volcanic dike on Elkhead Creek downstream of the confluence with First Creek is acting as a nickpoint that has prevented further downcutting. The downcutting has worked its way upstream through the stream system, and signs of active downcutting can be seen in many of the headwater tributaries and streams higher in the watershed. Downcutting has resulted in lowering of the water table and loss of stream access to floodplains (entrenchment) in many locations, particularly lower First and Elkhead creeks. This in turn has caused a shift in channel type and initiation of a new pattern of channel evolution. As a result of the natural processes coupled with historic impacts, several of the perennial and intermittent stream segments within GRSG habitat were rated functional at risk (BLM 1993). Management plans have been developed to address current management actions and improve riparian and stream conditions. A stream restoration plan has been developed to address all

of California Park; implementation began in 2012 and is expected to continue in 2013 and beyond.

South Hunt/Watson Creek Area. Water resources in this area are limited to steep headwater stream channels with narrow floodplains and riparian areas. The greatest impacts on available water resources come from ditch diversions, which can reduce stream flow available to support aquatic life and riparian plant communities. In general, the water resources in these areas are considered to be in good condition.

Western Gore Pass area including Long Park. Water resources in this area are generally confined to steep gradient streams with little to no floodplains, and bordered by narrow riparian areas. Due to the steep topography, management impacts are minimal, and water resources are generally in good condition. One isolated tributary segment to Crowner Creek was rated functional at risk (BLM, 1993) due to poor riparian vegetation and vigor, and vertical instability.

Lake Agnes Area. Water resources in this area are limited to steep headwater stream channels with narrow floodplains and riparian areas. The greatest impacts on available water resources come from ditch diversions which can reduce stream flow available to support aquatic life and riparian plant communities. In general, the water resources in these areas are considered to be in good condition.

Pete Gulch, West Carter Creek, and Diamond Creek Areas. Water resources in this area are generally confined to steep gradient streams with little to no floodplains and bordered by narrow riparian areas. Due to the steep topography, management impacts are minimal, and water resources are in good condition.

Lower Camp Creek Area. A portion of this habitat borders the North Platte River. The greatest impact on water resources in this area comes from recreation including white water boating and fishing, and upstream water diversions which can limit water availability for water resources. While some management impacts may exist, the overall existing condition for water resources is considered to be good with only isolated areas of concern.

3.15.2 Trends

Trends on BLM-Administered Lands

Activities associated with recreation, energy development, and grazing result in the greatest impact on water supply and quality within GRSG habitat, thereby affecting trends of water resources.

Within GRSG habitat, recreation activities have resulted in surface disturbance that require mitigation to prevent water resource damage. Types of damage include erosion, sediment production and gully creation, and riparian and terrestrial vegetation destruction. OHV activity has increased significantly in

more easily accessible wildland urban interface boundaries as well as more remote areas, due in part to population growth. Expansion of the wildland urban interface is anticipated to have long-term impacts on surface water quality and flow.

The BLM primarily monitors riparian and wetland conditions and does limited chemical analyses. The overall conditions of riparian areas and wetlands within the decision area are improving primarily due to more intensive range management techniques. In the past, heavy use of small riparian segments or wetlands for grazing occurred. In order to help meet the Public Land Health Standards related to riparian areas and wetlands, grazing plans, upland improvements, and allowable uses are being developed based upon the unique qualities and needs of these areas. In the more recent drought years, many riparian areas and wetlands actually continued to improve as permittees opted not to use their allotments or shortened their grazing season. Some riparian areas, however, were grazed heavier as upland water developments dried up and livestock stayed along streams and rivers.

Irrigation rights are expected to continue to be bought and sold, with some new property owners informally changing how rights are being used. Due to the continued population growth and land sales, more agricultural water rights may be converted to municipal and industrial uses. These changes may greatly impact the hydrology of streams, riparian areas and wetlands on BLM-administered lands. There are several acres of public wetlands that are supported or created by private irrigation practices.

Oil and gas development is also expected to have impacts on ground and surface water resources (BLM 2012). The BLM will continually strive to protect and improve water quality, and to reduce non-point source pollution. Phase II of the Stormwater Regulations requires more permitted actions on BLM-administered lands to develop erosion control plans and to reduce non-point source pollution resulting from ground disturbances. Federal lands are among the most manageable in terms of potential improvement because they must be managed in accordance with all applicable laws, rules, regulations, policies, standards, and guidelines. However, BLM-administered lands are often a small percentage of a watershed. Improving stream segments with limited public ownership, and mostly private water rights, would be more difficult. Section 303(d) of the CWA requires that states, Native American tribes, and federal agencies establish priority rankings for waters on the lists of impaired waters, and develop total maximum daily loads for these waters. Currently, none of the listed streams within the planning area have TMDLs that involve the BLM.

Trends on National Forest System Lands

In general, water resources are considered to be in good condition across the Routt National Forest. The area of greatest concern with GRS habitat is in the California Park and Slater Park areas because portions of these watersheds

show an upward trend, while other portions show a static or downward trend. A conceptual watershed restoration plan has been developed for the California Park area and implementation began on along Armstrong Creek in 2012 and will continue in 2013-2014 (Bidelspach 2011). Other portions of the Forest with GRS habitat are considered to be at or near the desired condition. Where concerns exist such as the tributary to Crowner Creek, management plans have been developed to reduce current management impacts and improve riparian and stream condition.

3.15.3 References

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3.16 SOIL RESOURCES

The BLM and Forest Service land management and resource use decisions influence long-term soil health, stability, and productivity. Many management activities and resources uses depend on suitable soils for the type, location, and

use level of that resource, including livestock grazing, mineral activities, fire management, road and travel management (including OHV use), recreation, wildlife habitat, riparian habitat, special status species, fisheries, water quality, and forestry. Consequently, soil attributes and conditions are important to BLM and Forest Service management decisions.

Soils are defined by the interaction of the processes that form them, including parent material (geology), climate, topography, biologic organisms, and time. Of these, soil surveys indicate that climate and topography have the primary influences on soil formation (US Department of Agriculture, Natural Resources Conservation Service 2000). Climate largely influences soil development processes including the rate of rock weathering, decomposition of plant materials, accumulation of organic matter, and nutrient cycling. Climate also has a strong influence on soil moisture and temperature, which in turn affects the rates of addition, removal, translocation, and transformation of material within the soil. Topography influences site conditions, such as precipitation amounts and effectiveness, drainage, runoff, erosion potential, and temperature.

Soils are classified by their degree of development into distinct layers and their dominant physical and chemical properties. These characteristics are used to group soils into 1 of 12 orders which are based on defining soil properties, such as organic matter, dominant sediment particle (silt, sand, or clay), amount of mineral material present, water and temperature regimes, and unique properties such as salt content or volcanic ash layers. These soil characteristics, in combination with climate, determine whether sagebrush can exist in a given location, and what which variety of sagebrush communities are able to thrive. Since the presence of GRSG is heavily dependent upon the presence of sagebrush, and sagebrush type and viability are dependent on soil type and quality, soils are an important element in GRSG habitat.

3.16.1 Existing Conditions

Conditions of the Planning Area

Soil productivity within the planning area varies widely due to the diversity of soils and site characteristics, including varying climatic, vegetative, topographic, and geologic conditions. The range-wide planning area is divided primarily by two ecoregions in which soils can be generally characterized: the Southern Rockies to the east and the Colorado Plateau to the west. In addition, portions of the Wyoming Basin ecoregion lie in the north, along the Wyoming/Colorado border. In these ecoregions the dominant soil orders are mollisols, alfisols, inceptisols, and entisols (US Department of Agriculture, Natural Resources Conservation Service 2009).

The planning area is characterized by high elevations and rugged mountains (Chapman et al. 2006). Due to low soil temperatures, the chemical reactions that release plant nutrients from minerals take place slowly. The rate of biologic

activity is also limited by temperature, resulting in a slow rate of biologic decomposition, seed germination, and root growth. These factors combine to give the soils low fertility. However, in specific areas, particularly in valley bottoms, soils can have a dark, thick, fertile surface that supports a variety of vegetation.

The soils in the planning area vary from calcareous to alkaline and surface texture ranges from strongly alkaline loams, sandy loams, loams, to clay loams underlain by sandy loam to clay textures, and rock outcrop complexes. Precipitation varies greatly with elevation and aspect (Western Region Climate Center 2008). Permeability ranges from very slow to moderately rapid, and erosion hazard for most soils is moderate, with some ranked as severe. Some of these soils are highly saline. The depth of the soils range from 0 to 60 inches depending on slope and aspect. Some soils have a very high runoff potential and erosion hazard rating.

Many of the soils in the Colorado Plateau ecoregion have developed from alluvium that was deposited over time as the Colorado, Dolores, and Gunnison Rivers and their tributaries eroded through the surrounding mountain ranges. The mountain ranges contained various lithologies, including sandstones, siltstones, and marlstones associated with the Uinta Formation and the Green River Formation, and the claystones, shale, and sandstones associated with the lower part of the Green River Formation, the Mesaverde Group, the Wasatch Formation, the Fort Union Formation, and the Mancos Shale (BLM 2007a). Soils derived from Mancos Shale or from other saline sedimentary formations tend to be high in salts and trace elements like selenium. Due to the salt content in these soils, vegetative cover can be sparse, resulting in soil particles not being anchored in place; thus, the soil is easily eroded by wind and water (BLM 2007a).

The most productive soils in the planning area are those in valley bottoms and at higher elevations. The valley bottoms receive additional moisture because they concentrate run-off from adjacent uplands, and because water will percolate laterally into the subsoil from stream channels. Most valley bottoms support grass hay production. Areas at higher elevations receive a greater amount of precipitation during the growing season (BLM 1984b). Soils that feature shallow claypans, hardpans, or salts pose substantial constraints to land use and management.

Biological Soil Crusts

Biological soil crusts (also known as cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts) are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. These biological crusts cover open spaces between vascular plants on relatively barren soils, and are found where vascular plant cover is sparse. Crust cover is generally greatest at lower elevation sites in semiarid areas (Belnap et al. 2001). The vertical and horizontal

vascular plant structure of many semi-arid vegetation communities optimizes growth of biological soil crusts. Vascular plants create windbreaks and shade, influencing how much moisture and light reach the soil surface. They also trap leaf litter, keeping the interspaces free of substantial or persistent litter cover. Biological crusts in many regions are best developed in interspaces between shrubs. Invasive exotic plants generally decrease the biological crust cover in most ecosystems (Belnap et al. 2001). Stable or embedded rocks at or near the soil surface can increase soil crust cover by perching water and armoring the surface from physical disturbances. Biological soil crusts have not been mapped in the range-wide planning area. In general, more stable, fine-textured soils (such as silty loams) support greater crustal cover than less stable, coarse-textured soils (Belnap et al. 2001). North and east slopes generally favor crustal development.

Biological crusts are well adapted to severe growing conditions; however, they are extremely susceptible to physical disturbances, domestic livestock grazing, and recreational activities (such as hiking, biking, and off-road driving). Fire can also damage the crust. Low-intensity fires, however, do not remove all of the crust structure, which allows for regrowth without significant soil loss. Shrub presence (particularly sagebrush) may increase fire intensity, thereby decreasing the likelihood of early vegetative or crust recovery after a burn (BLM 2009). Within the range-wide planning area, there are many areas where historic rangeland vegetation treatments (taking place around the 1950s) included ripping or plowing the soils, breaking apart the biological crusts. These crusts will remain broken during the life of the Approved Plan, regardless of current land conditions.

Disturbance of biological crusts results in decreased soil organism diversity, nutrients, stability, and organic matter. Trampling of the biological soil crust may reduce the number of crust organisms found on the surface and increase run-off and the rate of soil loss without apparent damage to vegetation. Burial of crusts by sediments kills non-mobile photosynthetic components (mosses, lichens, and green algae) of the crust.

Soil Erosion

Soil erosion is a concern throughout the western US, especially in semi-arid rangelands. The potential for soil erosion increases with increasing slope. The quantity of soil lost by water or wind erosion is influenced by climate, topography, soil properties, vegetative cover, and land use. While erosion occurs under natural conditions, rates of soil loss may be accelerated if human activities are not carefully managed (BLM 2007b). Recreational trails can quickly turn into widely braided ruts, especially in wetlands and at stream bank crossings. The resulting gully erosion can rapidly erode substantial quantities of previously stable soils (BLM 2007b).

It is possible to control rates of soil erosion by managing vegetation, plant residues, and soil disturbance. Vegetative cover is the most significant factor in controlling erosion because it intercepts precipitation, reduces rainfall impact,

restricts overland flow, and improves infiltration. Biological soil crusts are especially important for protecting the soil and controlling erosion in desert regions; however, they are easily disturbed by grazing and human activities.

Natural Resources Conservation Service soil map unit descriptions rate soils in the planning area according to their susceptibility to water and wind erosion. Wind erosion is particularly a hazard when surface litter and vegetation are removed by fire or other disturbances. Soils are considered fragile or of high erosion hazards if they contain the following characteristics:

- Soils rated as highly or severely erodible by wind or water, as described in soil survey reports
- Landslide Areas, as identified in soil survey reports
- Soils on slopes greater than 35 percent

Soil Compaction

Soil compaction is a complex process that depends upon the nature of the loading and moisture content of the soil, as well as on characteristics such as particle size, organic matter content, structure, and percent of coarse fragments. Soil compaction occurs in response to pressure exerted by machinery or animals. The risk for soil compaction is greatest when soils are wet. Compacted soil allows less water to infiltrate, resulting in greater overland flow of water for longer periods of time. The overland flow has greater energy to detach and transport soil particles, resulting in increased soil erosion.

Conditions on BLM-Administered Lands

Soil and soil condition of BLM-administered lands containing GRSG GH vary widely. A characterization of the major soil types found within GRSG habitat includes rock outcrops, very steep mountains, mesa breaks, and alluvial fans ranging down to mesas, terraces and benches, and a combination of clay and sandy loams, including clay loams, loamy sands, stony loams, and sandy loams. Erosion hazards of these soils range from moderate to severe and some soils are considered fragile.

Restrictions are imposed on other activities or uses of the BLM-administered lands within the planning area to improve soil conditions. These include ensuring rapid revegetation of disturbed areas, limiting vegetation manipulations or treatments in sensitive watersheds to spraying, aerial seeding, or designed grazing systems. Also, in order to protect sensitive watersheds, restrictions include limiting surface-disturbing activities from sensitive watersheds where they were contributing to, or had the potential for contributing to, water quality degradation, providing buffer strips between streams and surface-disturbing activities (such as mining, road building, and clear-cutting), and controlling OHV use in sensitive watersheds. General restrictions include reducing erosion or run-off on disturbed sites, placing timing restrictions on surface-disturbing

activities in order to avoid spring thaw and run-off seasons, and constructing snow management structures for watershed improvement.

Farmlands exist on GRSG habitat on private lands within the planning area. Many of these farmlands are irrigated hayfields and pastures. Of these farmlands in GRSG habitat, the majority are in Routt, Jackson, Grand, Rio Blanco, and Moffat Counties. Some of these private agricultural lands could have BLM-administered mineral resources. These split-estate areas (private surface but public minerals) are very rare and typically include small portions of irrigated pastures.

Conditions on National Forest System Lands

The major soil types on National Forest System lands in the planning area consist of shallow (10 to 20 inches) to very deep (greater than 60 inches), well drained soils. Many soils have formed in alluvium from fine grained sandstones, shales, and some basalts. Some soils formed in thin, noncalcareous, very gravelly or channery materials weathered residually from granite, sandstone, gneiss, or in places from tuff. The soil locations include plateaus, hills, mountain slopes, eroded side slopes and foot slopes. Some soils have varying amounts of rock fragments. Surface textures vary but are predominately loam and sandy clay loam with some very gravelly sandy loams with varying amounts of rock fragments. Subsurface textures vary as well and include sandy clay loams and clay loams.

In some locations, the soils have a dark thick surface soil supporting mainly big sagebrush, serviceberry, mountain snowberry, elk sedge, Gambel's oak, and aspen. Other vegetation consists of mountain brome, wheatgrass, western wheatgrass, Idaho fescue, Arizona fescue, mountain muhly, fringed sagebrush, slimstem muhly, blue grama, pine dropseed, sagebrush, junegrass, needle and thread, and bluegrass. These soils are generally used for livestock and wildlife grazing, with the Lower Camp Creek area being used for native pastureland. These soils are found in both PH and GH.

Detrimental soil disturbance usually occurs where cattle congregate, in locations of water development, and salting areas. There are several water developments in this area. However, overall detrimental soil disturbance is within the threshold set by the soil quality standards. Ground cover is sufficient to control accelerated erosion. Soil quality and productivity are being maintained.

Riparian area soils vary, but are generally very deep, somewhat poorly drained, and formed in alluvium from igneous and sedimentary rocks. Surface textures also vary, but are predominantly loam and sandy loam. Subsurface textures are sandy loam to clay loam. In some locations, riparian area soils are hydric. In general, riparian areas support planeleaf willow and water sedge on drier soil types and water sedge and beaked sedge on the wetter soil types. Other plants in these communities include rush, elk slip marsh marigold, bluejoint reedgrass, tufted hairgrass, elephant head, and cinquefoil.

Detrimental soil disturbance within the riparian areas is within the threshold set by the soil quality standards. Ground cover is sufficient to control accelerated erosion. Soil quality and productivity are being maintained.

3.16.2 Trends

Soil quality and quantity has degraded over time due to compaction and disturbance related to livestock grazing and mineral development. Implementation of the BLM's Standards for Rangeland Health Guidelines has reduced the potential for soil erosion in overgrazed areas and requirements for commercial operations to reclaim and restore damaged soils have slowed or reversed soil degradation (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado). Additionally, vegetation ground cover has been reduced due to invasive species, which increases soils susceptibility to wind and water erosion. Some invasive species also add salt or other elements that change the soil chemistry and affect the site potential.

The overall objective for management for soil resources is to maintain or improve the ability of the soil to support vegetation and allow water and nutrients to be cycled by either macro- or microorganisms, all of which promote and improve the health of the land. Degradation by excessive grazing, erosion, or land developments will cause a reduction in soil function, as one or perhaps many of the soil properties are changed, thereby affecting the functions necessary for healthy soil. In general, soils are being managed to meet or exceed Colorado land health standard #1 which states that soils must exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes of the area, and that adequate soil infiltration and permeability allow for the accumulation of soil moisture necessary for optimal plant growth and vigor and minimize surface runoff (see **Appendix K**, BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado).

On National Forest System lands, active management has been implemented in GH in the California Park and Slater Park areas to improve soil conditions and reduce bare ground by implementing sub-soiling actions to alleviate soil compaction and restoration planting to increase ground cover. This has resulted in improving soil conditions in the restoration area.

3.16.3 References

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3.17 AIR QUALITY

This section describes air quality conditions in the planning area. Air pollutants addressed in this assessment include criteria pollutants, hazardous air pollutants, and compounds that could cause visibility impairment or contribute to atmospheric deposition.

Clean, breathable air, expansive vistas, and minimal acidification of the lands, streams, and lakes are significant goals pursued by the BLM and Forest Service. The Clean Air Act and FLPMA require the BLM, Forest Service, and other federal agencies to comply with local, state, Native American tribal, and other federal agency air quality standards and regulations. The FLPMA further directs the Secretary of the Interior (BLM) to take any action necessary to prevent

unnecessary or undue degradation of the lands (Section 302 (b)), and to manage the public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values” (Section 102 (a)(8)).

Air resource management is accomplished by establishing desired outcomes (goals and objectives) and allowable uses (management actions) in BLM RMPs that, at a minimum, must ensure authorized activities are in compliance with regulatory standards. The BLM, within the scope of its authority to do so, may also go beyond simple regulatory requirements in order to prevent unnecessary or undue degradation of the public lands and their associated resources. For example, an objective for reducing atmospheric pollution might include requiring advance designed engines as COAs in a BLM permit. The Routt National Forest Plan contains similar direction (Forest Service 1997, p. 1-4).

3.17.1 Existing Conditions

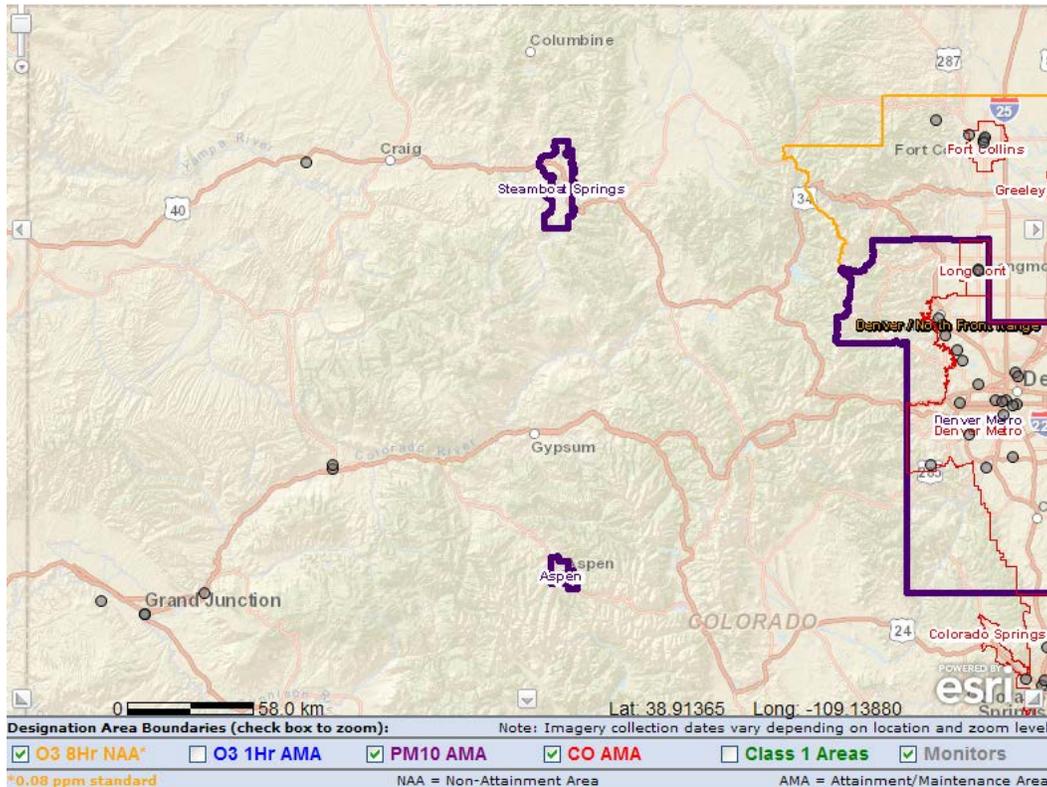
Conditions of the Planning Area

With respect to the National Ambient Air Quality Standards, the US EPA classifies all locations in the US as attainment (including unclassified), nonattainment, or maintenance areas. These classifications are determined by comparing actual monitored air pollutant concentrations to their applicable federal standards. **Diagram 3-8** shows all the nonattainment areas adjacent to or within close proximity of the planning area. Note that a very small portion of the North Front Range 8-hour ozone nonattainment area lies within the planning area boundaries.

Air Quality Monitoring

The majority of the planning area is contained within the Western and Mountain Counties monitoring districts maintained by the Colorado Department of Public Health and Environment, Water Quality Control Division. The 2010 annual monitoring data report describes the Mountain Counties as those that are generally located on or near the Continental Divide. They consist of mostly small towns located in tight mountain valleys. Currently, there are six particulate matter less than 10 microns in diameter (PM₁₀) monitoring sites operated by the air pollution control district in the Mountain Counties region. There is one ozone monitor (operated by the city of Aspen, Colorado) in the region. The report describes the western counties as generally smaller towns, usually located in fairly broad river valleys. Grand Junction is the only large city in the area, and the only location that monitors for carbon monoxide and air toxics on the western slope. In 2008, Rifle, Palisade, and Cortez began monitoring for ozone. The BLM also maintains two ozone monitors within the region at Rangely and Meeker. There are one carbon monoxide, five ozone, eight PM₁₀, and one particulate matter less than 2.5 microns in diameter (PM_{2.5}) active monitoring sites within the planning area. The National Park Service and

Diagram 3-8
Nonattainment Areas and Monitoring Locations Within or Near the Planning Area



Source: Colorado Department of Public Health and Environment, Water Quality Control Division, 2012

Forest Service also maintain networks of ozone monitors within or adjacent to the planning area. **Table 3.71** shows the most recent monitoring data available for stations in or around the planning area (excluding National Park Service and Forest Service monitors).

Table 3.71
Air Quality Monitoring Data and National Ambient Air Quality Standard
Percent Comparison

Location	Pollutant (standard) ¹	Concentration				Percent NAAQS ²
		2007	2008	2009	2010	
Grand Junction	CO - 1 hr. (9 ppm)	2.8	7.1	2.3	1.7	18.9
Grand Junction	CO - 8 hr. (35 ppm)	1.8	1.5	2.2	1.1	3.1
Aspen	O ₃ - 8 hr. (75 ppb)				0.063	84.0
Colorado National Monument	O ₃ - 8 hr. (75 ppb)	0.067	0.067	0.064	0.063	84.0
Gothic	O ₃ - 8 hr. (75 ppb)	0.067	0.067	0.067	n/a	89.3
Meeker	O ₃ - 8 hr. (75 ppb)	n/a	n/a	n/a	0.066	88.0
Palisade	O ₃ - 8 hr. (75 ppb)	n/a	0.07	0.064	0.067	89.3
Rifle	O ₃ - 8 hr. (75 ppb)	n/a	0.066	0.062	0.065	86.7
Rangely	O ₃ - 8 hr. (75 ppb)	n/a	n/a	n/a	0.058	77.3

Table 3.71
Air Quality Monitoring Data and National Ambient Air Quality Standard
Percent Comparison

Location	Pollutant (standard) ¹	Concentration				Percent NAAQS ²
		2007	2008	2009	2010	
Rio Blanco County	O ₃ - 8 hr. (75 ppb)	n/a	n/a	n/a	0.072	96.0
Aspen	PM ₁₀ - 24 hr. (150 µg/m ³)	52	53	47.3	44.7	29.8
Clifton	PM ₁₀ - 24 hr. (150 µg/m ³)	62	96	93	98	65.3
Glenwood Springs	PM ₁₀ - 24 hr. (150 µg/m ³)	28	n/a	n/a	n/a	18.7
Grand Junction (Pitkin Avenue)	PM ₁₀ - 24 hr. (150 µg/m ³)	118	120	105	107	71.3
Grand Junction (South Avenue)	PM ₁₀ - 24 hr. (150 µg/m ³)	72	83	77	76	50.7
New Castle	PM ₁₀ - 24 hr. (150 µg/m ³)	50	n/a	n/a	n/a	33.3
Parachute	PM ₁₀ - 24 hr. (150 µg/m ³)	64	88	89	87	58.0
Rifle	PM ₁₀ - 24 hr. (150 µg/m ³)	55	67	68	67	44.7
Silt (County Road 233)	PM ₁₀ - 24 hr. (150 µg/m ³)	27	n/a	n/a	n/a	18.0
Silt (County Road 327)	PM ₁₀ - 24 hr. (150 µg/m ³)	23	n/a	n/a	n/a	15.3
Silt (Owens Drive)	PM ₁₀ - 24 hr. (150 µg/m ³)	27	n/a	n/a	n/a	18.0
Grand Junction (South Avenue)	PM _{2.5} - 24 hr. (35 µg/m ³)	22.7	25	30.6	34.5	98.6
Grand Junction (South Avenue)	PM _{2.5} - Annual (15 µg/m ³)	9.18	9.43	9.44	9.28	61.9

Source: Colorado Air Quality Data Report, Colorado Department of Public Health and Environment 2007, 2008, 2009, 2010

¹ CO = carbon monoxide; O₃ = ozone; ppm = parts per million; µg/m³ = micrograms (one-millionth of a gram) per cubic meter; ppb = parts per billion; PM_{2.5} = particulate matter less than 2.5 microns in diameter; PM₁₀ = particulate matter less than 10 microns in diameter

² Percent National Ambient Air Quality Standard is based on last year of available monitoring data for each site

The limited data available for PM_{2.5} do not provide a reasonable basis for establishing area-wide baseline conditions. Additionally, the available monitoring data do not provide for definitive trending analysis for any of the pollutants. The National Park Service data available for ozone for Class I and sensitive Class II areas within or adjacent to the planning area suggests the ambient air quality in the area is between 86 and 99 percent of the National Ambient Air Quality Standard for ozone. For the majority of the planning area the monitored ozone values provide evidence that ozone is a pollutant of concern.

Air Emissions

The current emissions inventory for the planning area is based on the most recent Colorado Department of Public Health and Environment, Water Quality Control Division, county inventory data (2008). Counties that have a majority of land area contained within the planning area are included and summarized in **Table 3.72**. Although Larimer County has a substantial portion of land area

**Table 3.72
Planning Area Emissions Inventory**

Planning Area County	Pollutants Inventoried by Colorado Department of Public Health and Environment, Water Quality Control Division, (tons per year)						
	CO	Nitrogen Dioxide	SO ₂	Sulfur Dioxide	PM ₁₀	Volatile Organic Compounds	Benzene
Eagle	21,709	3,769		80	4,256	14,948	72
Garfield	35,464	13,546		279	6,338	55,727	267
Grand	9,565	1,695		75	2,429	19,315	39
Jackson	4,527	509		5	608	20,996	16
Mesa	40,688	9,048		2,879	8,050	39,828	161
Moffat	25,876	19,855		4,031	7,401	32,503	153
Pitkin	7,379	882		10	967	11,566	25
Rio Blanco	15,446	4,615		67	5,358	33,647	100
Routt	10,776	8,732		2,582	4,856	26,362	31
Summit	13,132	1,751		21	1,678	11,627	47
Total Emissions	184,562	64,402		10,028	41,942	266,521	911

Source: Colorado Department of Public Health and Environment, Water Quality Control 2008

within the planning area, no emissions are included in the inventory because it is assumed the majority of Larimer County emissions correspond to the major population centers that lie to the east outside of the planning area. These areas include the cities of Fort Collins and Loveland, and would also include those emissions associated with visitors to Rocky Mountain National Park.

Visibility Monitoring

The typical threshold of significance in visibility monitoring or prediction is an increase in the number of days above natural conditions where the 98th percentile value of the haze index is greater than 0.5 deciview (approximately a 5-percent change in light extinction), which is considered to contribute to regional haze visibility impairment. Similarly, where the haze index exceeds 1 deciview (approximately a 10-percent change in light extinction), visibility impairment will occur (Federal Land Managers' Air Quality Related Values Work Group 2010). The visibility data presented in **Table 3.73** are from the IMPROVE network. **Diagram 3-9** provides long-term Standard Visual Range trend data for each area outlined in this table.

Deposition Monitoring

Ecological thresholds for air pollution, such as critical loads for nitrogen and sulfur deposition, are not currently included in the formal regulatory process for emissions controls in the US, although they are now considered in local management decisions by the National Park Service and Forest Service.

Table 3.73
Current Visibility Conditions (5-year average, 2006–2010)

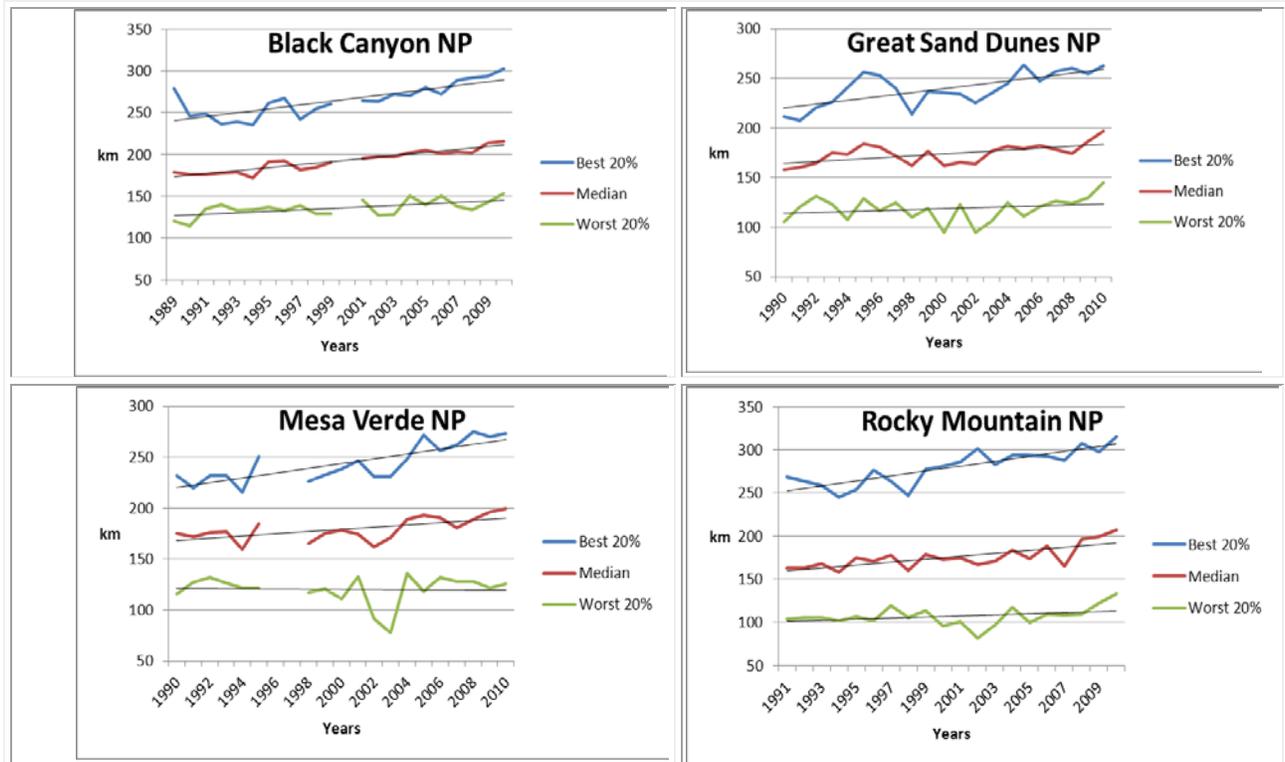
Site Name	Class	State	Monitor Name	20% Clearest Days (deciviews)	20% Haziest Days (deciviews)
Black Canyon of the Gunnison National Park	I	CO	WEMII	2.3	9.9
Great Sand Dunes National Park	I	CO	GRSAI	3.6	10.9
Mesa Verde National Park	I	CO	MEVEI	3.1	11.2
Rocky Mountain National Park	I	CO	ROMOI	1.9	12.0
White River National Forest	I	CO	WHRII	0.3	10.7
Mount Zirkel Wilderness	I	CO	MOZII	0.5	9.4
Arches National Park ¹	I	UT	NA	2.8	10.9
Canyonlands National Park	I	UT	CANYI	2.9	11.0

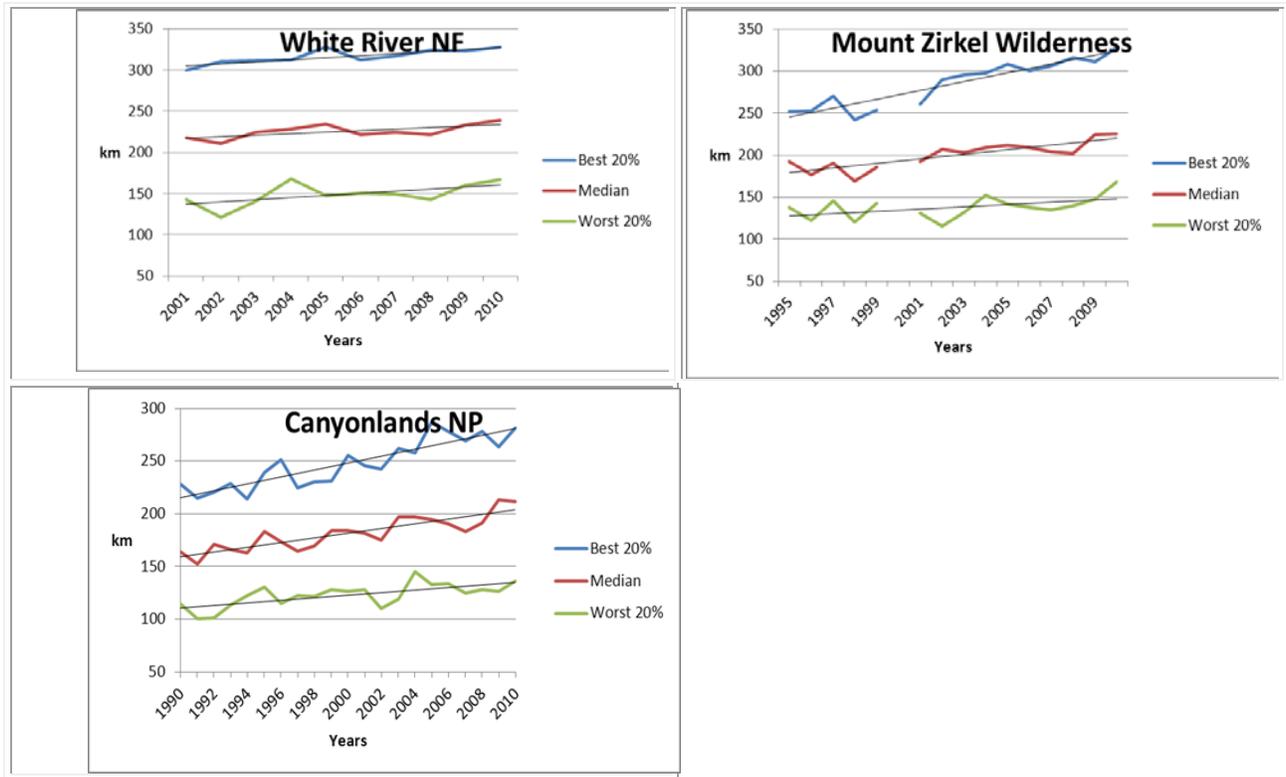
Source: Interagency Monitoring of Protected Visual Environments 2011

Note: With the exception of Arches National Park, all of the data are based on the revised (new) IMPROVE algorithm.

¹ National Park Service 2006–2010 5-Year Average Visibility Estimates

Diagram 3-9
Standard Visual Range Trends for Areas in Table 3.73, Current Visibility Conditions (5-year average, 2006–2010)



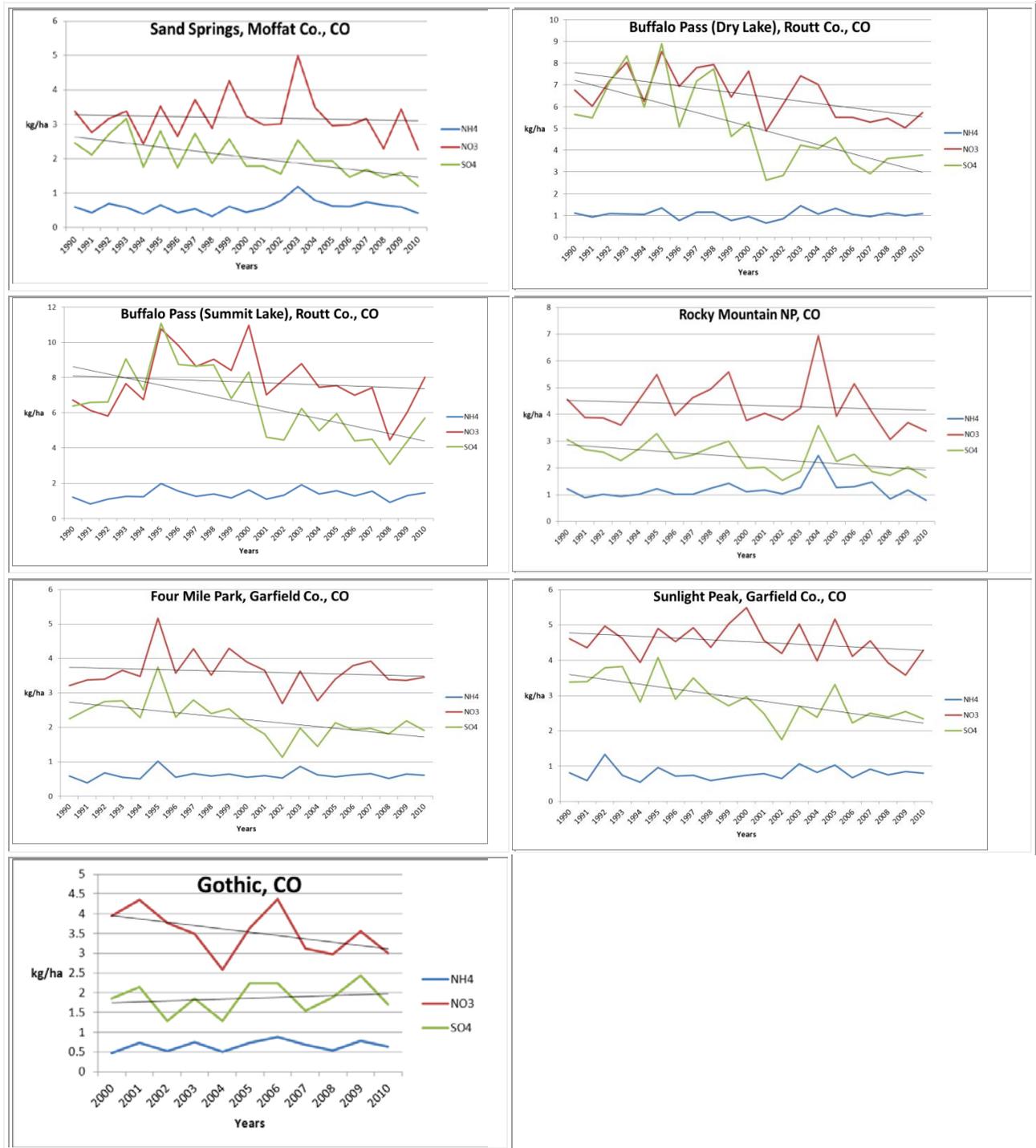


Thresholds for various deposition parameters or critical loads have been established by the National Park Service and Forest Service in several guidance documents (e.g., Federal Land Managers' Air Quality Related Values Work Group 2010)¹. Adverse impact determinations are considered on a case-by-case basis for modeled deposition values that are higher than the threshold. Federal land managers will continue to use scientific data and information, in conjunction with modeling, to evaluate whether or not an adverse impact would occur.

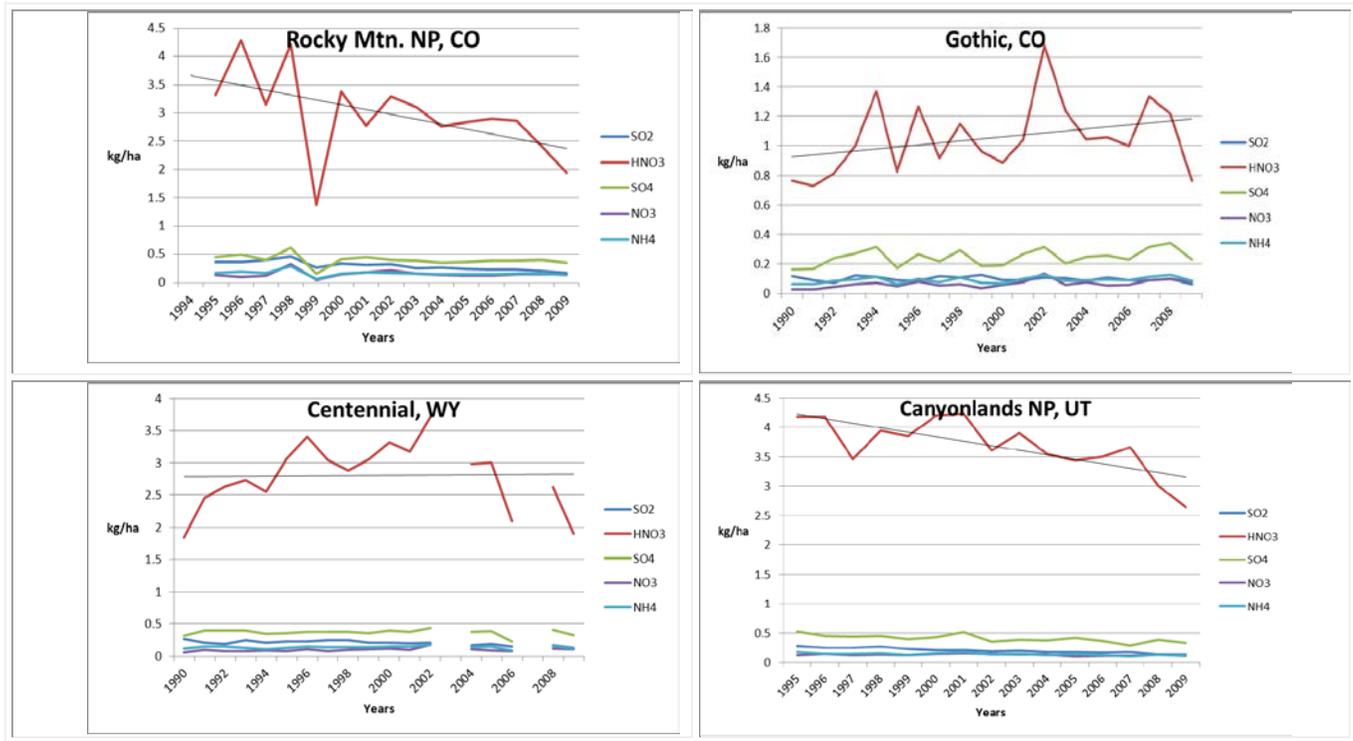
Where specific impact analyses require reference to historical deposition rate data, it is included in **Chapter 4, Environmental Consequences**. **Diagram 3-10** and **Diagram 3-11** show the current trends for wet and dry deposition monitoring within or adjacent to the planning area. Total deposition (the sum of both wet and dry deposition) data are only available at two sites within the region where the deposition monitors are collocated; this is presented in **Diagram 3-12**.

¹ For water sensitivity within the planning area, the USFS has established guidelines for surface waters with Low Acid Neutralizing Capacity (ANC) that states: 1) for surface waters that have a baseline of less than 5 microequivalents per liter Acid Neutralizing Capacity, no more than 1 microequivalent per liter decrease in Acid Neutralizing Capacity would be acceptable; and 2) for surface waters that have a baseline of equal to or greater than 25 microequivalents per liter Acid Neutralizing Capacity, the limit of acceptable change is not more than 10 percent from the baseline. The National Park Service has established modeling Data Analysis Thresholds that trigger a management concern.

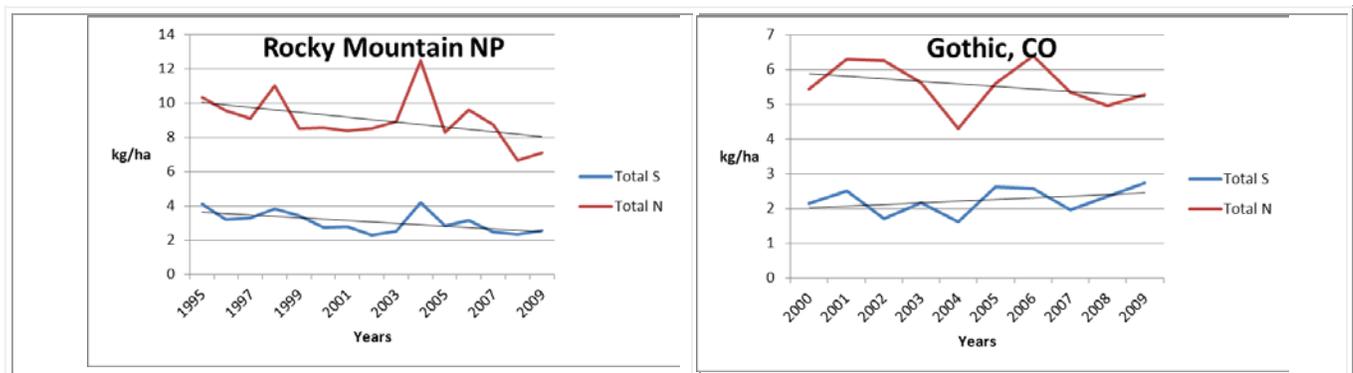
**Diagram 3-10
Wet Deposition Trends**



**Diagram 3-11
Dry Deposition Trends**



**Diagram 3-12
Total Deposition Trends**



Conditions on BLM-Administered Lands

Conditions on BLM-administered lands are as described above for conditions of the planning area. Authorized activities on BLM-administered lands that produce PM₁₀ and PM_{2.5}, nitrogen oxides, volatile organic compounds, carbon monoxide, sulfur oxides, hazardous air pollutants, and greenhouse gas pollutants include wildfires, prescribed burns, and slash pile burns; mechanical thinning and other vegetation management activities; vehicle travel on paved and unpaved roads;

trails and open areas; energy development, mineral extraction, and mining operations; livestock grazing; and camping and other recreational activities.

Conditions on National Forest System Lands

Routt National Forest

Most of the air quality monitoring (wet deposition, dry deposition, and visibility) conducted in the Routt National Forest is and has been associated with the National Atmospheric Deposition Program and the National Trend Network. Two National Atmospheric Deposition Program monitoring sites are located in the Hahns Peak/Bears Ears Ranger District. Both sites, described in more detail below, were established in the 1980s to monitor air quality conditions in and adjacent to the Mount Zirkel Wilderness Area.

Recently, Routt County, Colorado, contracted for assistance with planning and implementing air quality programs designed to reduce the impacts of oil and gas development on ambient air quality and to comply with existing state and federal air quality standards and regulations. The Forest Service and the National Park Service have contracted to upgrade existing air quality monitoring infrastructure in Walden, Colorado, (Jackson County) to monitor the impacts of oil and gas development on air quality and criteria pollutant (particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, and lead) concentrations in Colorado, Utah, and Wyoming; the Walden site is part of a Three-State Pilot Study.

Like other parts of the country, the sources of air pollution in and adjacent to the Routt National Forest vary. Most of the sources of local air pollution are associated with automobiles and coal-fired, electrical-power generation. However, other sources of air pollution, such as oil and gas development, smelter operation, and wildland fires, also contribute to air quality degradation.

Air Quality – Existing Monitoring Infrastructure

Buffalo Pass, Summit Lake (CO97) – The CO97 monitoring site became operational on February 7, 1984, and continues to collect wet- and dry-precipitation samples, ozone samples, and air visibility data. This site is located near Buffalo Pass (Park Range) at an elevation of 3,234 meters (10,607 feet). Air quality samples collected at this site are precipitation sulfates, nitrates, chlorine, phosphates, sodium, potassium, calcium, magnesium, and ammonium. In addition, each sample is analyzed to determine pH and conductivity. CO97 is equipped with an IMPROVE MOZII device (filters) that measures changes in air visibility based on changes in atmospheric particulate matter concentrations. CO97 also is equipped to measure atmospheric mercury and is part of the Mercury Deposition Network and the National Trends Network.

Buffalo Pass, Dry Lake (CO93) – The CO93 monitoring site became operational on October 18, 1986, and continues to collect wet- and dry-precipitation samples, ozone samples, and air visibility data. This site is on the west side

Buffalo Pass (Park Range) at an elevation of 2,538 meters (8,325 feet). Air quality samples collected at this site are precipitation sulfates, nitrates, chlorine, phosphates, sodium, potassium, calcium, magnesium, and ammonium. In addition each sample is analyzed to determine pH and conductivity. CO93 is part of the National Trends Network.

State and Local Air Monitoring Stations Network monitoring station in Walden, Colorado – This monitoring station is located about 12 miles north of Walden near the small town of Cowdrey, Colorado. This station is part of the Three-State Pilot Study (Colorado, Utah, and Wyoming) designed to better monitor the impacts on air quality associated with oil and gas development in the three-state region. Air quality metrics measured at this station are ambient concentrations of ozone, nitrogen oxides, sulfur dioxide, and carbon monoxide. In addition, concentrations of atmospheric particulate matter less than or equal to 10 microns are measured. Finally, metrics such as air temperature, relative humidity, solar radiation, wind speed, and wind direction are measured at this station. Data collected at this station is submitted hourly to the US EPA's Air Quality System.

3.17.2 Trends

Because of limited available data, it is only possible to trend air quality-related values for a few locations. For those locations, ambient air quality concentrations are below standards, visibility is typical of clear skies associated with remote areas in the western US, and there have been improvements in total deposition at Rocky Mountain National Park in recent years. Future changes to air quality conditions in the 62-mile radius of the planning area would occur according to the intensity and expansion or reduction of activities that produce air pollutants; however, the use of air pollution mitigation techniques can also minimize air quality impacts and, in some cases, reduce emissions from sources. Proposed activities on BLM-administered lands and the mitigation measures planned for those activities must be evaluated on a case-by-case basis to determine if an air quality impact could occur, and whether the activity would be in compliance with air quality regulations. At this time, future impacts on air quality within the planning area from non-BLM sources (e.g., power plants and fireplaces) are uncertain; however, it is not anticipated that existing sources would increase their emissions in the future. In addition, major sources such as power plants are operating under state-administered air permits and are subject to periodic inspections.

Visibility

The majority of areas have seen steady improvements in visibility over the past 15 to 20 years. Standard Visual Range distances have been increasing at both ends of the visibility spectrum, meaning that improvements are generally being made on the best and worst visibility days.

Deposition

Current trends indicate that deposition rates are decreasing and progress is being made to reduce the associated impacts of deposition in and around the planning area. This does not suggest that the current levels of deposition are acceptable for all areas of concern. A case-by-case determination must be made to determine significance when specific project data are known.

3.17.3 References

Colorado Department of Public Health and Environment, Water Quality Control Division. 2008. 2008 Air Pollution Emissions Inventory. Internet Web site: http://www.colorado.gov/airquality/inv_maps_2008.aspx.

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Interagency Monitoring of Protected Visual Environments (IMPROVE). 2011. IMPROVE and RHR Summary Data. Regional Haze Rule Summary data 1988–2010 (posted December 2011). Internet Web site: http://vista.cira.colostate.edu/improve/data/improve/summary_data.htm.

3.18 CLIMATE CHANGE**3.18.1 Existing Conditions*****Conditions of the Planning Area***

Climate represents the long-term statistical characterization of daily, seasonal, and annual weather patterns such as temperature, relative humidity, precipitation, cloud cover, solar radiation, and wind speed and direction. Climate is the composition of the general prevailing weather conditions of a particular region throughout the year, averaged over a series of years (typically 30 years). A region's climate is affected by its latitude, terrain, and elevation, as well as its relative location to large water bodies.

Climate in the planning area is varied depending on the orientation of topography, elevation, slope and aspect. Winters are typically cool to cold with temperatures ranging from below zero to above freezing. Precipitation events are occasional and, depending on the elevation, are typically in the form of snow.

Summers are generally warm to hot, again depending on elevation. Precipitation during the summer is usually in the form of short-duration, high-intensity

monsoonal thunderstorms. Precipitation ranges from 9 to 25 inches primarily dependent on elevation, with the highest receiving the most.

3.18.2 Trends

There is now strong and growing scientific evidence for human-induced climate change (National Climate Assessment Development Advisory Committee 2012). These changes typically forecast that temperatures will increase with precipitation becoming more variable in nature. This change in climate, primarily over the last 50 years, is due to the increased emissions of greenhouse gases such as carbon dioxide, methane, nitrous oxide (Intergovernmental Panel on Climate Change 2007). While these gases are produced naturally through physiological processes of plants and animals, decomposition of organic matter, naturally started wildfires, and volcanic and geothermal activity, concentrations of these gases has dramatically increased over the last 150 years from the emissions of industrial processes, transportation technology, urban development, agricultural practices, and other human-induced factors.

Climate is both a driving force and limiting factor for many biological, ecological, and hydrologic processes, as well as resource management activities such as disturbed site reclamation, wildland fire management, rangeland and watershed management, and vegetation and wildlife habitat management. Climate change presents a challenge to land managers because of the magnitude of potential effects of climate change on ecosystem structure, process, and function, along with the uncertainty associated with these effects.

While ecosystems gradually change over time in response to climate change, this accelerated change in climate over the 50 years is likely to impact ecosystems at rates where some resources (species and habitats) are unable to adapt at the same rate. Climate change also may intensify and compound existing non-climate change stressors such as invasive species, pests and diseases, and frequency and intensity of wildfires. Expected changes to ecosystems as a result of climate change include changing of the onset of spring and fall seasons, reduced snowpack, earlier snow melt, altering stream flows, more prolonged and intense seasonal droughts, local extinctions of species (including GRSG), and more intense and frequent extreme weather events.

While not covering the entire planning area (LSFO, KFO, CRVFO, and Routt National Forest), the recently completed Colorado Plateau Rapid Ecoregional Assessment (Bryce et. al. 2012) covers the southern and western portions of the planning area. This assessment projected future climate scenarios using the ECHAM5-driven RegCM3 model. While not covering the entire planning area, one can reasonably assume that the future climate scenarios for temperature and precipitation will be similar for the rest of the planning area.

The downscaled results from the Colorado Plateau Rapid Ecoregional Assessment show that northwest Colorado is expected to undergo a general warming through 2060. Average summer temperatures are expected to increase

by as much as 4 degrees Fahrenheit, but even greater increases are expected in the winter months. This increase in winter temperatures may lead to more rain events, thus impacting snow pack and causing earlier snow melt and leading to more prolonged drought in the summer. Further, increasing temperatures may result in a change of vegetation communities. Increase in temperatures in the summer may result in a loss of shrub and woodland canopy due to an overall drying of the soil for a longer period during the growing season and a shift of more drought-resistant vegetation or from shrublands to grasslands. This may ultimately result in a loss of sagebrush cover across the planning area.

Wyoming is also expected to increase in summer temperatures as well with increases as much as 8 degrees Fahrenheit by the end of the century (Karl et al. 2009). As with the Colorado Plateau Rapid Ecoregional Assessment, it is unclear if seasonal precipitation patterns will change. Even if they do not change, the increase in temperatures during the summer will increase the number and frequency of hot days. This would lead to increased water stress in vegetation during the summer.

Climate models are generally less reliable in predicting precipitation than temperature (Bryce et. al. 2012). Under the climate scenarios presented in the Colorado Plateau Rapid Ecoregional Assessment, precipitation is expected to decline throughout much of the year through 2030, with the exception of a couple of months in the fall. From 2030 to 2060, the precipitation trends in the northern part of the Colorado Plateau indicate a slight increase in precipitation, with this increase primarily occurring in the summer.

3.18.3 References

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- Intergovernmental Panel on Climate Change. 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Core Writing Team: R. K. Pachauri and A. Reisinger (eds.). Intergovernmental Panel on Climate Change, Geneva, Switzerland.
- Karl, T. R., J. M. Melillo, and T. C. Peterson (eds). 2009. In: Global Climate Change Impacts in the United States. Cambridge University Press, New York, NY. Pp:123-128.
- National Climate Assessment Development Advisory Committee. 2012. Draft National Climate Assessment. Internet Web site: <http://ncadac.globalchange.gov/>.

National Fish, Wildlife and Plants Climate Adaptation Partnership. 2012. National Fish, Wildlife and Plants Climate Adaptation Strategy. Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and US Fish and Wildlife Service. Washington, DC.

3.19 VISUAL RESOURCES

Visual resources are the visible physical features on a landscape, such as soils, geomorphic features, water, vegetation, and human-made structures, that contribute to the landscape's scenic or visual quality and appeal. A visual impact is created when a perceptible contrast is created that affects the scenic quality of a landscape. The degree of visual impact as perceived by an individual or group depends on a variety of factors or conditions, including personal experience, time of day, and weather or seasonal conditions.

BLM

As required by the FLPMA, the BLM must consider scenic quality as part of its management of public lands. To carry out this mandate, the BLM uses the VRM system. VRM involves the identification and evaluation of scenic values. The BLM's VRM system helps to ensure that actions taken on public lands will benefit the visual qualities associated with the described landscape.

The VRM system includes the development of a visual resource inventory, determination of management levels, and visual resource contrast rating analysis when a surface-disturbing activity is proposed. Visual resource inventory involves identifying an area's visual resources. Based on the inventory and consideration of other RMP objectives, the BLM assigns area-specific management classes (**Table 3.74; Figure 3-12 [Appendix A, Figures]**).

The BLM uses a contrast rating analysis process to evaluate the design elements of a proposed activity to determine the level of visual impact on the existing landscape as observed from key observation points. Mitigation requirements can be applied to an activity to lessen visual impacts on the landscape.

Forest Service

The Routt National Forest Plan (Forest Service 1998) provides guidance for all resource management activities, including scenic quality, in the Routt National Forest. The plan specifies desired conditions for visual resources. Desired conditions include the provision of scenic quality, maintenance of the overall landscape character, and continued attraction of visitors through the physical setting and scenic beauty of the Routt National Forest.

Historically, the Forest Service managed visual quality using the Visual Management System. The key component of the Visual Management System is the establishment of Visual Quality Objectives. These Visual Quality Objectives

Table 3.74
BLM Visual Resource Management Class Descriptions

VRM Class	Class Objective
I	Preserve landscape character. This class provides for natural ecological changes, but does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	Retain existing landscape character. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
III	Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.
Rehabilitation Areas	Areas in need of rehabilitation should be flagged during the inventory process. The level of rehabilitation is determined through the RMP process by assigning the VRM approved for that particular area.

provide visual goals for management activities. Each Visual Quality Objective prescribes a different degree of acceptable alteration of the landscape based on the importance of aesthetics. Visual Quality Objectives consist of five levels: preservation, retention, partial retention, modification, and maximum modification.

- Preservation – Allows ecological change only. Management activities are prohibited except for very low visually impacting recreation facilities.
- Retention – Management activities may not be visually evident. Contrasts in form, line, color, and texture must be reduced during or immediately following the management activity.
- Partial Retention – Management activities must remain visually subordinate to the characteristic landscape. Associated visual impacts in form, line, color, and texture must be reduced as soon

after project completion as possible or at a minimum within the first year.

- **Modification** – Management activities may visually dominate the characteristic landscape. However, landform and vegetation alterations must borrow from naturally established form, line, color, or texture so as to blend in with the surrounding landscape character. The objective should be met within 1 year of project completion.
- **Maximum Modification** – Management activities including vegetation and landform alterations may dominate the characteristic landscape. However, when viewed as background they must visually appear as natural occurrences within the surrounding landscapes or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middle ground. Reduction of contrast should be accomplished within 5 years.

With an amendment to the Forest Service Manual, Chapter 2380 in 2003 (Forest Service 2003), the Forest Service began transitioning from the Visual Management System to the Scenery Management System.

3.19.1 Existing Conditions

Conditions of the Planning Area

The visual landscape across the planning area varies greatly but is generally consistent with the broader landscape features found throughout the Rocky Mountains and western Colorado plateau. Landscape characteristics that contribute to the planning area's scenic conditions include mountains, ridges, narrow and broad river valleys, rolling hills, numerous lakes and reservoirs, sand dunes, and diverse vegetation regimes. Over time, volcanic activity, seismic forces, and erosion have produced unique ridges, isolated mountain peaks, rock outcrops, and waterways. Development in the planning area consists of oil and gas development, urban centers, utility infrastructure, dispersed ranches, recreation areas including ski areas, and range improvements such as fencing and water developments. Urban development is largely situated along major roadways. Taken together, these features create a variety of landscape compositions. Overall, public lands in the planning area serve as important scenic backdrops and visual open space.

Conditions on BLM-Administered Lands

BLM-administered land is distributed throughout the planning area, with the greatest acreage located in the LSFO, GJFO, and WRFO. Existing RMPs for each field office establish the VRM classes within which GRSG habitat is located.

Recently, several field offices have updated their Visual Resource Inventories and subsequently are preparing VRM management classes based on the new inventories. The VRM classes resulting from the new inventories will establish new baseline conditions from which trends can be determined. However, only in the KFO have the VRM classes been updated to reflect the latest inventory. For all other field offices, the VRM classes represent the most recent inventory.

GRSG habitat is widely distributed throughout the planning area, with the highest concentrations of PH and GH in the Wyoming Basin MZ. The largest habitat areas are in Moffat County within the BLM's LSFO, as well as throughout the KFO. Habitat areas in the remaining three field offices are generally smaller and less concentrated.

Colorado River Valley Field Office

GRSG habitats are found in two significant visual resource areas in the CRVFO: the Roan Plateau and Castle Peak-King Mountain areas. The Roan Plateau is home to the Parachute/Piceance/Roan population, and the Castle Peak-King Mountain area is home to the Northern Eagle-Southern Routt population. Two separate land use planning efforts were conducted for the two areas (BLM 1984; BLM 2006).

There are 36,200 acres of GRSG habitat, all of which is GH, located on top of the Roan Plateau and overlapping private surface estate, split estate, and BLM surface estate. The top of the Roan Plateau is characteristic of long ridgelines that slope to the north and are deeply incised by east and west-flowing tributaries of Parachute Creek. This effect creates an undulating horizontal line in the landscape broken by steep vertical lines created by the drainages. The top of the plateau is dominated by a mosaic of aspen woodlands, sagebrush flats, and mixed mountain shrublands, with riparian habitat along the deep stream valleys. The Roan Plateau landscape is visually fragmented by existing development that occurred prior to current VRM objectives (BLM 2006) and includes roads, cabins, grazing improvements, old vegetation treatments, communication towers, limited oil shale development, and (on private land) limited oil and gas development.

The Roan Plateau also lies within an area of high natural gas and oil potential. While no oil and gas development of the federal mineral estate has taken place above the rim, wells have been drilled and developed on private land. The top of the Roan Plateau has valid existing leases and with those leases, valid existing leasing rights. The visual resources within the Roan Plateau are protected through the application of stipulations and mitigation measures. Two stipulations are currently in place for the Interstate 70 viewshed and VRM Class II areas.

The Castle Peak-King Mountain area contains 105,400 acres of GRSG habitat, and is remote and largely undeveloped, although a number of towns are present along the major transportation routes. GRSG habitat is not easily accessible because of private land and topography constraints. The area is characteristic of

rural ranching and agricultural land. The topography is varied with visually prominent mountain peaks including King Mountain, Castle Peak, Greenhorn Mountain, and Horse Mountain. Within the mapped GRSG habitat, there is a distinct division of the landscape created by the Colorado River. The vegetation is diverse with the steep north-facing mountain slopes generally forested with conifers intermixed with extensive groves of aspen, and the drier south-facing exposures largely pinyon-juniper woodlands and oakbrush. Grasses, sagebrush, and assorted shrubby species constitute the ground cover along the valley bottoms and riparian communities follow the river corridors.

Grand Junction Field Office

The landscape containing PH and GH within the GJFO planning area lies on the mesa/ridge tops above Roan Creek and its tributaries in the northeast portion of the field office, and along the western and southwestern slopes of Battlement Mesa. The Roan Creek portion of this landscape, which contains 5,500 acres of PH and 8,900 acres of GH, is characterized by steep-sided mesas or ridges rising 1,500 to 2,000 feet above the primary drainages. The GRSG habitat lies primarily on the tops of these mesas. The Battlement Mesa portion of habitat, which is all GH, lies on the more gradually sloping lower and middle slopes of Battlement Mesa. Both areas share similar topography and vegetation types that create a landscape with relatively indistinct rolling form, gently undulating lines, subtle hues of greens, greys and tans, and a mottled medium texture. Human-made developments introducing visual contrast to this landscape include scattered roads, fences, stock ponds/tanks, homes and other structures, and energy development infrastructure (such as well-pads, compressor stations, and pipelines.)

The inventoried habitat on top of the mesas and ridges above the Roan Creek drainage is primarily visible only from observation points within and directly adjacent to the habitat areas. The habitat on the slopes of Battlement Mesa is visible from observation points above, below, and within the habitat area.

Kremmling Field Office

In the KFO, two mountain parks dominate the visual setting of the planning area: North Park and Middle Park. North Park is predominately an open landscape composed of flat valleys and rolling hills. Middle Park is a synclinal basin surrounded by mountain ranges. Most of the valley bottoms are privately owned and within the foreground of the viewsheds. GRSG habitat in North Park consists almost exclusively of PH. GRSG habitat in Middle Park is a mix of GH on the western side and non-habitat on the eastern side.

Throughout North Park, the views are predominantly of open rolling hills covered with grasses and sagebrush. The vegetation regime is characterized by sagebrush on the southern exposures and pine and aspen forests on the northern exposures. Throughout the center of North Park, water features and ridges contrast with the sagebrush hillsides. Creeks and rivers winding through

the hills include riparian vegetation communities and flowing water. Lakes in the northwest portion of North Park give this area additional variety. The ridges that run across North Park are composed of rock outcrops and open sage grasslands. The rock outcrops and mountains break the line of the rolling rounded hills.

Middle Park is more visually diverse than North Park. When traveling through the area, visitors observe a landscape that is constantly changing. The Middle Park landscape is comprised of open rolling sagebrush hills interrupted by isolated mountain peaks with rocky south faces and forested north faces. The Colorado River bisects Middle Park from east to west through Byers Canyon in the east and the steep-walled Gore Canyon in the west. As the river exits Gore Canyon, it winds through hills composed of reddish-orange, rocky soil strata. Pinyon-juniper-covered hills provide a diversity of color and texture along the riverway.

The human features on the east side of Middle Park are mainly the result of tourism. The largest town is Granby; other communities include Hot Sulphur Springs, Grand Lake, Fraser, Tabernash, and Winter Park. The east side provides a ski area, several subdivisions, gateway access to Rocky Mountain National Park, and recreational access to three large lakes. Many homes on this side of the county have been built in the forested areas and serve mainly as recreational homes.

Increasing urbanization and oil and gas development have changed the visual landscape in the KFO in recent years. Urban areas in the North Park area include Walden, Rand, Gould, and Cowdrey. In Middle Park, urban areas include Granby, Hot Sulphur Springs, Fraser, Winter Park, and Kremmling. The area also has several isolated communities, large ranches, ranchettes, and sizeable vacation homes. Oil and gas fields are primarily located east of Walden.

The viewshed in the KFO is also influenced by dead trees killed by the mountain pine beetle. Timber removal is occurring, and removal areas are designed to look like naturally occurring clearings. However, subdivisions in heavily forested areas are becoming more visible as trees are removed.

Little Snake Field Office

PH or GH covers a majority of the LSFO, with the exception of steep rugged terrain in the western portion of the field office. The landscape of the LSFO consists of open rolling hills and desert in the lower elevations of the western portion of the field office, while forested mountainous landscapes characterize the higher elevations to the east. The landscape types consist of mountains, ridges, narrow valleys, canyons, mesas, rolling hills, broad valleys, river valleys, basins, reservoirs and badlands. Although much of the LSFO is largely undeveloped, range improvements and oil and gas developments in the past 15 years have altered much of the scenery. Most oil and gas developments have

occurred in concentrated areas where the potential for economically recoverable mineral resources is high.

White River Field Office

The WRFO has over 120,000 acres of PH and 180,000 of GH scattered throughout the field office planning area. Landscapes in the WRFO display a variety of characteristics depending on location, elevation, vegetation, and cultural modifications. The region consists of high mountain ranges with deeply dissected, steep-side valleys and canyons. These narrow canyons are comprised of irrigated fields flanked by rugged foothills and cliff features. Vegetation in the foothills creates an irregular pattern caused by patches of grasses, low-lying shrubs, or dark evergreen stands.

River corridors such as the White River, Douglas Creek and Cathedral Creek provide high quality scenery. The vegetation along these river corridors provides color variation from the more muted upland hues. Certain landforms such as Cathedral Bluffs present distinct visual characteristics in the WRFO. These features often exhibit strong vertical lines in landscapes typically dominated by horizontal and shallow diagonals.

The WRFO is generally undeveloped and cultural modifications are sparse. The towns of Rangely, Dinosaur, and Meeker along with major roads (SH 139, US 40 SH13 and SH64) contain the highest concentrations of cultural modifications in the area. Rangeland improvements and utility lines are also scattered throughout the WRFO.

Oil and gas development equipment and infrastructure is scattered throughout the WRFO planning area concentrated in five major areas: Rangely, Wilson Creek, Douglas Creek Arch and Piceance Basin.

Conditions on National Forest System Lands

Routt National Forest

The Routt National Forest, located in the northeast portion of Routt County, contains a comparatively smaller concentration of GRSG habitat than is found on BLM-administered lands in the planning area. **Table 3.75** summarizes the distribution of PH and GH throughout the Routt National Forest's four Visual Quality Objective areas and includes the geographic location name. Refer to **Figure 3-13**.

Table 3.75
GRSG Habitat by Geographic Area, Visual Quality Objective, and Habitat Type on the Routt National Forest

Geographic Area Name	Visual Quality Objective ¹	GRSG Habitat Type	Acres
Chimney Rock	Modification	GH	5
Chimney Rock	Partial Retention	GH	110
<i>Chimney Rock Subtotal</i>			<i>115</i>
Corral Peaks	Modification	GH	150
Corral Peaks	Modification	PH	210
<i>Corral Peaks Subtotal</i>			<i>360</i>
Dunckley	Partial Retention	GH	90
Dunckley	Partial Retention	PH	30
<i>Dunckley Subtotal</i>			<i>120</i>
Elkhead Mountain	Modification	GH	140
Elkhead Mountain	Partial Retention	GH	7,150
Elkhead Mountain	Retention	GH	60
<i>Elkhead Mountain Subtotal</i>			<i>7,350</i>
Gore	Modification	GH	5
Gore	Modification	PH	10
Gore	Partial Retention	GH	40
Gore	Partial Retention	PH	410
Gore	Retention	PH	0
<i>Gore Subtotal</i>			<i>465</i>
Green Ridge	Partial Retention	GH	90
Green Ridge	Partial Retention	PH	150
<i>Green Ridge Subtotal</i>			<i>240</i>
Grizzly Creek	Partial Retention	GH	10
Grizzly Creek	Retention	GH	40
<i>Grizzly Creek Subtotal</i>			<i>50</i>
Pinkham Mountain	Partial Retention	PH	590
Pinkham Mountain	Retention	PH	180
<i>Pinkham Mountain Subtotal</i>			<i>770</i>
Red Dirt	Partial Retention	GH	70
Red Dirt	Retention	GH	370
<i>Red Dirt Subtotal</i>			<i>440</i>
Slater Creek	Modification	GH	1,370
Slater Creek	Partial Retention	GH	1,210
<i>Slater Creek Subtotal</i>			<i>2,580</i>
Troublesome	Modification	GH	20
Troublesome	Modification	PH	0
<i>Troublesome Subtotal</i>			<i>20</i>
Total			12,510

Source: Data from GIS by C. Tolbert, 6/15/2012

¹ Visual Quality Objective data was created for the Routt National Forest Plan (Forest Service 1998) and has not been updated since 1983.

3.19.2 Trends

Trends on BLM-Administered Lands

Visual resources throughout BLM-administered lands are expected to be influenced by a number of competing management areas. Recreation and oil and gas development are likely to be the most influential. As the state's population grows, more visitors will be attracted to BLM-administered lands for outdoor recreation in natural landscapes. The exercising of valid existing rights for oil and gas leases is also expected to affect scenic quality in the planning area over time. Other management activities expected to influence visual resources include fire management, energy and utility corridor development, road and trail construction, communication site placement, pipeline development, livestock grazing, and water tank siting.

Other possible trends or threats related to visual resources that are largely outside the control of BLM administrative actions include:

- decline in forest health and visual quality as a result of mountain pine beetle infestations
- changes to visual quality as a result of wildfire
- the proliferation of unauthorized routes on BLM-administered lands that can result in erosion, scarring, and deterioration of the scenic landscape

Activities on non-BLM-administered lands may also impact visual resources on BLM-administered land. Mineral extraction, energy development, and urban sprawl on neighboring lands have the greatest potential to alter the overall visual landscape in the planning area.

Trends on National Forest System Lands

Routt National Forest

Trends would be similar to activities occurring on BLM especially in outdoor recreation. Outdoor recreation use would continue to increase on Routt National Forest. Timber activities would occur in areas that have beetle killed trees and would change the visual quality.

3.19.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 1984 (Revised 1988). Glenwood Springs Resource Management Plan. Glenwood Springs Field Office, CO.

_____. 2006. Final Roan RMP Amendment and EIS. Glenwood Springs Field Office, Glenwood Springs, CO.

Forest Service (United States Department of Agriculture, Forest Service). 1974. Handbook #462 National Forest Landscape Management Volume 2, Chapter I. Visual Management System. Washington, DC.

_____. 1998. Record of Decision, Final Environmental Impact Statement and Revised Land and Resource Management Plan for the Routt National Forest. Steamboat Springs, CO.

_____. 2003. Amendment to the Forest Service Manual, Chapter 2380. National Headquarters, Washington, DC.

3.20 LANDS WITH WILDERNESS CHARACTERISTICS

BLM

The purpose of and need for the national GRSG planning effort is limited to making land use planning decisions specific to the conservation of GRSG habitats. No decisions related to the management of lands with wilderness characteristics will be made as part of this planning effort; therefore, management of lands with wilderness characteristics is considered outside the scope of this plan amendment process. Impacts on lands with wilderness characteristics from the alternatives being analyzed for this planning effort are presented in **Chapter 4, Section 4.20**, Lands with Wilderness Characteristics.

As part of the original FLPMA Section 603-mandated inventories, inventories were conducted during past RMP revisions and amendment efforts, and through other various lands with wilderness characteristics inventory updates that have recently taken place. Inventories for wilderness characteristics were conducted for each field office, including some ongoing inventories and reflect the most up-to-date lands with wilderness characteristics baseline information for this planning area. For inventories that were conducted after 2011, findings were documented following guidance in BLM Instruction Memorandum 2011-154, Requirement to Conduct and Maintain Inventory Information for Wilderness Characteristics and to Consider Lands with Wilderness Characteristics in Land Use Plans, which is now encompassed in BLM Manuals 6310 and 6320. Lands with wilderness characteristics inventories will be updated for any site-specific project NEPA analyses that are conducted in the planning area to determine if a project will have impacts to lands with wilderness characteristics identified through previous or updated inventory efforts.

Forest Service

Wilderness characteristics assessments are not applicable to National Forest System lands.

3.20.1 Existing Conditions

Conditions on BLM-Administered Lands

The BLM's wilderness characteristics assessment is designed to answer the following question: Does the area meet the overall criteria for wilderness character? The assessment reflects current conditions and will be used to update wilderness inventories. The process entails the identification of wilderness inventory units, an inventory of roads and wilderness character, and a determination of whether or not the area meets the overall criteria for wilderness character (naturalness, sufficient size, outstanding opportunities for solitude and primitive and unconfined types of recreation). Units found to possess such character are evaluated during the land use planning process to address future management. The following factors are documented:

- **Size:** Must be a roadless area with over 5,000 acres of contiguous BLM land or contiguous with designated wilderness or WSAs (or the equivalent. A roadless area of less than 5,000 acres may be considered if it is demonstrated that the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.
- **Naturalness:** Lands and resources exhibit a high degree of naturalness when affected primarily by the forces of nature and where the imprint of human activity is substantially unnoticeable. An area's naturalness may be influenced by the presence or absence of roads and trails, fences or other developments; the nature and extent of landscape modifications; the presence of native vegetation communities; and the connectivity of habitats. Wildlife populations and habitat are recognized as important aspects of naturalness and would be actively managed.
- **Outstanding Opportunities for Solitude or Primitive and Unconfined Types of Recreation:** Visitors may have outstanding opportunities for solitude, or primitive and unconfined types of recreation when the sights, sounds, and evidence of other people are rare or infrequent, where visitors can be isolated, alone or secluded from others, where the use of an area is through non-motorized, non-mechanical means, and where no or minimal recreation facilities are encountered.
- **Supplemental Values:** Does the area contain ecological, geological, or other features of scientific, educational, scenic, or historical value?

Within the planning area, there are inventoried units with wilderness characteristics in four of the five BLM field offices, encompassing approximately 116,800 acres. Of the lands with wilderness characteristics in the planning area, approximately 31,900 acres include GRSG PH and approximately 84,900 acres

include GRSG GH. Additionally, many acres have not yet been fully inventoried, particularly in the LSFO and WRFO. **Table 3.76** provides information on the lands with wilderness characteristics broken down by field office.

Table 3.76
BLM-Administered Lands with Wilderness Characteristics

Field Office	Acres with Wilderness Character	
	GH	PH
Colorado River Valley	25,500	3,600
Grand Junction	300	0
Kremmling	0	0
Little Snake ¹	57,600	25,700
White River ²	1,500	2,600
Total	84,900	31,900

Source: BLM 2013

¹ The LSFO has not completed a field office-wide inventory of lands with wilderness characteristics. For purposes of analysis, it is assumed that lands not yet inventoried contain wilderness characteristics.

² In the WRFO, an additional 22,000 acres of GH and 14,000 acres of PH may potentially contain wilderness character. However, a full inventory of these areas has not been completed. Until these areas can be inventoried, they will be managed as though they contain these characteristics.

Conditions on National Forest System Lands

Routt National Forest

Wilderness characteristics assessments are not applicable to National Forest System lands.

3.20.2 Trends

Trends on BLM-Administered Lands

As the BLM's LSFO and WRFO complete their inventories of wilderness characteristics, it is anticipated that more units will be identified to contain wilderness characteristics within the planning area. For purposes of analysis, it is assumed that lands not yet inventoried contain wilderness characteristics. Following completion of the inventories, these offices will determine whether or not to manage for the protection of areas found to have wilderness characteristics. It is expected that the wilderness characteristics in these areas will be maintained over time.

Three units found to possess wilderness characteristics within the LSFO are currently managed for the protection of those wilderness characteristics. It is

expected that the wilderness characteristics in these three areas will be preserved over time.

Within the CRVFO and GJFO, the BLM has completed lands with wilderness characteristics inventories, but is deferring determinations of protection for lands with wilderness characteristics until the release of the RMPs for those field offices. The prioritization of management of GRS habitat is likely to impact lands with wilderness characteristics within the decision area. It is anticipated that some wilderness characteristics in these areas will be degraded over time, while others will be protected or preserved.

Trends on National Forest System Lands

Routt National Forest

Wilderness characteristics assessments are not applicable to National Forest System lands.

3.20.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 1984. Glenwood Springs RMP. Glenwood Springs, CO.

_____. 2005. Handbook H-1601-1: Land Use Planning Handbook. Rel. 1-1693, March 11, 2005. BLM, Washington, DC.

_____. 2008. Roan Plateau Planning Area RMP Amendment and EIS. Glenwood Springs, CO.

_____. 2011. Little Snake Record of Decision and RMP. Craig, CO.

_____. 2012a. BLM Manual 6310—Conducting Wilderness Characteristics Inventory on BLM Lands. Rel. 6-129. BLM, Washington, DC. March 15, 2012.

_____. 2012b. BLM Manual 6320—Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. Rel. 6-130. BLM, Washington, DC. March 15, 2012.

_____. 2012c. Colorado River Valley Field Office Draft RMP. Silt, CO.

3.21 SOUNDSCAPES

Soundscapes, defined as the combination of sounds in a given area, are the result of and influenced by two primary factors: sound sources and landscape features that attenuate or amplify sound. Sound can originate from natural sources such as surface water features, animal vocalizations, and weather or from human sources such as aircraft, automobiles, construction equipment, and human speech. Terrain features that may affect noise transmission include mountains, vegetation, and structures such as buildings, fences, and sound walls.

3.21.1 Existing Conditions

Conditions of the Planning Area

GRSG habitat is widely distributed throughout the planning area, with the highest concentrations of PH and GH in the Wyoming Basin MZ. This area covers the northern portion of the planning area. The largest habitat areas are located in Moffat, Jackson, and Grand counties. Habitat areas in the remainder of the planning area are generally smaller and less concentrated.

Due to the planning area's distance from large urban centers and rugged topography, the existing soundscape is largely punctuated by natural sounds. Landscapes within the planning area vary, but include mountains, ridges, narrow valleys, canyons, mesas, rolling hills, broad valleys, river valleys, basins, reservoirs, and badlands. These features influence the soundscape by magnifying, attenuating, and influencing the various sounds in the soundscape. **Figure 3-13, Figure 3-14, Figure 3-15, and Figure 3-16 (Appendix A, Figures)**, represent the expected levels of sound dissipation during the winter months and the summer months as tied to vegetation and as tied to topography.

Conditions on BLM-Administered and National Forest System Lands

Soundscapes on both BLM-administered and National Forest System lands within the Colorado sub-region are consistent with the planning area where natural sounds are dominant. Ambient background sources of sound within unpopulated and undeveloped areas include wind, insects, birds, and flowing water in proximity to rivers and streams. Variations in wind speeds and direction can affect the soundscape. Additional factors influencing the GRSG habitat soundscape on BLM-administered and National Forest System lands include aviation sources, recreation (including OHV use), location of transportation routes, proximity to urban areas, and energy development.

Aviation

The Colorado Army National Guard conducts high-altitude army aviation training from its facility at the Eagle County Airport in Gypsum. The Colorado Army National Guard's training exercises typically extend outward in a 25-mile radius (BLM 2007) covering areas of the mapped GRSG habitat in Eagle County. On average, 5 training operations occur per weekday for 46 weeks of the year. Training exercises typically take place during daylight hours, but during the fall and winter months when darkness occurs earlier, training exercises may extend into darkness hours. Training in the area is dispersed and infrequent and the more distant sectors of the training areas tend to receive less use in order to maximize training time. High-altitude army aviation training operates in conformance with seasonal restrictions and specific best management practices for avoiding public areas, wildlife, livestock, and areas with special designations. At close range (less than 100 feet), helicopters produce a sound exposure level of around 100 A-weighted decibels for the instant an overflight occurs. With greater distance these sound exposure level decrease, so that at 1,000 feet the

noise level is 80 to 90 A-weighted decibels. At 1 mile, noise levels decrease to 80 A-weighted decibels or less.

There are several airports within or near the planning area, including in the towns of Steamboat Springs, Hayden, Craig, Meeker, Glenwood Springs, Kremmling, Granby, and Walden. The Walden-Jackson County Airport in Walden, McElroy Airport in Kremmling, and Craig-Moffat County Airport in Craig are in or directly adjacent to PH.

Recreation and Off-Highway Vehicle Use

Colorado State Law regulates noise emissions for OHVs. Under the law, vehicles manufactured before January 1, 1998, must not exceed 99 A-weighted decibels. Vehicles made after January 1, 1998, cannot exceed 96 A-weighted decibels. OHV use is popular throughout the planning area. In the CRVFO, for example, the BLM issues six special recreation permits for guided jeep and all-terrain vehicle tours around the Castle Peak area. Stipulations are included in the permits to limit group sizes, coordinate with other operators to minimize congestion, operate 2 trips or less per day, and avoid early dawn trips.

The Bocco Mountain SRMA, in the CRVFO, overlaps a small portion of the southern mapped boundary of GRSG habitat. This SRMA is also a popular OHV area. The BLM manages the Bocco Mountain SRMA for motorcycle activity on a system of designated single tracks. The Sand Wash area in the LSFO is also a popular location for OHV use.

Shotgun, raffle, and handgun discharges also influence the soundscape. Big game hunting is popular throughout the planning area, particularly in the fall. In addition, there are two developed shooting ranges in the planning area. The Byers Canyon Rifle Range, managed by Colorado State Parks and Wildlife, is along US Highway 40. The privately owned Blue Valley Sportsmen Club Rifle Range is along Colorado Highway 9. Both ranges are adjacent to BLM-administered lands. These shooting ranges see moderate to heavy use, with the highest usage rates occurring during the fall big-game hunting season.

Transportation Routes

Several major roadways traverse the planning area and contribute to the soundscape for areas adjacent to these routes. These roadways are used by private autos and the trucking industry to access other road networks, communities, and BLM-administered and National Forest System lands throughout the planning area. US Highway 40, which runs east to west through Sulphur Springs, Steamboat Springs, and Craig before entering eastern Utah, crosses more GRSG habitat than any other roadway in the planning area. Other roadways that contribute to the soundscape include State Highways 9, 13, 14, 125, and 131. A network of smaller local and private roads also influences the soundscape but to a lesser degree of intensity and frequency.

Several railroad lines cross the planning area. Passing trains provide intense but infrequent contributions to the surrounding soundscapes.

Urban Areas

GRSG habitat in the planning area is mainly on remote, rural land. However, noise radiating from urban areas influences the soundscape for certain GRSG habitat on BLM-administered land adjacent to urban areas. The municipalities with the greatest potential to influence the soundscape of adjacent GRSG habitat are Craig, Walden, Hot Sulphur Springs, and Kremmling. Urban activity originating in Steamboat Springs may contribute to the soundscape in the Routt National Forest.

Energy Development

Noise from energy-related surface activities and mineral extraction modifies the soundscape directly, adjacent to, and, due to the intensity of sound from these activities, well beyond the footprint of the activity. Noise levels associated with construction activities range from 70 A-weighted decibels to over 90 A-weighted decibels within 50 feet of the activity. Noise levels attenuate with distance with a reduction of approximately 6 A-weighted decibels with each doubling of distance (Thurman and Miller 1996). **Table 3.77** summarizes noise levels for a number of oil and gas activities. See also **Diagram 3-13**.

North Park, in the KFO, has the McCallum and Battleship oil fields, which have moderate to high levels of development and associated truck traffic. In recent years, additional oil and gas development has increased within the area but primarily on privately owned lands. The oil and gas rigs and associated vehicle traffic contribute to manmade noise in the soundscape.

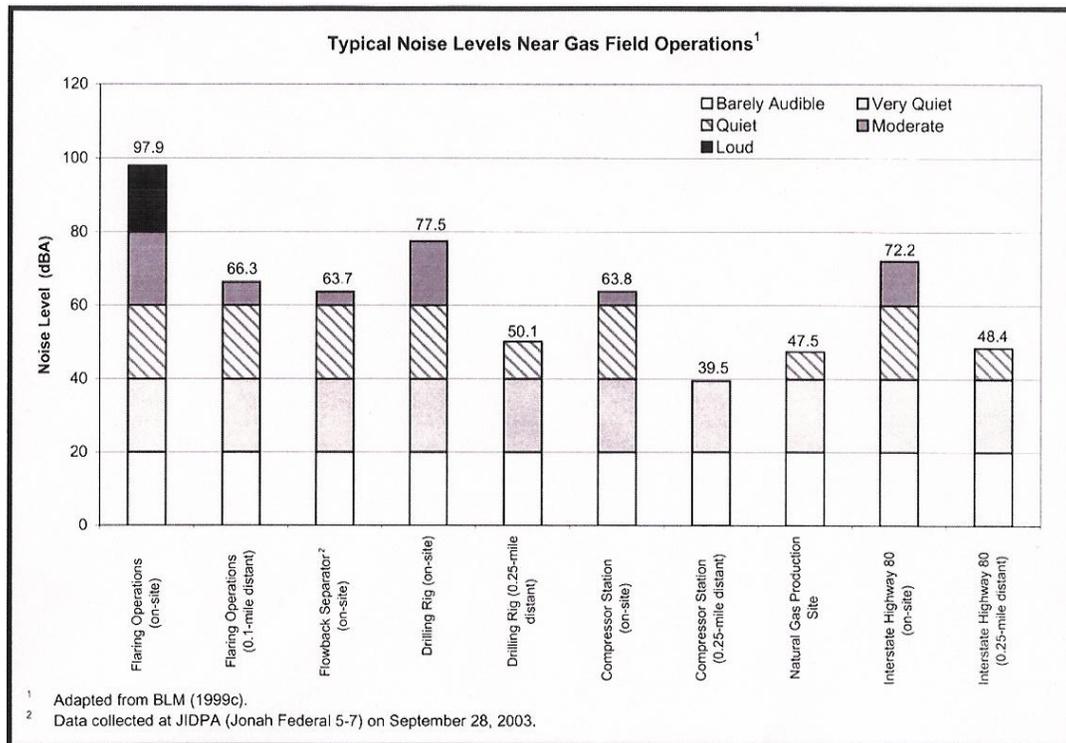
In the LSFO, about 226 wells have been constructed on BLM-administered lands in the last 20 years. Most oil and gas developments have occurred in more concentrated areas where the potential for economically recoverable mineral resources is high.

Table 3.77
Noise Levels for Oil and Gas Activities

Typical compressor station	50 A-weighted decibels (375 feet from property boundary)
Pumping units	50 A-weighted decibels (325 feet from well pad)
Fuel and water trucks	68 A-weighted decibels (500 feet from source)
Crane for hoisting rigs	68 A-weighted decibels (500 feet from source)
Concrete pump used during drilling	62 A-weighted decibels (500 feet from source)
Average well construction site	65 A-weighted decibels (500 feet from source)

Source: La Plata County, Colorado

Diagram 3-13
Typical Noise Levels Near Gas Field Operations



3.21.2 Trends

As the state's population grows, more visitors will be attracted to BLM-administered lands for recreation and solitude in natural landscapes. With the increase in both resident populations and in tourism, soundscapes are expected to become further influenced by human activities such as recreation, hunting, motor vehicle travel, and energy development.

Oil and gas development in the North Park area continues to slowly increase primarily on privately owned lands. The top of the plateau has valid existing leases and with those leases, valid existing leasing rights. Future oil and gas development on the Roan Plateau could generate noise but would be seasonally limited because of snow accumulations on top of the plateau. Limited convenient access to the top of the plateau would also limit the number of other users that may contribute to the ambient noise on top of the plateau.

Significant modifications to the existing soundscapes in the planning area may be limited since the habitat areas are not easily accessible due to topography constraints. The distribution of private land adjacent to BLM-administered and National Forest System lands also constrains access but may introduce the potential for soundscape changes in the planning area as private parcels are developed.

Soundscapes near GRSG habitat have not changed on the Routt National Forest in the past several decades, with the exception of increased snowmobile activity during the winter. The majority of this activity within GRSG habitat occurs in GH that is not suitable for winter use by GRSG.

3.21.3 References

BLM (United States Department of the Interior, Bureau of Land Management). 2007. Environmental Assessment #CO-140-2005-143. Increased Aircraft Operations at the Colorado Army National Guard High-Altitude Army Aviation Training Site. BLM, Glenwood Springs Field Office, CO.

La Plata County, Colorado. 2002. La Plata County Impact Report. pp 3-98.

Thuman, A., and R. K. Miller. 1996. Fundamentals of Noise Control Engineering. Prentice-Hall, Englewood Cliffs, New Jersey. 287pp.

3.22 CULTURAL RESOURCES AND NATIVE AMERICAN RELIGIOUS CONCERNS

Cultural resources are the material and physical remains of prehistoric and historic human activity, occupation, or endeavor. "Culture [is] a system of behaviors, values, ideologies, and social arrangements. These features, in addition to tools and expressive elements such as graphic arts, help humans interpret their universe, as well as deal with features of their environments, natural and social. Culture is learned, transmitted in a social context, and modifiable. Synonyms for culture include lifeways, customs, traditions, social practices, and folkways (Parker and King 1998). Natural features of importance in human history, such as mountains and rivers, may also be considered cultural resources. Overall, these resources are fragile and nonrenewable, and embody characteristics and information specific to the period in which a cultural group lived. Intrinsically, each cultural resource is important and provides valuable information about human occupation of an area. The protection of cultural resources is provided for by an extensive framework of laws, regulations, executive orders, and formal agreements. These laws and regulations have evolved over the past century to create a complex but strong policy for managing cultural resources for public benefit on both BLM-administered and National Forest System lands.

Section 106 (16 USC 470-f) and Section 110 (16 USC 470h-2) of the National Historic Preservation Act are the foundation of cultural resource protection and management for all federal agencies. Section 106 specifically requires federal agencies to take into account the effects of their activities on significant cultural properties, and specifies the procedures for meeting the statutory responsibilities. The Act also established the NRHP, which is a national program that coordinates and supports public and private sectors in the identification, evaluation, and protection of historic and archaeological resources. The NRHP provides an official listing of the nation's historic places deemed worthy of preservation.

Section 110 (16 USC 470h-2) provides the legal basis for the historic component of federal agencies' cultural programs. Section 110 prescribes to federal agencies and initiates a preservation program for each agency, which is responsible for both collecting information about cultural resource sites in a particular planning area, as well as identifying sites eligible for nomination to the NRHP. Historic properties are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. The term includes, for purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the NRHP" includes properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP listing criteria (36 CFR 800.2[e])."

Significant cultural properties include Traditional Cultural Properties. According to this code of regulations, a property is significant, and therefore eligible for nomination to the NRHP, if it possesses the following characteristics:

- I. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that
 - a. Are associated with events that have made a significant contribution to the broad patterns of our history.
 - b. Are associated with the lives of persons significant in our past.
 - c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
 - d. Have yielded, or may be likely to yield, information important in prehistory or history.

Although typically only properties 50 years or older may be considered significant, a number of exceptions apply for properties of unusual or exceptional significance (36 CFR 60).

Sites identified as eligible or that require additional data for significance evaluation as potentially eligible for the NRHP, are entitled to resource management considerations. These sites are protected through avoidance, and if avoidance is not possible, a mitigation strategy is developed to mitigate adverse impacts. Sites evaluated as not eligible for the NRHP after complete identification, description, and significance evaluation are eliminated from further resource management considerations. Federal agencies have the responsibility

to protect cultural resources on non-federal lands for certain Section 106 undertakings. However, federal agencies have no responsibility for their long-term protection because cultural resource sites are owned by the landowner.

The BLM has entered into a national programmatic agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers, and a protocol with the Colorado State Historic Preservation Office on planning for and managing historic properties under the BLM's jurisdiction or control. The protocol outlines how the BLM and State Historic Preservation Office would continue to interact, cooperate, and share information to ensure that the alternate procedures are consistent with the goals of the National Historic Preservation Act. These procedures allow the BLM more flexibility in identifying those cultural resources that meet criteria listed in 36 CFR Part 60.4 for NRHP eligibility and determining effects according to 36 CFR 800.9 without consulting State Historic Preservation Office for each routine undertaking.

The Routt National Forest currently has two forest specific programmatic agreements with the Advisory Council on Historic Preservation and the Colorado State Historic Preservation Office for project specific reporting and managing historic properties under the forest's jurisdiction. These agreements provide protocols for expedited reporting of surveys where there are no cultural resources that meet the criteria for NRHP eligibility as well as standard protection measures to ensure a no adverse effect to those sites meeting the criteria.

3.22.1 Existing Conditions

Conditions of the Planning Area

Documented prehistoric site types on BLM-administered lands in the planning area include open architectural, open and sheltered camps, open lithic, rock art, stone quarries, and a sheltered lithic. Prehistoric sites in this area commonly contain projectile points, scraping and cutting tools, hammerstones, tool manufacture flake debris, manos and metates, and, less commonly, pottery. Prehistoric sites could be associated with one or more of four regional cultural traditions: Paleo-Indian, Archaic, Formative (Fremont), and Proto-historic.

Historic sites are primarily related to early ranching and livestock grazing and are concentrated along the more moist drainage bottoms. Sites include, but are not limited to, arborglyphs, cow camps, trash scatters, mines, roads, trails, railroads, ditches, homesteads, and other historic structures. Artifacts at these sites commonly include tin cans, glass, ceramic, wire, nails, wood, and other metal objects.

Table 3.78 displays the number of inventoried acres and the number of historic properties found, divided up by BLM field office and Routt National Forest.

Table 3.78
Inventory Acreage, Sites, and Ratio of Known Cultural Resources Sites to Acres

Location	Total Class III Inventory	Known Sites	Total Historic Properties	Ratio of Known Sites to Acres (sites: acres)
CRVFO	23,300	243	56	1:96
GJFO	10,600	87	42	1:122
KFO ¹	305,500	5,533	1,086	1:55
LSFO ¹	65,400	5,679	1,573	1:318
WRFO	88,100	645	286	1:137
Routt National Forest	1,400	43	3	1:32
Total	494,300	12,230	3,046	1:183

Source: Reed et al. 2008 (for KFO); McDonald and Metcalf 2006 (for LSFO); BLM 2013 (for all other locations).

¹ Numbers for the KFO and LSFO includes acreage and sites outside of GRSG habitat. However, because a large proportion of both field offices falls within the planning area these numbers can be considered representative of the portions of these two field offices that falls within the planning area. Numbers for all other field offices are specific to GRSG habitat within those offices.

As a result of Class III Inventories, the most cultural resource inventory sites and historic properties are within the KFO and LSFO. The ratio of known sites to acres suggests the highest densities of cultural resources occur on the Routt National Forest and KFO.

Conditions on BLM-Administered Lands

The following field office descriptions are intended to provide a general overview of the condition of cultural resources on BLM-administered lands within the decision area. More specific information on the cultural resources for each area can be found in the respective RMPs and several overview reports, including Reed and Metcalf's Northern Colorado River Basin overview (1999), a synthesis of archaeological data compiled for several large pipeline projects (2009); Athearn (1982), Husband (1984), and Church (2007) for an overview of the historic context; and individual Class I Overview Reports for LUP revisions including for the LSFO (McDonald and Metcalf 2006).

Colorado River Valley Field Office

Within the portion of the decision area that falls within the CRVFO, cultural resources are broken out into two separate areas; the Roan Plateau and the North Eagle areas. The Roan Plateau area is located northwest of Rifle, Colorado, north of the Colorado River and on top of the Roan Plateau. The North Eagle area is located north of Eagle, Colorado, and north of the Colorado River within the Upper Colorado River watershed. Differences in cultural resources between the Roan Plateau and the North Eagle areas provide insight to how the areas were utilized in the past.

A total of 23,300 acres have been inventoried for cultural resources at the Class III level the portion of the planning area that falls within the CRVFO. This accounts for approximately 19 percent of the planning area that falls within the

CRVFO. A total of 172 prehistoric sites and 177 prehistoric isolated finds have been documented within this area. Of the 172 sites, 37 are eligible and 37 others are potentially eligible for the NRHP. Prehistoric cultural resources consist of open camp sites, open lithic sites, open architectural sites, and various isolated finds. Of the prehistoric sites that are datable, the majority (about 20 sites) date from the Archaic and 15 sites date to the Late Prehistoric. Additionally, the planning area contains one Paleoindian site, one Protohistoric site, and two possible Fremont sites. Unlike the entirety of the CRVFO, the planning area does not contain sites with Wickiup structures. Because Wickiups are mainly located within Pinion-Juniper vegetation and the planning area is predominantly sage brush, these types of sites are not found in this part of the CRVFO.

Historic cultural resources within the planning area consist of irrigation ditches, railroad segments, trails, roads, cabins, and bridges. A total of 58 historic sites have been documented, six of which are eligible and three of which are potentially eligible for the NRHP. Additionally, a total of 20 historic isolated finds have been recorded. Some unique historic sites in the planning area include the Historic Burns School, the Burns rodeo grounds, a cemetery, and 13 separate arboglyph (aspen art) sites. The oldest historic sites date to the 1880s and are segments of stage coach lines or roads.

Grand Junction Field Office

Within the portion of the decision area that falls within the GJFO, cultural resource settings can be split into two distinct units. One unit is located south and east of the Colorado River and wraps around the west end of Battlement Mesa (Sunnyside). The other is located north and west of the Colorado River and characterized as the high elevation ridges above the Roan Creek watershed (Roan Creek). These two environments seem to have been utilized differently during prehistoric times and have distinctly different cultural resources.

Within the portion of the decision area that falls within the GJFO, a total of 10,600 acres have had Class III surveys and a total of 87 cultural resources (sites) and 163 isolated finds have been recorded.

Within the Sunnyside unit, the majority of prehistoric sites are open camps, with open architectural (wickiups), sheltered camps, and rock art sites also recorded. Historic sites in this unit include homesteads, camps, isolated trash scatters, and a wagon road. Recorded Native American sites range from 6,000 years ago to what is interpreted as historic Ute occupation. Excavations in the unit have demonstrated that sites from the archaic time period are not only found on the surface, but in some locations are deeply buried with little to no surface artifacts.

Within the Roan Creek unit, the prehistoric sites are evenly divided between open camps and open lithic (one multicomponent site has an open lithic component at a homestead). Historic sites include cabins, corrals and camps.

No excavation data are available and all prehistoric sites have been recorded as “unidentified Native American” which gives no indication of even a general date of occupation. The presence of obsidian at the lithic scatter at the homestead suggests a possible historic Ute association but this is speculative.

Kremmling Field Office

Within the KFO, a total of 305,500 acres have had Class III surveys and a total of 5,533 known sites have been recorded. This includes some acreage and sites that fall outside the planning area for this EIS. However, because the decision area represents the majority of the KFO it can be assumed to be representative of the planning area within the KFO.

The draft EIS for the KFO RMP further describes cultural resource conditions that may affect historic properties on the KFO (BLM 2011, pp. Section 3.2.7) and describes the number of prehistoric and historic properties that are eligible and whether they are multi-component sites, and isolated finds within the decision area, three landscape units defined as: the Middle Park Unit, the North Park Unit and the Larimer Unit. The draft RMP/EIS also describes significant historic properties and actions for protection under the NHPA of 1966, as amended and its implementing laws and regulations within the KFO (BLM 2011, Section 3.2.7). Those portions of Chapter 3 of the draft RMP/EIS that describe the affected environment are incorporated here by reference.

Little Snake Field Office

Within the entirety of the LSFO, 65,400 acres have had Class III surveys and a total of 5,679 sites have been recorded. This includes some acreage and sites that fall outside the decision area for this EIS. However, because the decision area represents a large portion of the LSFO it can be assumed to be representative of the portion of the decision area within the LSFO.

The prehistoric and historic cultural context for the LSFO has been described in several recent regional contexts. The prehistoric context is described in Reed and Metcalf's Northern Colorado River Basin overview (1999), a synthesis of archaeological data compiled for several large pipeline projects (2009). The historic context is described in overviews compiled by Frederic J. Athearn (1982) and Michael B. Husband (1984). A historical archaeology context has also been prepared for the state of Colorado by Church and others (2007). An overview of significant cultural resources (affected environment) on BLM-LSFO administered lands has been compiled by McDonald and Metcalf (2006) for the Little Snake RMP and Final EIS (3-81). Those portions of Chapter 3 of the LSFO RMP/EIS that describe the affected environment are incorporated here by reference.

White River Field Office

Within the portion of the decision area that falls within the WRFO, a total of 88,000 acres (14 percent of the total acreage of the decision area within the WRFO) have had Class III surveys and a total of 645 sites have been recorded.

Of these 645 sites, 458 are prehistoric, 169 are historic, and 17 are multicomponent. Of the sites, one is listed on the NRHP (the Battle of Milk Creek/Thornburgh battlefield), 68 are eligible, 218 are potentially eligible, and 358 are not eligible sites. The majority of the previously recorded sites in the WRFO planning area have been identified as prehistoric in age and cultural affiliation.

Prehistoric sites could be associated with one (or more) of four regional cultural traditions: Paleo-Indian, Archaic, Formative (Fremont), and Proto-historic. Documented prehistoric site types in the portion of the decision area that falls within the WRFO include open architectural, open and sheltered camps, open lithic, rock art, stone quarries, and a sheltered lithic. Prehistoric sites in this area commonly contain projectile points, scraping and cutting tools, hammerstones, tool manufacture flake debris, manos and metates, and less commonly pottery.

The historic sites in the portion of the decision area that falls within the WRFO are primarily related to early ranching and livestock grazing and are concentrated along the more moist drainage bottoms. Sites include, but are not limited to, aspen art, a barn, a battlefield, bridges, brush fences, a cairn, cabins, camps, coal mines, corrals, cow camps, ditches, a historic marker, homesteads, horse traps, ranches, roads, rock art, school houses, a townsite, trails, and trash scatters. Artifacts at these sites commonly include tin cans, glass, ceramic, wire, nails, wood and other metal objects.

Conditions on National Forest System Lands

Routt National Forest

Of the 17,500 acres on the Routt National Forest in the decision area, 1,400 acres (8 percent) have been inventoried for cultural resources. Of the acres inventoried, 43 cultural resources have been located, or approximately one cultural resource located for every 30 acres of habitat inventoried.

Of the located cultural resources, the majority (26 of the 43, or 60 percent) are prehistoric sites. The most common type of site located in the habitat on the Routt National Forest is a lithic scatter. Historic sites in the habitat area include isolated USGS survey markers, historic aspen art, roads, and cabins.

Of the 43 sites located, only 3 have been evaluated as being eligible to the NRHP. This translates to one eligible site for every 452 acres surveyed. The Hahns Peak/Bears Ears Ranger District has one of the eligible sites, a historic cabin site. The Parks Ranger District has the other two sites, both of which are prehistoric sites.

3.22.2 Trends

Trends on BLM-Administered Lands

Known conditions of cultural resources within the decision area indicate that the majority of sites are in good or fair condition; few sites are in deteriorating or poor condition. Natural erosion, such as wind and water erosion, project development, increases in site visitation, and increases in recreation and development activities can all contribute to declining site conditions. Actions that specifically highlight stabilization or avoidance measures for cultural resources would contribute to maintaining current site conditions.

Declining site conditions can result from project development activities, permitted activities, or neglect. Causes of declining site conditions in the decision area include recreation activities, vegetation treatments, fire (both natural and unplanned), locatable mineral development, coal development, road and utility rights of ways and leases (such as pipelines, roads, and transmission lines), livestock grazing, and wild horses and burros. These activities generally fragment the landscape, break up site continuity, and can damage and destroy sites, contributing to their decline.

The cultural resource program within the Colorado GRSG decision area continues to be driven primarily by project-related cultural resource inventory, as well as proactive Section 110 inventories. As a result new discoveries are ongoing, and newly discovered cultural resources are being documented and added to the cultural resource database regularly. Significant cultural resources are selected for protection or mitigation prior to project implementation.

Trends on National Forest System Lands

Routt National Forest

Trends that are likely to affect cultural resources include oil and gas development, recreation, vegetation treatments, lands and realty actions, and livestock grazing. For the Routt National Forest, these trends are primarily qualitative in nature. As projects are proposed, additional acres are surveyed for cultural resources. If a significant resource is located, mitigation is typically designed to avoid any negative consequences of the proposed actions. In general, increased numbers of proposed projects increase the ability of the Forest Service to identify and evaluate cultural resources, and thereby protect those that are considered significant. The increasing use of the Forest by recreation users has the potential to increase effects on significant resources through exposure of the sites by vehicular and foot traffic, as well as potential effects through unauthorized collection of artifacts.

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3.23 PALEONTOLOGICAL RESOURCES

Paleontology is the study of fossils and related remains. A fossil is defined as any trace of a past life form. The term “paleontological resources” includes any fossilized remains, traces, or imprints of organisms that are preserved in or on the earth’s crust, are of scientific interest, and provide information about the history of life on earth. Paleontological resources constitute a fragile and nonrenewable scientific record of the history of life on earth.

Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the occurrence potential of paleontological resources.

BLM

BLM policy is to manage paleontological resources for scientific, educational, and recreational values and to protect or mitigate these resources from adverse impacts. To accomplish this goal, paleontological resources must be professionally identified and evaluated, and paleontological data should be considered as early as possible in the decision-making process. Paleontological resources are managed according to the BLM Manual Section 8270, Paleontological Resource Management, BLM Handbook H-8270-1, General Procedural Guidance for Paleontological Resource Management, and applicable BLM instructional memoranda and bulletins. Additional preservation measures have been enacted under the Omnibus Public Lands Act of 2009. The BLM is currently developing regulations to implement the requirements of this law.

BLM guidance (BLM Instruction Memorandum 2008-009, Potential Fossil Yield Classification System for Paleontological Resources on Public Lands) defines a classification system to provide a more uniform tool to assess potential occurrences of paleontological resources and evaluate potential impacts. The Potential Fossil Yield Classification system is intended to be applied in broad approach for planning efforts and as an intermediate step in evaluating specific projects. This is part of a larger effort to update BLM Handbook H-8270-1, General Procedural Guidance for Paleontological Resource Management.

Using the Potential Fossil Yield Classification system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts. A higher class number indicates a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally be found in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major

determinant for the class assignment. Five classes were developed: Class 1 has very low potential for containing fossils, and Class 5 has very high potential.

The Potential Fossil Yield Classification system class assignments are (BLM 2008h):

- Class 1—Very Low. Geologic units that are not likely to contain recognizable fossil remains.
- Class 2—Low. Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.
- Class 3—Moderate or Unknown. Fossiliferous or scientifically geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.
- Class 4—High. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface-disturbing activities may adversely affect paleontological resources in many cases.
- Class 5—Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

Forest Service

In 2009, Congress passed the Paleontological Resources Preservation Act as part of the Omnibus Public Land Management Act (Public Law 111-11). The Act mandated that the “Secretary [of Agriculture] shall manage and protect paleontological resources on federal land using scientific principles and expertise. The Secretary shall develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources, in accordance with applicable agency laws, regulations, and policies. These plans shall emphasize interagency coordination and collaborative efforts where possible with non-federal partners, the scientific community, and the general public.”

The Forest Service Rocky Mountain Region has developed a classification system of geologic units according to their probability of containing scientifically significant fossil resources referred to as the Fossil Yield Potential Classification. The Fossil Yield Potential Classification is designed to provide Forest Service management with a way to prioritize protection of paleontological resources. Under this system, geologic formations are classified on a scale from 1 to 5 (with 5 as the highest paleontological sensitivity) to reflect the likelihood of

containing scientifically significant vertebrate fossils of terrestrial (i.e., nonmarine) origin. A less arbitrary and subjective classification system is currently being developed by Forest Service paleontological resource specialists.

3.23.1 Existing Conditions

Conditions of the Planning Area

The planning area, which includes Dinosaur National Monument and other high fossil yielding geological formations, contains extensive paleontological resources. While comprehensive paleontological inventories have not been completed for the planning area, however, many studies have been conducted.

Conditions on BLM-Administered Lands

While a comprehensive paleontological inventory has not been conducted on BLM lands within the decision area, various government, academic, and private industry personnel have studied paleontological resources.

Within the KFO, 23 of the 59 named surface formations are known to contain fossils. Over 1,000 paleontological localities have been documented, representing a diverse array of plants, invertebrates, and vertebrates (BLM 2011, Section 3.2.8). Within the portion of the decision area that falls within the KFO, the Kremmling Cretaceous Ammonite ACEC is managed for scientific and educational purposes related to paleontological resources.

Within the LSFO, at least 40 groups and institutions from the 1850s to the present have collected fossils (Armstrong and Wolney 1989). During that period, over 1,000 paleontological localities have been documented, representing a diverse array of plants, invertebrates, and vertebrates. There are currently active paleontological use permits within the LSFO.

Roughly 20 percent of the GJFO has either Morrison or Wasatch formation on the surface, both of which have produced many scientifically significant fossils. Since 1987, numerous paleontological fossil sites have been discovered and continue to be surveyed and recorded. Nearly all of the decision area within the GJFO is classified as Potential Fossil Yield Class 5, meaning these areas have a high probability of containing significant fossils.

Over 1,000 paleontological localities have been documented in the CRVFO area, and the fossils recovered represent a diverse array of plants, invertebrates, and vertebrates. There are active paleontological use permits issued on decision area lands in the CRVFO. Efforts to fully inventory fossil resources within the CRVFO have been limited in scope. The 78 named surface formations identified within the CRVFO area are described in the draft EIS for the CRVFO RMP (DES 11-33, BLM 2011, Section 3.2.9). This document also outlines the 20 fossil bearing formations classified as high potential yield based on the BLM's Potential Fossil Yield Classification system. Most fossil bearing formations present within the identified PH and GH in the CRVFO are not exposed in bedrock outcrops

(which represent the majority of discovery sights) due to tertiary aged colluvium and alluvium deposits as well as a high degree of vegetative cover.

Efforts to fully inventory fossil resources within the WRFO planning area have been limited in scope. Government, academic, and private industry personnel have studied paleontological resources in various contexts, but principally in relation to surface-disturbing development activities. To date, there are approximately 355 documented paleontological localities within the WRFO and many more that were located prior to current recording standards. The GRSG habitat in the WRFO is primarily in Potential Fossil Yield Class 5 formations, so there is a very high probability of it containing significant fossils. There are 68 documented paleontological localities that have been recorded in the GRSG habitat.

Conditions on National Forest System Lands

Routt National Forest

The extent of paleontological deposits in the Routt National Forest is unknown at this time. A complete inventory of the possible fossil-laden deposits has not been completed. Two potential paleontological resource areas on the National Forest have been identified. In the late 1970s, a single mammoth femur was removed from the mud at the base of the Yamcolo Reservoir Dam during construction. Little is known about the circumstances of the recovery. However, the excellent preservation of the specimen and the geomorphology of the area suggest the presence of Pleistocene deposits which may contain more faunal material. The other area is California Park, which contains unique features such as sulphur springs, fossils, and buffalo skulls. The California Park area is the only areas of known fossils in conjunction with GH.

The Fossil Yield Potential Classification maps for the Routt National Forest show most of the forest as a 1 or 2, with the two mentioned areas as 3's. At this time there are not any known areas with a classification rating of 4 or 5 on the National Forest.

3.23.2 Trends

Trends on BLM-Administered Lands

Interest in fossils and paleontology has been greatly stimulated in recent years, bringing new vocational and professional visitors to the known fossil locations, and increased exploration to discover new fossil localities. This has in turn increased agency concern for potential impacts on the resource from vandalism and theft. The current trend of paleontological resource use permits and scientific activity is likely to continue or to increase slightly in the future. Clearances and monitoring of surface-disturbing activities, land tenure adjustments, and scientific research are anticipated to be the primary means of identifying paleontological localities.

The current management direction and forecast for paleontological resources is to implement the Potential Fossil Yield Classification throughout the decision area and to identify and record new findings. Another goal is to seek opportunities to identify areas with significant paleontological resources for special management. Preservation measures for paleontological resources enacted under the Omnibus Public Lands Act of 2009 would be implemented.

Surface-disturbing activities and oil and gas development are two of the main drivers of the paleontology program. Developments of oil and gas and other minerals such as coal and nahcolite, as well as the realty actions associated with them, road and pipeline construction for example, fragment the landscape, and cause outright destruction of sites, as well as indirect impacts such as theft. The positive effect of energy and mineral development is the increased knowledge of the resource that is gained by surveys, construction monitoring, and excavations.

Additionally, despite the harm oil and gas can potentially cause paleontological resources, all paleontological resources are managed to protect their important scientific values and will continue in the future as the BLM continues to enact preservation measures enacted under the Omnibus Public Lands Act of 2009 and other legislation.

Trends on National Forest System Lands

Routt National Forest

The Forest Service recognizes multiple-use values for paleontological resources that include a legacy for present and future generations; scientific significance, education and interpretation; recognition of aesthetic qualities; and public participation. The Paleontological Resources Preservation Act set specific regulations for permitting, collection, and curation of paleontological resources from federal lands. Furthermore, it is the policy of the Forest Service to complete a paleontological resources inventory for all National Forest System lands potentially impacted by agency and non-agency project proposals. For sites located during these inventories, it is policy to complete a paleontological resource site form.

3.23.3 References

BLM (US Bureau of Land Management). 2008. Instruction Memorandum No. 2008-009, Potential Fossil Yield Classification System for Paleontological Resources on Public Lands. BLM, Washington Office, Washington, DC.

3.24 SOCIAL AND ECONOMIC CONDITIONS (INCLUDING ENVIRONMENTAL JUSTICE)

This section includes the individual resources of social conditions, economic conditions, and environmental justice. Due to the nature of social, economic, and environmental justice conditions, the social and economic analysis is based on a somewhat different area for analysis than is used for other resources. Specifically, the Socioeconomic Study Area is made up of counties within the

Northwest Colorado sub-region that contain some GRSG habitat, plus counties that may not contain habitat but are intimately linked to the economic or social conditions and also serve as important service areas. This latter category includes what are sometimes called “service area” counties, or counties from which businesses operate that regularly provide critical economic services, such as recreational outfitting or support services for oil and gas drilling and production, within the counties that contain habitat (METI Corp/Economic Insights of Colorado 2012). Including service area counties is important because a change in economic activity in a county containing habitat may result in changes in economic activity within service area counties as well. At the same time, not every possible service area county is included in the Socioeconomic Study Area, because to do so would risk dwarfing the impacts within the counties that would be most affected. For example, businesses within the City and County of Denver do provide some services within the Northwest Colorado sub-region, but including Denver in the Socioeconomic Study Area would risk overwhelming the observable conditions in less populated counties within the sub-region.

The Socioeconomic Study Area contains eight counties in Colorado: Eagle, Garfield, Grand, Jackson, Mesa, Moffat, Rio Blanco, and Routt. Each of these counties contains PH or GH. Larimer and Summit counties also have GRSG habitat in the Northwest Colorado sub-region but were excluded from the Socioeconomic Study Area because they have considerably less habitat than other counties (less than 10,000 acres), are not considered important service areas for the remaining counties, and, in the case of Larimer County, would have considerably altered the data presented for the Socioeconomic Study Area because of the size of the county’s population and economy. Mesa County also has less than 10,000 acres of GRSG habitat but was kept in the Socioeconomic Study Area because the city of Grand Junction is a primary service area county for oil and gas support services. **Table 3.79** shows the counties contained partially or wholly within the Routt National Forest and each BLM field office composing the Socioeconomic Study Area.

Table 3.79
BLM and Forest Service Management Units and Counties
within the Socioeconomic Study Area

Agency	Management Unit	Counties
BLM	CRVFO	Eagle, Garfield, Mesa, Pitkin, Rio Blanco, Routt
BLM	GJFO	Garfield, Mesa
BLM	KFO	Eagle, Grand, Jackson, Larimer, Summit
BLM	LSFO	Moffat, Rio Blanco, Routt
BLM	WRFO	Garfield, Moffat, Rio Blanco
Forest Service	Routt National Forest	Garfield, Grand, Jackson, Moffat, Rio Blanco, Routt

BLM and Forest Service considered Larimer and Summit Counties in Colorado, with some GRSG habitat, as part of a “secondary” Socioeconomic Study Area. In addition, Uintah County, in Utah, and Sweetwater and Carbon counties, in Wyoming, were also included as part of the secondary Socioeconomic Study Area. Uintah County was included because companies in Vernal provide important oil and gas related services within some of the areas of northwestern Colorado in the primary analysis area (Lau 2012). Sweetwater and Carbon counties were included because Rock Springs (Sweetwater County) and Rawlins (Carbon County) also seem to serve as an important service areas (Comstock 2013). Because any effects on the Secondary Socioeconomic Study Area would be indirect and sometimes focused on specific sectors (e.g., oil and gas in Uintah County), this section contains limited data on conditions within these counties, and focus on what is necessary to provide appropriate context for the impact analysis provided in **Chapter 4**, Environmental Consequences.

Table 3.80 shows the share of workers employed in a given county of the Primary and Secondary Socioeconomic Study Areas and that reside in the same county. It also shows other counties that provide labor to the selected primary or secondary study area. The table shows that no labor market in the Socioeconomic Study Area relies on a county outside the Socioeconomic Study Area for a considerable share of the workers employed.

Table 3.80
Commuter Patterns in the Socioeconomic Study Area, 2010

Geographic Area of Employment	Live in Same Area of Employment	Other Counties Where Considerable Share of Workers Live
Primary Socioeconomic Study Area		
Eagle County, CO	64.4%	Garfield (5.3%), Summit (4.6%), Lake (2.7%), Denver (2.4%), Jefferson (2.0%)
Garfield County, CO	60.8%	Mesa (9.0%), Eagle (5.0%), Pitkin (2.4%)
Grand County, CO	73.9%	Jefferson (3.8%), Larimer (3.2%), Denver (2.4%).
Jackson County, CO	74.7%	Larimer (3.4%), Jefferson (2.7%), Albany (2.5%)
Mesa County, CO	74.6%	Jefferson (2.5%), Montrose (2.2%), Delta (2.0%)
Moffat County, CO	68.6%	Routt (7.8%), Mesa (2.6%)
Rio Blanco County, CO	61.8%	Moffat (12.4%), Mesa (8.2%), Garfield (3.9%), Uintah, UT (2.6%)
Routt County, CO	70.7%	Moffat (8.6%)
Secondary Socioeconomic Study Area		
Larimer County, CO	68.1%	Weld (10.9%), Boulder (3.1%), Jefferson (3.0%)
Summit County, CO	55.2%	Eagle (7.3%), Jefferson (4.3%), Park (3.2%), Denver (2.9%), Arapahoe (2.3%), Boulder (2.2%), Douglas (2.0%)
Uintah County, UT	73.3%	Duchesne, UT (7.7%), Salt Lake, UT (5.1%), Utah, UT (3.2%)
Sweetwater County, WY	73.0%	Uinta, WY (5.4%), Natrona, WY (3.9%), Carbon, WY (2.4%)
Carbon County, WY	73.5%	Natrona, WY (3.9%), Laramie, WY (3.9%), Sweetwater, WY (3.5%), Fremont, WY (2.6%), Albany, WY (2.0%)

Source: US Census Bureau 2012b

Because of the nature of the Socioeconomic Study Area, the socioeconomic resources section has a slightly different format than the other resource analyses in the EIS. Rather than proceeding by Field Office and National Forest, the section provides information for the entire Socioeconomic Study Area except where the relevant information or data are tabulated for the specific geographic area of field office or National Forest. In addition, the analysis presents information about existing conditions and trends within the same section, because that is the common practice for analysis of social and economic conditions.

3.24.1 Existing Conditions

Social Conditions

Social conditions concern human communities, including towns, cities, and rural areas, and the customs, culture, and history of the area as it relates to human settlement, as well as current social values.

Population and Demographics

Table 3.81 shows current and historic populations in the Socioeconomic Study Area.

Table 3.81
Population Growth, 1990–2010

Geographic Area (Colorado)	1990	2000	2003	2005	2007	2010	Percent Change (1990-2010)
Eagle County	21,928	41,659	44,995	47,205	49,803	52,197	138.0
Garfield County	29,974	43,791	47,622	49,579	53,534	56,389	88.1
Grand County	7,966	12,442	13,324	13,627	14,306	14,843	86.3
Jackson County	1,605	1,577	1,512	1,449	1,407	1,394	-13.1
Mesa County	93,145	116,255	124,994	130,194	139,434	146,723	57.5
Moffat County	11,357	13,184	13,106	12,956	13,348	13,795	21.5
Rio Blanco County	6,051	5,986	5,923	5,945	6,373	6,666	10.2
Routt County	14,088	19,690	20,893	21,398	22,491	23,509	66.9
Socioeconomic Study Area	186,114	254,584	272,369	282,353	300,696	315,516	69.5
Colorado	3,294,473	4,301,261	4,528,732	4,631,888	4,803,868	5,029,196	52.7
US	248,790,925	281,421,906	290,107,933	295,516,599	301,231,207	308,745,538	24.1

Sources: US Census Bureau 1990, 2000, 2010a, 2010d

Since 1990, the population in Colorado has increased by 52.7 percent, over twice the percent change of the US. A higher percentage of growth occurred in Colorado between 1990 and 2000 than between 2000 and 2010. Of the percentage increase in Colorado's population since 1990, natural increase (births minus deaths) accounts for approximately 41 percent of the growth and

an increase in net migration accounts for approximately 59 percent (Colorado State Demography Office 2012).

Within the Socioeconomic Study Area, Mesa County has maintained the largest population of any county over the last 20 years. Currently, Mesa County's population of nearly 147,000 is over twice the size of the Study Area's second largest county.

With a population of 58,566 people (US Census Bureau 2010a), Grand Junction is the most populous city in Mesa County and the 15th most populous city in Colorado. Other large communities include Fruita in Mesa County with a population of 12,646 (the 37th most populous city in Colorado); Steamboat Springs in Routt County with a population of 12,088 (39th most populous); Glenwood Springs in Garfield County with a population of 9,614 (46th most populous); Craig in Moffat County with a population of 9,464 (47th most populous); and Rifle in Garfield County with a population of 9,172 (48th most populous) (US Census Bureau 2010a, 2010b).

Table 3.82 shows age and gender characteristics of the population in each county of the Socioeconomic Study Area.

Table 3.82
Demographic Characteristics, Share in Total Population (percent), 2010

Geographic Area (Colorado)	Women	20 to 64 Years of Age	Under 20 Years of Age	65 Years of Age or Older
Eagle County	46.7	68.0	26.4	5.6
Garfield County	48.4	62.2	29.4	8.4
Grand County	46.6	67.5	22.3	10.2
Jackson County	47.2	60.8	20.8	18.4
Larimer County	50.4	62.7	25.4	11.9
Mesa County	50.3	58.5	26.6	14.9
Moffat County	48.9	60.0	29.5	10.5
Rio Blanco County	48.5	60.0	27.6	12.4
Routt County	46.8	68.8	23.1	8.1
Summit County	45.1	73.3	19.0	7.7
Colorado	49.9	62.0	27.1	10.9
US	50.8	60.1	26.9	13.0

Source: US Census Bureau 2010b

In terms of demographic characteristics, Colorado generally follows the same trends as the country as a whole: approximately 50 percent of the population is women, and approximately 60 percent of the population is between the ages of 20 and 64. The Socioeconomic Study Area, however, has a slightly lower percentage of women than the nation and a higher percentage of working age individuals. Of the counties within the Socioeconomic Study Area, Routt, Eagle, and Grand Counties have the highest percentages of working-age individuals, all

at least 7 percentage points higher than the national average. Jackson County has the highest percentage (18.4 percent) of individuals over the age of 65, with more than 5 percentage points higher than the national average (13 percent).

Interest Groups and Communities of Place

There is a range of interest groups in the Socioeconomic Study Area, and the positions advanced by these groups include some overlapping interests and some divergent interests. These groups sometimes define and/or measure “sustainable use” or “resource conservation” differently, and different definitions and measures of sustainability sometimes result in different conclusions about how land and resources should be managed. There are also groups that represent coalitions of interest groups. A list of interest groups that have requested to receive a copy of the draft EIS are provided in **Chapter 6, Consultation and Coordination**. Interest groups within the Socioeconomic Study Area include the following: federal agencies, state agencies, county agencies, local agencies, congressional representatives, academic institutions, civic organizations, local chambers of commerce, environmental groups, outdoors groups, farm associations, Native American groups, and various business groups. Specific types of business interest groups include the following: real estate; tourism; recreation; mineral development; textile manufacturers; grain, fruit and vegetable farmers; and ranch operators.

The Socioeconomic Study Area includes various communities of people who are bound together because of where they reside, work, visit, or otherwise spend a continuous portion of their time. The various communities in the Socioeconomic Study Area share a strong link to the land and natural resources.

For example, recreation opportunities and scenic beauty are among the most commonly cited reasons that people live in or visit the communities in the Colorado River valley. The quality of life and small town character are also reasons residents live in these communities (BLM 2007a). Popular recreation activities includes skiing, fishing, hiking, hunting, OHV use, pleasure driving and mountain biking. These activities contribute greatly to the quality of life and lifestyles in the Socioeconomic Study Area.

Recently, many rural communities in the western US have witnessed "migration turnaround," a reversal of the rural-to-urban migration that characterized much of the US prior to the 1970s. Many rural areas are experiencing a significant increase in population after decades of stability or decline. In scenic areas, particularly those with recreational opportunities, ranches are being sold and used for recreation purposes or subdivided for home sites. Other rural areas, however, continue to lose population. This is due, in part, to the out-migration of young people. In addition to these trends, some rural areas have experienced the population and employment "boom and bust" cycles that are sometimes associated with certain kinds of industries, such as mineral development (BLM,2010b; BLM 2011a). Most recently, several communities in the study area

experienced relatively rapid growth in the early- to mid-2000s in large part driven by natural gas development. The recent economic downturn in conjunction with falling natural gas prices slowed economic activity down substantially. This recent “boom and bust” cycle especially impacted housing as some developments were left partially completed or deteriorated.

Mining and agriculture have historically defined the character and lifestyle of Moffat County. The power plant and coal mine near the City of Craig have provided employment opportunities for ranchers and their family members. The Moffat County government has expressed the importance of protecting the customs and culture of Moffat County, which includes agricultural production, timber, industries and manufacturing, and mineral production (Forest Service 1998). There has been a population pattern of boom and bust due to energy production. The population was 6,525 in 1970, doubled between 1970 and 1980 to 13,133, and decreased by 13 percent to 11,357 in 1990. More recently, the population has remained relatively stable, increasing by only 611 persons from 13,184 in 2000 to 13,795 in 2010. While just 1.2 percent of Moffat County is contained within the Routt National Forest, ranchers, loggers, hunters, outfitters and guides, and other businesses and individuals use the Forest and contribute significantly to the character of eastern Moffat County. Dinosaur National Park, which is primarily located in Moffat County, represents a national and regional attraction.

Routt County's social context has changed considerably in recent years. This is due largely to a transition from dependence on agriculture and mining to dependence on recreation and tourism, especially downhill skiing. This transition has been accompanied by sustained, and at times relatively rapid, population growth. Much of the growth has been concentrated in the Steamboat Springs area (Forest Service 1998). Steamboat Springs is a major winter ski resort destination (Colorado Tourism Office 2012).

Historically, Mesa County's economy revolved around agriculture and energy extraction, including extraction of natural gas and uranium (BLM 2010a). Recently, its economy has become more diverse. Key industries include retail trade; healthcare and social assistance; accommodation and food services; and government. Tourism-related industries, in particular, have grown in importance as communities begin marketing the County's extensive public lands as tourism destinations (public lands comprise 76 percent of Mesa County's acreage) (BLM 2010a; Mesa County 2000). For example, the Gateway Canyons resort in Gateway, a community in Mesa County, has marketed surrounding public lands as tourism destinations. The resort's efforts have contributed to Gateway's shift from a primarily mineral extraction- and ranching-based economy to a diversified economy that includes tourism (BLM 2010a).

In addition to its evolving economy, Mesa County's population has grown over 50 percent since 1990 (BLM 2010a). The two most populous cities in the

Socioeconomic Study Area, Grand Junction and Fruita, lie in Mesa County (US Census Bureau 2010a). Both cities have grown quickly: Grand Junction's population has increased by 71 percent increase and Fruita's population by 163 percent in the past three decades (BLM 2010a). The Grand Junction economy was historically based on mining and agriculture, but the economy has diversified considerably in the last 25 years. The area's manufacturing base ranges from electronics to semiconductor equipment, advanced composites to bicycle parts, as well as traditional and base manufacturing. Additionally, oil and gas extraction, mining and construction have re-emerged as strong industry sectors in recent years. The area's growing gross metropolitan production was rated 15th in the nation in average annual growth from 1995 - 2005 (Grand Junction Economic Partnership 2012). Grand Junction also offers outdoor recreation opportunities including hunting, fishing, and biking (Grand Junction Economic Partnership 2012). It serves as the healthcare, educational, economic, and political hub of the County and Western Colorado (BLM 2010a). Fruita, once focused on farming and ranching, has expanded its economy to include energy extraction and tourism. The City considers itself a "mountain biking and outdoor sports destination" (City of Fruita 2008).

Grand County has historically had a farming and ranching culture. However, consistent population and economic growth since the 1970s has introduced opportunities for diversification, as well as challenges to preservation of the County's rural character. In the western portion of the county, agriculture still predominates; in the eastern portion, outdoor recreation (e.g., skiing, hiking, biking, and snowmobiling) and tourism focused on Grand County's natural amenities have become important contributors to the economy (Grand County 2011b). Tourist destinations in the county include the Winter Park ski area, Fraser Valley, Silver Creek ski and resort area, Town of Grand Lake resort community, and Rocky Mountain National Park, among others (Grand County 2011b). Grand County consists primarily (75 percent) of public lands (Grand County 2011b).

Social characteristics in Jackson County differ from those of many of the other counties within the Socioeconomic Study Area. Jackson County is one of the few counties in Colorado that has experienced a recent reduction in population. Its population is rural, with most economic activity coming from agriculture, forestry, fishing, hunting, and mining (BLM 2011b). The Town of Walden is the county seat and has a population of 608 people (US Census Bureau 2010b). The North-Central Colorado Community Assessment Report (BLM 2007a) identified the reasons people live in Jackson County, the most important issues to Jackson County residents, and their desired benefits from public land management. Jackson County residents expressed the wish to preserve the rural character and lifestyle but still want to pursue some development. They enjoy a rugged lifestyle and they respect the land and its resources, as it provides the base for their lifestyle. Jackson County residents have a flexibility and survivability inherent in their lifestyle that is necessitated by the lack of

diversity in economic opportunities (BLM 2007a). During the scoping process, commenters highlighted the importance of Jackson County's agricultural industry and heritage as well as the importance of energy development on BLM-administered land to the social values and economy of the county (BLM and Forest Service 2012). Recreation opportunities available in Jackson County include hunting, fishing, OHV use, GRSG tours, and campgrounds and cabin facilities (Crowder 2012).

Rio Blanco County is primarily rural and is the second smallest county by population in the Study Area after Jackson County. The majority of the land in the county is public, including land administered by BLM and Forest Service, as well as land managed by the State of Colorado. Public land therefore plays a central role in the social and economic characteristics of Rio Blanco County. The residents of the county place a high value on quality of life, independence, open space, and outdoor recreational opportunities – values reliant, to a large extent, on public land (BLM 1994). Many residents also place a high value on resource extraction industries and their importance to the economic well-being of the county. The primary economic activities in the county include agriculture, mineral development (coal, nahcolite, natural gas, oil, oil shale), and recreation (Rio Blanco County 2012). Much of this activity, excluding agriculture, occurs on public land. The communities of Meeker (county seat) and Rangely are located within the county. Both towns advertise the scenic qualities and recreational opportunities in the surrounding area and both are important staging areas for nearby oil and gas and other mineral-related activity. Meeker offers abundant outdoor recreational opportunities in part because it is the home to some of the nation's largest elk herds (Meeker Colorado 2012).

Respondents to the 2008 Garfield County Community Survey identified cost of living, affordable housing, preservation of rural character, water availability, and preservation of open space as the most important issues facing Garfield County (Garfield County 2008). Garfield County has experienced rapid population growth in recent years resulting from increases in energy development, tourism and recreation. From 1990 to 2010, the population of Garfield County increased 88.1 percent and the resulting pressures on the housing market, including the availability of affordable housing for workers, has become an issue for many communities in the county. In the face of increasing population and development, many long-time residents have expressed the importance of preserving rural characteristics and values. The presence of public land plays an important role in the county – approximately 60 percent of land in the county is publicly owned (Garfield County 2012). Many of the primary economic activities in the county including energy development, recreation, and livestock grazing occur on public lands and residents have expressed the importance of protecting these industries and the economic lifeline they provide to local communities. The county seat, Glenwood Springs, is the largest community in the county with a population of 9,614 (US Census Bureau 2010b). The

communities of Rifle and Parachute are staging areas for oil and gas activity in the Piceance Basin.

Eagle County is located in the central mountains of Colorado whose terrain and geology has sculpted the social and economic characteristics of the county. Eagle County is home to downhill skiing resorts Vail and Beaver Creek. Many of the mountain communities were founded in the mid- to late-1800s to support local mining industry. As the industry declined in the region, many of the towns declined along with it, with some disappearing altogether. Over the last several decades, tourism and recreation, and especially ski tourism, has become the dominant industry in many mountain communities. In Eagle County, oil and gas activity has also been an important economic contributor (BLM 2011a). Population growth in Eagle County has more than doubled since 1990, driven primarily by resort development. With the increase in population have come problems with local services including housing, day care, and health care along with strains on infrastructure and other county and community services (BLM 2011a). Affordability has become a major issue in many communities as the cost of housing and other goods and services has increased alongside the rise in resort and second-home development (BBC Research and Consulting 2008). Eagle County has a 39 percent housing vacancy rate due in large part to the high presence of secondary homes in its resort communities (Colorado State Demography Office 2010; BLM 2011a, 2011b).

A common theme expressed by many residents of the Socioeconomic Study Area – including in previous planning processes – is the concern for the preservation of rural characteristics and values; however, there is also a perceived conflict in values and beliefs between long-time residents and newer residents (BLM 2011a, 2011b). For instance, some individuals perceive that people who commute to jobs distant from their residential communities have less of a social connection with the places where they live, and that they participate less in local affairs (BLM 2011a). In addition, various trends threaten the economic viability of livestock grazing and ranching, and the number and size of ranches is decreasing in parts of the Socioeconomic Study Area, especially in Garfield, Grand, and Routt Counties (BLM 2011a, 2011b). Development of land for purposes other than ranching, including residential development, has raised social concerns about preserving open space and traditional Western values and culture (BLM 2011a, 2011b). Cattle ranching has played a large role in distinguishing this culture and in providing open areas (BLM 2007b; Grand County, 2000).

Residents expressed some similar themes during public scoping and the June 2012 Economic Strategies Workshop for this planning document (BLM and Forest Service 2012; BLM 2013a). In addition to the themes expressed above, some individuals were concerned that certain recreation and tourism activities important to communities across the Socioeconomic Study Area, including OHV use, hunting, and lek-viewing, would be adversely impacted by additional

GRSG protections. Conversely, residents who expressed support for additional conservation measures noted indirect benefits to recreation, tourism, and scenic values through the preservation of habitat for big game and other wildlife.

As before, many residents expressed concerns that constraints on energy development, mining, and ranching might create economic hardship within their communities. Additionally, some argued that constraints on livestock grazing would exacerbate existing trends of conversion of ranch lands to agricultural and residential uses, perhaps with the unintended consequence of decreasing available GRSG habitat.

County Land Use Plans

BLM-administered and National Forest System surface land in the Socioeconomic Study Area is intermingled with State and private lands. County governments have land use planning responsibility for the State and private lands located in unincorporated areas within their jurisdictions. County-level LUPs were identified for all eight counties in the Socioeconomic Study Area. Of these, five (Eagle, Garfield, Jackson, Moffat, and Rio Blanco) include explicit economic development components.

Economic Conditions

Economic analysis is concerned with the production, distribution, and consumption of goods and services. This section provides a summary of economic information, including trends and current conditions in the Socioeconomic Study Area. This section also identifies and describes major economic sectors in the Socioeconomic Study Area that can be affected by BLM and Forest Service management actions. The economic sectors most likely affected by BLM and Forest Service management actions would be those sectors that rely or could rely on public lands.

Economic Sectors, Employment and Personal Income

The distribution of employment and income by industry sector within the Socioeconomic Study Area is summarized in **Table 3.83** and **Table 3.84**. See **Appendix N**, Socioeconomics Data and Methodology, for equivalent data by county.

Employment results for the Socioeconomic Study Area as a whole are driven in large part by Mesa County. The industry sector in the Socioeconomic Study Area employing the greatest number of individuals is the services related sector, which comprised 68.3 percent of total employment in 2010. This reflects a growth rate of 16.5 percent from 2001, compared to an overall employment growth rate of 13.2 percent. Within the services related sector, retail trade (10.3 percent) and accommodations and food services (10.1 percent) accounted for the largest share of employment in 2010, followed by construction at 9.1 percent. The industries that demonstrated the largest growth between 2001 and 2010 were mining, with an increase of 204.6 percent; management of companies and enterprises (increase of 99.5 percent); and finance and insurance

(increase of 47.1 percent). Compared to the services related sector, the non-services related sector and the government sector represented much lower levels of employment, 18.2 percent and 12.1 percent, respectively.

Diagram 3-14 presents the employment trends for several industries from 2001 to 2010. Notably, retail trade and accommodation and food services both employed approximately 20,000 to 25,000 individuals in each year of the 10-year period. This is more than double the employment in the mining industry and approximately four times the employment in the farming industry. (Note: Values in **Diagram 3-14** may not match exactly those in **Table 3.83** due to revisions to data between data releases.) See **Appendix N**, Socioeconomics Data and Methodology, for equivalent data by county.

Table 3.83
Employment by Industry Sector within the Socioeconomic Study Area

Socioeconomic Study Area	Absolute			Percentage of Total		Percent Change 2001-2012
	2001	2010	Change 2001-2010	2001	2010	
Total Employment (number of jobs)	181,183	205,113	23,930	100.0%	100.0%	13.2%
Non-services related	38,190	37,300	-890	21.1%	18.2%	-2.3%
<i>Farm</i>	4,941	4,905	-36	2.7%	2.4%	-0.7%
<i>Forestry, fishing, and related activities</i>	883	1,127	244	0.5%	0.5%	27.6%
<i>Mining (including fossil fuels)</i>	2,736	8,333	5,597	1.5%	4.1%	204.6%
<i>Construction</i>	24,105	18,627	-5,478	13.3%	9.1%	-22.7%
<i>Manufacturing</i>	5,525	4,308	-1,217	3.0%	2.1%	-22.0%
Services related	120,332	140,181	19,849	66.4%	68.3%	16.5%
<i>Utilities</i>	586	572	-14	0.3%	0.3%	-2.4%
<i>Wholesale trade</i>	3,713	4,348	635	2.0%	2.1%	17.1%
<i>Retail trade</i>	21,074	21,220	146	11.6%	10.3%	0.7%
<i>Transportation and warehousing</i>	4,426	5,494	1,068	2.4%	2.7%	24.1%
<i>Information</i>	2,466	2,224	-242	1.4%	1.1%	-9.8%
<i>Finance and insurance</i>	5,989	8,812	2,823	3.3%	4.3%	47.1%
<i>Real estate and rental and leasing</i>	11,485	15,835	4,350	6.3%	7.7%	37.9%
<i>Professional and technical services</i>	8,843	10,804	1,961	4.9%	5.3%	22.2%
<i>Management of companies and enterprises</i>	521	1,039	518	0.3%	0.5%	99.5%
<i>Administrative and waste services</i>	8,699	10,152	1,453	4.8%	4.9%	16.7%
<i>Educational services</i>	1,464	1,976	512	0.8%	1.0%	35.0%
<i>Health care and social assistance</i>	13,643	16,803	3,160	7.5%	8.2%	23.2%
<i>Arts, entertainment, and recreation</i>	8,567	9,504	937	4.7%	4.6%	10.9%
<i>Accommodation and food services</i>	19,224	20,795	1,571	10.6%	10.1%	8.2%
<i>Other services, except public administration</i>	9,632	10,603	971	5.3%	5.2%	10.1%
Government	20,415	24,748	4,333	11.3%	12.1%	21.2%
<i>Federal</i>	2,820	3,598	778	1.6%	1.8%	27.6%
<i>State</i>	3,174	3,412	238	1.8%	1.7%	7.5%
<i>Local</i>	14,417	17,734	3,317	8.0%	8.6%	23.0%

Source: US Department of Commerce 2012a

Table 3.84
Labor Income by Industry Sector and Non-Labor Income within the Socioeconomic Study Area (2010 dollars)

Socioeconomic Study Area	Absolute (Millions)			Percentage of Total ¹		Percent Change 2001-2010
	2001	2010	Change 2001-2010	2001	2010	
Total Labor Earnings ²	\$7,124.3	\$8,431.8	\$1,307.6	100.0%	100.0%	18.4%
Non-services related	\$1,786.6	\$1,827.1	\$40.6	25.1%	21.7%	2.3%
<i>Farm</i>	\$35.4	\$33.4	-\$2.1	0.5%	0.4%	-5.8%
<i>Forestry, fishing, and related activities</i>	\$20.8	\$17.3	-\$3.5	0.3%	0.2%	-16.9%
<i>Mining (including oil and gas)</i>	\$213.1	\$644.9	\$431.8	3.0%	7.6%	202.6%
<i>Construction</i>	\$1,251.3	\$953.4	-\$297.9	17.6%	11.3%	-23.8%
<i>Manufacturing</i>	\$265.9	\$178.2	-\$87.7	3.7%	2.1%	-33.0%
Services related	\$4,279.5	\$5,181.0	\$901.5	60.1%	61.4%	21.1%
<i>Utilities</i>	\$80.1	\$81.7	\$1.7	1.1%	1.0%	2.1%
<i>Wholesale trade</i>	\$179.4	\$244.9	\$65.6	2.5%	2.9%	36.5%
<i>Retail trade</i>	\$681.9	\$684.5	\$2.6	9.6%	8.1%	0.4%
<i>Transportation and warehousing</i>	\$221.3	\$306.6	\$85.3	3.1%	3.6%	38.6%
<i>Information</i>	\$109.2	\$100.9	-\$8.3	1.5%	1.2%	-7.6%
<i>Finance and insurance</i>	\$241.2	\$279.7	\$38.5	3.4%	3.3%	16.0%
<i>Real estate and rental and leasing</i>	\$403.5	\$471.1	\$67.6	5.7%	5.6%	16.7%
<i>Professional and technical services</i>	\$354.8	\$451.9	\$97.1	5.0%	5.4%	27.4%
<i>Management of companies and enterprises</i>	\$42.2	\$47.2	\$5.1	0.6%	0.6%	12.0%
<i>Administrative and waste services</i>	\$212.5	\$311.0	\$98.6	3.0%	3.7%	46.4%
<i>Educational services</i>	\$51.1	\$67.5	\$16.4	0.7%	0.8%	32.1%
<i>Health care and social assistance</i>	\$651.6	\$897.7	\$246.1	9.1%	10.6%	37.8%
<i>Arts, entertainment, and recreation</i>	\$244.3	\$283.7	\$39.4	3.4%	3.4%	16.1%
<i>Accommodation and food services</i>	\$467.8	\$560.9	\$93.1	6.6%	6.7%	19.9%
<i>Other services, except public administration</i>	\$338.7	\$391.5	\$52.8	4.8%	4.6%	15.6%
Government	\$985.3	\$1,377.4	\$392.1	13.8%	16.3%	39.8%
<i>Federal</i>	\$188.2	\$286.1	\$97.9	2.6%	3.4%	52.0%
<i>State</i>	\$161.7	\$185.7	\$23.9	2.3%	2.2%	14.8%
<i>Local</i>	\$635.4	\$905.6	\$270.2	8.9%	10.7%	42.5%
Non-labor Income ³	\$2,986.6	\$4,400.6	\$1,414.0	30.9%	36.2%	47.3%
<i>Dividends, interest, and rent</i>	\$2,046.8	\$2,719.7	\$672.9	21.1%	22.4%	32.9%

Table 3.84
Labor Income by Industry Sector and Non-Labor Income within the Socioeconomic Study Area (2010 dollars)

Socioeconomic Study Area	Absolute (Millions)			Percentage of Total ¹		Percent Change 2001-2010
	2001	2010	Change 2001-2010	2001	2010	
Personal current transfer receipts ⁴	\$939.8	\$1,680.9	\$741.1	9.7%	13.8%	78.9%
Contributions to government social insurance ⁵	\$686.8	\$873.2	\$186.4	7.1%	7.2%	27.1%
Total Personal Income ⁶	\$9,677.7	\$12,154.6	\$2,476.9	100.0%	100.0%	25.6%

Source: US Department of Commerce 2012a. Values reported in 2001 dollars were converted to 2010 dollars using the Consumer Price Index (US Bureau of Labor Statistics 2012a).

¹ Industry earnings are reported as a share of total labor earnings. Dividends, interest, and rent; personal current transfer receipts; and contributions to government social insurance are reported as a share of personal income.

² Total labor earnings are reported by place of work.

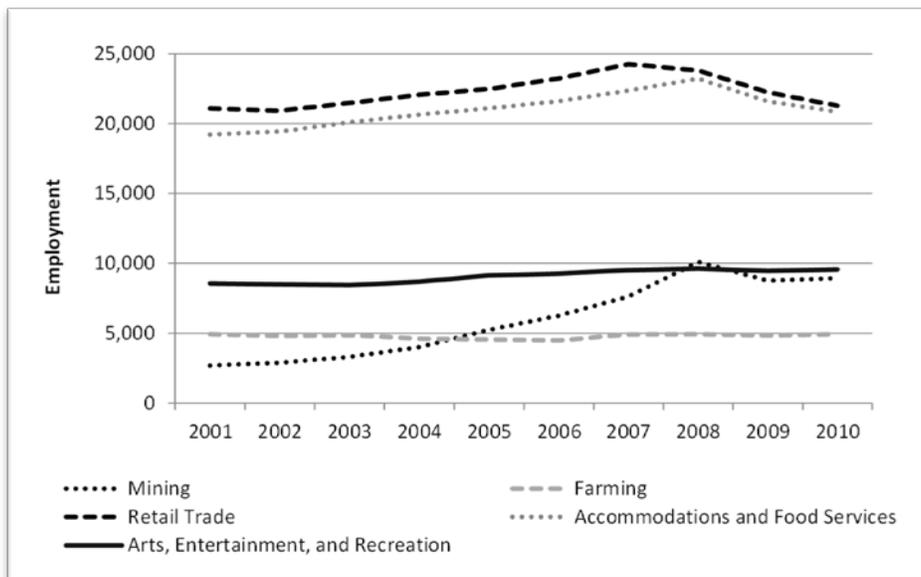
³ Non-labor income includes dividends, interest, and rent and personal current transfer receipts.

⁴ "Personal current transfer receipts" are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.

⁵ "Contributions for government social insurance" consists of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly-administered workers' compensation; military medical insurance; and temporary disability insurance (US Department of Commerce 2012b).

⁶ Total personal income is reported by place of residence.

Diagram 3-14
Employment Trends by Select Industry Sector within the Socioeconomic Study Area, 2001-2010



Source: US Department of Commerce 2012a

Note: Farming value sums data for "Farm and Agriculture and forestry support activities."

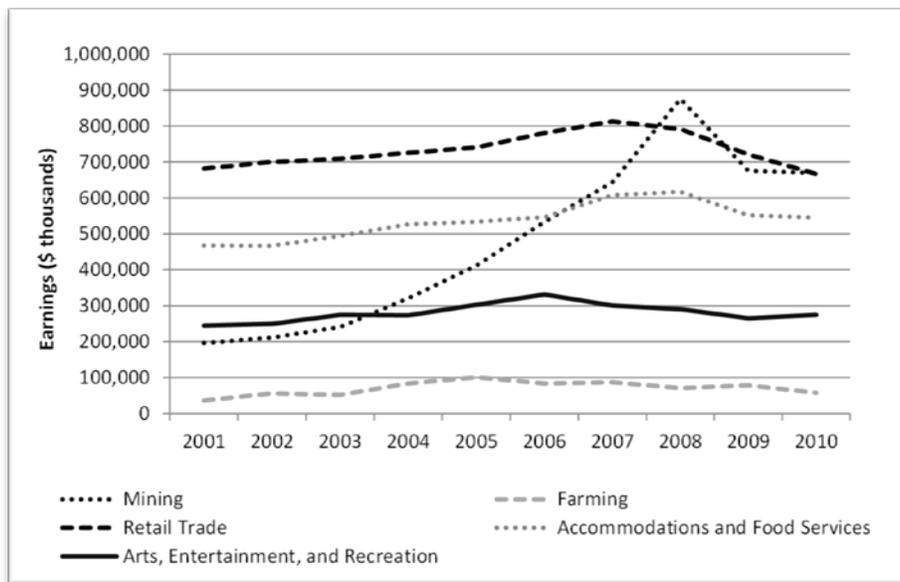
Focusing on industry sectors that directly use public lands, mining contributes a substantial portion of employment in several counties, especially Rio Blanco but also Moffat, Garfield, Jackson and Mesa. Mining also contributes substantially in Sweetwater and Carbon counties, Wyoming and Uintah County, Utah, which constitute part of a secondary study area for socioeconomics as noted in the introduction. Farming, including livestock grazing, also contributes a sizable share of employment in several counties, particularly Jackson County (11.8 percent) as well as Rio Blanco, Moffat, Routt, and others. (Ranching contributes a sizable share of employment in Jackson County. The US Department of Commerce captures ranching employment in its data for the “farming” industry.) The accommodation and food services industry (which depends partly on outdoor recreation on public lands) contributes substantially to employment in all counties, but is particularly large in Eagle and Grand Counties. The accommodation and food services industry also contributes substantially in Summit County, which makes up part of a secondary study area for socioeconomics as noted in the introduction. See **Appendix N**, Socioeconomics Data and Methodology, for equivalent data by county.

With respect to personal earnings, the services related sector accounted for the largest share (61.4 percent) of labor income in the Socioeconomic Study Area in 2010, followed by the non-services related sector (21.7 percent) and the government sector (16.3 percent). In 2010, the individual industries that generated the largest shares of personal earnings included the construction industry (11.3 percent), the healthcare and social services industry (10.6 percent), and the retail trade industry (8.1 percent). Several industries showed a trend of relative growth since 2001, with the mining industry displaying the highest growth rate (202.6 percent). During the same time period, the manufacturing and construction industries experienced the largest declines (33.0 percent and 23.8 percent, respectively).

Diagram 3-15 presents the labor earnings trends for several industries from 2001 to 2010. In 2010, the mining industry generated over three times its earnings in 2001. Retail trade has consistently generated a high level of earnings, compared to the other four industries displayed. In the 10-year period, farming generated the least, at fewer than \$100 million almost every year. (Note: Values in **Diagram 3-15** may not match exactly those in **Table 3.84** due to revisions to data between data releases.) See **Appendix N**, Socioeconomics Data and Methodology, for county-level detail.

Appendix N, Socioeconomics Data and Methodology, provides county-level labor earnings figures. The county-by-county patterns (focusing on sectors that directly use public lands) are similar to those for employment. Mining contributes the most to earnings in Rio Blanco County at 31.8 percent, followed by Moffat County at 19.6 percent. Mining is also a significant contributor to earnings in Uintah County, Utah, which represents part of a secondary study

Diagram 3-15
Labor Earnings Trends by Select Industry Sector within the Socioeconomic Study Area, 2001-2010



Sources: US Department of Commerce 2012a. Values reported in 2001 dollars were converted to 2010 dollars using the Consumer Price Index (US Bureau of Labor Statistics 2012a).

Note: Farming value sums data for “Farm and Agriculture and forestry support activities.”

area as noted in the introduction. The earnings data indicate that farming, including livestock grazing, is an important industry in the Socioeconomic Study Area, particularly in Jackson County, where it accounts for 25.1 percent of earnings. (Ranching contributes substantially to earnings in Jackson County. The US Department of Commerce captures ranching employment in its data for the “farming” industry.) Within the remaining counties a much lower share of earnings is from farming, with the greatest share at 2.8 percent in Moffat County. Earnings from the accommodation and food services sector also vary by county; they are highest in Eagle and Grand. Retail trade, another recreation-related industry, contributes consistently across all counties (between 7.0 and 9.4 percent of earnings).

In addition to industry shares of labor earnings, another metric – residence adjustment – provides information about the economic conditions in the Socioeconomic Study Area. Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs. Moffat County’s residence adjustment represented 11.4 percent of its total personal income, the highest share of all counties in the Socioeconomic Study Area. Grand County had the second highest share (7.8 percent). Residence adjustment accounted for the lowest share of total personal income in Rio

Blanco County (-9.1 percent), followed by Routt County (-3.7 percent). See **Appendix N**, Socioeconomics Data and Methodology, for detailed county data.

Table 3.85 presents the unemployment rates for each county in the Socioeconomic Study Area, as well as the rates for the eight counties aggregated and the State of Colorado. The data show that the Socioeconomic Study Area as a whole experienced a lower rate of unemployment than the State in 2007 and 2008. In 2012, the most recent year reported, the Socioeconomic Study Area recorded an unemployment rate of 8.2 percent, compared to the state rate of 7.8 percent. At the county level, in 2012, the unemployment rate ranged from a low of 3.6 percent in Jackson County to a high of 9.1 percent in Mesa County.

Table 3.85
Annual Unemployment, 2007–2012

Geographic Area (Colorado)	2007	2008	2009	2010	2011	2012
Eagle County	2.9%	3.5%	7.8%	9.5%	8.9%	7.9%
Garfield County	2.5%	3.1%	7.8%	10.1%	9.1%	7.9%
Grand County	2.6%	3.7%	7.4%	9.1%	8.3%	7.3%
Jackson County	2.5%	3.2%	4.6%	6.7%	4.3%	3.6%
Mesa County	3.2%	3.9%	9.3%	10.7%	9.9%	9.1%
Moffat County	3.1%	3.8%	6.9%	9.5%	8.8%	7.5%
Rio Blanco County	2.1%	2.6%	5.4%	6.5%	5.6%	5.8%
Routt County	2.6%	3.4%	7.3%	9.5%	8.3%	7.1%
Socioeconomic Study Area	3.1%	3.8%	7.6%	10.1%	9.2%	8.2%
Colorado	3.8%	4.8%	8.1%	8.9%	8.3%	7.8%

Source: US Bureau of Labor Statistics 2012b

Recreation

Approximately 33,701 jobs (27.0 percent of all private sector jobs) in the Socioeconomic Study Area are related to travel and tourism (Headwaters Economics 2012). This estimate is based on data from the US Census Bureau County Business Patterns and selects industrial sectors that, at least in part, provide goods and services to visitors to the local economy and to the local population.²

It includes both full- and part-time jobs. Most of these jobs are concentrated in the “accommodation and food services” and “retail trade” sectors. Travel and tourism-related jobs in the Socioeconomic Study Area grew 14.3 percent between 1998 and 2010. This growth was below the growth of non-travel and tourism-related jobs in the Socioeconomic Study Area (20.6 percent) and the share of travel and tourism-related jobs in the total employment in the Study

² Typical sector classifications do not map easily into tourism. For example, “accommodation and food services” includes meals out by local residents, not just tourists; “retail trade” captures purchases of souvenirs but also a wide range of other purchases.

Area fell from 28.1 percent to 27 percent during that period. Still, the share of travel and tourism-related jobs in the Socioeconomic Study Area is approximately 11.9 percent points higher than the national average. Jobs in these sectors are more likely to be seasonal and/or part-time and the average annual earnings per job tend to be lower than jobs in non-travel and tourism-related sectors. The average annual wage per job in this sector was \$21,849 (2010 dollars) in the Socioeconomic Study Area in 2011, compared to \$43,339 (2010 dollars) for private sector jobs not related to travel and tourism (Headwaters Economics 2012).³

Although much of the recreation use on BLM-administered and National Forest System lands is dispersed, and far from counting devices such as trail registers, fee stations, or vehicle traffic counters, approximations of the number of visitors to BLM-administered lands can be obtained from the BLM Recreation Management Information System database, in which BLM recreation specialists provide estimated total visits and visitor days to various sites within the boundaries of their field office.⁴ The Forest Service tabulates visitor data through its National Visitor Use Monitoring program. **Table 3.86** summarizes the most recent visitation data available for BLM field offices and the Routt National Forest.

Visitor expenditures can be approximated by using the Recreation Management Information System data in conjunction with data from Forest Service, which has constructed recreation visitor spending profiles based on years of survey data gathered through the National Visitor Use Monitoring program. Although the data are collected from National Forest visitors, the analysis that follows is based on the National Visitor Use Monitoring program profiles because the BLM has no analogous database. The profiles break down recreation spending by type of activity, day use versus overnight use, local versus nonlocal visitors, and non-primary visits. **Table 3.87** summarizes individual and party visits and expenditures by trip type and estimated direct expenditure.

As **Table 3.87** shows, the estimated total visitor spending on BLM and Forest Service lands in the Socioeconomic Study Area was about \$301 million in fiscal year 2011. It is important to note that this includes expenditures from local residents and visitors whose use of public lands was incidental to some other primary purpose.

³ All dollar values were converted to 2010 dollars using the US Bureau of Labor Statistics Consumer Price Index Inflation Calculator (US Bureau of Labor Statistics 2012a).

⁴ In Recreation Management Information System, a *visit* is defined as the entry of any person onto lands or related waters administered by the BLM for any time period. A same day reentry, negligible transit, and entry to another recreation site or detached portion of the management area on the same day are considered a single visit. Recreation Management Information System defines a *visitor day* as equivalent to 12 visitor hours.

Table 3.86
Estimated Number of Annual Visits by Field Office and National Forest

BLM Field Office or National Forest	Total Individual Visits ¹	Local Individual Visits ²	Nonlocal Individual Visits ²	Non Primary ³ Individual Visits ²
BLM CRVFO	826,267	446,184	272,668	107,415
BLM GJFO	839,252	453,196	276,953	109,103
BLM KFO	640,606	345,927	211,400	83,279
BLM LSFO	118,398	63,935	39,071	15,392
BLM WRFO	252,605	136,407	83,360	32,839
Forest Service Routt National Forest	1,631,680	881,107	538,454	212,118
Total	4,308,808	2,326,756	1,421,906	560,146

¹ Data for BLM field offices is for fiscal year 2011 (BLM 2012c); data for the Routt National Forest is for fiscal year 2007 (Forest Service 2012). Fiscal year 2011 is the year ending September 30, 2011.

² Based on national averages for all National Forests. White and Gooding (2012). Party spending per visit is converted from 2009 to 2010 dollars using the Consumer Price Index (US Bureau of Labor Statistics 2012a).

³ Non-primary means incidental visits where the primary purpose of the trip was other than visiting the National Forest being surveyed.

Table 3.87
Visitor Spending from Recreation on BLM-Administered and National Forest System Lands in Socioeconomic Study Area

Trip Type	Percent of Visits ¹	Estimated Number of Individual Visits	Average Party Size ¹	Estimated Number of Party Visits	Party Spending Per Visit (2010) ¹	Estimated Direct Expenditure (\$ millions)
Nonlocal Day Trips	10	430,881	2.5	172,352	\$63.68	\$11.0
Nonlocal Overnight on Public Lands	9	387,793	2.6	149,151	\$237.27	\$35.4
Nonlocal Overnight off Public Lands	14	603,233	2.6	232,013	\$522.63	\$121.3
Local Day Trips	49	2,111,316	2.1	1,005,389	\$33.56	\$33.7
Local Overnight on Public Lands	4	172,352	2.6	66,289	\$165.14	\$10.9
Local Overnight off Public Lands	1	43,088	2.4	17,953	\$216.48	\$3.9
Non-Primary Visits	13	560,145	2.5	224,058	\$376.62	\$84.4
Total	100	4,308,808	N/A	1,867,205	N/A	\$300.6

¹ National average for all National Forests. White and Gooding (2012). Party spending per visit is converted from 2009 to 2010 dollars using the Consumer Price Index (US Bureau of Labor Statistics 2012a).

Grazing

Farming employed approximately 4,905 people in the Socioeconomic Study Area in 2010, accounting for 2.4 percent of total employment. The share has been falling consistently over the last 40 years. The average annual wage for a farm job in the Study Area was \$26,993 (2010 dollars) in 2011. This was lower

than the average annual wage for a non-farm job, which was \$37,469 (Headwaters Economics 2012).⁵ As of 2007, the Socioeconomic Study Area contained 4,289 farms, with an average farm size of 742 acres. Farms covered approximately 22.9 percent of the land area in the Study Area. **Table 3.88** presents the breakdown of number of farms and land area by county.

Table 3.88
Number of Farms and Land in Farms, 2007

Geographic Area (Colorado)	Number of Farms	Land in Farms (Acres)	Average Farm Size (Acres)	Approximate Percent of Land Area in Farms
Eagle County	152	124,000	816	11.5
Garfield County	623	335,300	538	17.8
Grand County	229	208,500	910	17.6
Jackson County	120	387,100	3,226	37.5
Mesa County	1,767	372,500	211	17.5
Moffat County	503	836,600	1,663	27.6
Rio Blanco County	285	386,600	1,356	18.8
Routt County	610	533,000	874	35.3
Socioeconomic Study Area	4,289	3,183,600	742	22.9

Source: US Department of Commerce 2012a

Table 3.89 presents the distribution of farms by primary product type and county. These data demonstrate the prevalence of farms engaging primary in activities related to beef cattle, and to some extent sheep and goats, across the Study Area in 2007 (Headwaters Economics 2012).

Table 3.90 presents the proportion of personal income originating from farm earnings and the farm cash receipts from livestock received throughout the Socioeconomic Study Area and Colorado as a whole. Mesa has the largest amount of farm cash receipts in absolute terms. Farm earnings are a highest share of total earnings in Jackson County. Just over 70 percent of farm cash receipts in that county are from livestock.

Table 3.90 shows that – as noted earlier in this section – the relative contribution of farm earnings varies substantially across the counties in the Socioeconomic Study Area, and the share of farm earnings is greatest in Jackson and Moffat Counties (25.1 percent and 2.8 percent, respectively). Compared with the state as a whole, the share of farm cash receipts originating from livestock and crops in the Socioeconomic Study Area are roughly equal.

⁵ All dollar values were converted to 2010 dollars using the US Bureau of Labor Statistics Consumer Price Index Inflation Calculator (US Bureau of Labor Statistics 2012a).

Table 3.89
Number of Farms by Type, 2007

Geographic Area (Colorado)	Crops ¹	Beef Cattle	Cattle Feedlots	Dairy Cattle & Milk	Hog & Pig	Poultry & Egg	Sheep & Goat	Animal Aquaculture & Other
Eagle County	41	56	1	0	0	0	5	49
Garfield County	235	155	4	4	10	13	17	185
Grand County	68	85	3	1	5	3	1	63
Jackson County	27	54	1	0	0	1	1	36
Mesa County	836	413	29	9	22	43	47	368
Moffat County	195	148	1	1	14	17	25	102
Rio Blanco County	92	91	1	1	12	1	15	72
Routt County	289	166	8	0	11	9	13	114
Study Area	1,783	1,168	48	16	74	87	124	989

Source: Headwaters Economics 2012.

¹ The "Crops" category includes farms primarily engaged in oil seed and grain, vegetables and melon, fruit and nut, greenhouse/nursery, and other crops.

Table 3.90
Farm Earnings Detail, 2010 (2010 dollars)

Geographic Area (Colorado)	Farm Earnings as Share of All Earnings	Earnings from Agriculture and Forestry Support Activities as Share of All Earnings ¹	Farm Cash Receipts (\$millions)	Share of Farm Cash Receipts from Livestock	Share of Farm Cash Receipts from Crops
Eagle County	0.1%	(D)	\$5.3	68.1%	31.9%
Garfield County	-0.1%	0.1%	\$24.4	65.9%	34.1%
Grand County	1.2%	(D)	\$10.5	78.6%	21.4%
Jackson County	25.1%	(D)	\$24.7	72.2%	27.8%
Mesa County	0.1%	0.2%	\$62.8	43.1%	56.9%
Moffat County	2.8%	0.5%	\$31.5	81.1%	18.9%
Rio Blanco County	0.8%	(D)	\$17.1	83.1%	16.9%
Routt County	0.5%	(D)	\$38.2	79.2%	20.8%
Socioeconomic Study Area	0.3%	0.1%	\$355.2	63.4%	36.6%
Colorado	0.6%	0.1%	\$6,375.7	64.4%	35.6%

Source: US Department of Commerce 2012a

¹ This division is the finest resolution of data provided by the US Department of Commerce's Bureau of Economic Analysis that includes agricultural services.

² (D) indicates that the value is not released to the public by the US Department of Commerce's Bureau of Economic Analysis to avoid disclosure of confidential information.

Table 3.91 provides information on active and billed AUMs on BLM and Forest Service land, for each of the BLM field offices and the Routt National Forest. An AUM is the amount of forage needed to feed 1 cow, 1 horse, or 5 sheep for 1 year. Cattle are the dominant species grazed in all areas, although sheep

Table 3.91
Active and Billed Animal Unit Months, 2011

Region	Active (2011)	% Billed	Billed (Avg. 2000-2011)	Cattle (%)	Sheep (%)	Other (%)	Allotments	Acres per AUM	Expenditures (millions)
CRVFO	44,446	69	30,718	88	12	0	191	12.4	\$1.54
GJFO	64,190	61	38,839	100	0	0	188	16.3	\$1.95
KFO	34,630	80	27,547	99	0	1	246	9.7	\$1.38
LSFO	139,772	62	86,530	61	36	3	312	9.5	\$4.35
WRFO	120,401	69	82,848	82	18	0	155	12.1	\$4.16
Routt NF ¹	73,213	102	74,592	n/a	n/a	n/a	104	n/a	\$3.75
Total	476,652	-	341,074	-	-	-	1,196	-	\$17.14

Source: BLM 2012b; Forest Service 2013; Workman 1986; US Department of Agriculture Economic Research Service 2012.

Expenditures are calculated based on billed AUMs and 10-year average expenditures, as described in the text.

¹ For Routt NF, Active AUMs as of March 06, 2013 and Billed AUMs average of 2001-2012. Percent billed over 100% reflects decrease in active and billed AUMs during the period 2001 to 2013

consume about one-third of the forage in the LSFO. The estimated expenditure data in **Table 3.91** are calculated from data from the US Department of Agriculture Economic Research Service, which publishes annual budgets for cow-calf operations for different production regions across the country (US Department of Agriculture Economic Research Service 2012). The BLM calculated a 10-year inflation-adjusted average expenditure per cow-calf operation from the US Department of Agriculture Economic Research Service budgets, then converted that information to a per-AUM figure based on average forage requirements for a cow including other livestock (e.g., bulls and replacement heifers) that are needed to support the production from the cow (Workman 1986). Based on these calculations, BLM estimates that the 10-year average expenditure in the Socioeconomic Study Area is \$50.24 per AUM (2010 dollars).

The data in **Table 3.91** help to demonstrate the importance of livestock grazing throughout the Socioeconomic Study Area. It is important to remember, as well, that the data are only for forage values on BLM-administered land; forage on other public lands, and private lands, contribute additional values to the Socioeconomic Study Area. The economic analysis of the alternatives, presented in **Chapter 4**, Environmental Consequences, addresses additional indirect contributions of livestock grazing (as well as other resource uses) to the regional economy, comparing the alternatives to one another.

Minerals

Approximately 4,416 jobs (3.5 percent of all private sector jobs) in the Socioeconomic Study Area are from mining industry sectors (Headwaters Economics 2012). This is up from 1.7 percent of private sector jobs in 1998. The relative contribution differs across the Study Area counties and is substantial for some counties. The share of mining jobs in the Socioeconomic

Study Area was higher than the national average of 0.5 percent. This estimate is based on data from the US Census Bureau County Business Patterns and a selection of industrial sectors that includes “oil and gas extraction,” “coal mining,” “metal ore mining,” and “nonmetallic minerals mining” industry sectors. It includes both full- and part-time jobs. Average annual earnings per mining jobs are higher than non-mining jobs: The average annual wage per job in the mining sector was \$74,219 (2010 dollars) in the Study Area in 2011, compared to \$35,470 (2010 dollars) for private sector jobs not related to mining (Headwaters Economics 2012).

Several of the counties in the Socioeconomic Study Area have a significant percentage of mining jobs according to the data in the County Business Patterns: Rio Blanco (481 mining jobs, 26 percent of private employment) and Moffat (541 mining jobs, 14 percent of private employment) (Headwaters Economics 2012). Mining contributes more jobs numerically, but fewer proportionately, in Garfield (1,060 jobs, 6 percent of private employment) and Mesa county (1,755 jobs, 4 percent of private employment). **Table 3.92** provides sales volume and sales value for coal, gas and oil resources managed by the BLM, and underscores the importance of mining in these five counties – especially Garfield and Rio Blanco.

Table 3.92
Coal, Gas, and Oil: Sales Volume and
Sales Value from BLM-Administered Resources, Fiscal Year 2011

Geographic Area (Colorado)	Sales Volume			Sales Value (millions)		
	Coal (tons)	Gas (mcf)	Oil and Condensate (bbl)	Coal	Gas	Oil and Condensate
Eagle County	0	0	0	\$0	\$0	\$0
Garfield County	15,894	166,822,688	4,699,051	\$0.7	\$700.3	\$249.9
Grand County	0	0	0	\$0	\$0	\$0
Jackson County	0	0	76,875	\$0	\$0	\$6.3
Mesa County	0	18,200,250	234,102	\$0	\$76.7	\$7.9
Moffat County	3,145,954	16,136,910	312,561	\$95.5	\$68.7	\$24.7
Rio Blanco County	3,725,700	88,457,430	4,235,755	\$134.4	\$384.4	\$343.6
Routt County	696,048	0	19,210	\$31.6	\$0	\$1.5
Socioeconomic Study Area	7,583,596	289,617,278	9,577,554	\$262.2	\$1,230.1	\$634.1

Source: Office of Natural Resources Revenue 2012
mcf = thousand cubic feet; bbl = oil barrel

Other mineral production in the Socioeconomic Study Area includes gypsum (Eagle County), sodium, limestone, and construction sand and gravel (USGS 2011; BLM 2013b). **Table 3.93** shows production of other minerals in the study area in 2010.

Table 3.93
Other Mineral Production, 2010 (Tons)

Geographic Area	Leasable		Locatable		Salable Sand and Gravel
	Sodium	Limestone	Gypsum		
LSFO	N/A	5,000	N/A		10,000
GJFO	N/A	N/A	N/A		23,405
WRFO	130,000	N/A	N/A		20,000
KFO	N/A	N/A	N/A		20,000
CRVFO	N/A	50,000	350,000		N/A
Socioeconomic Study Area	130,000	55,000	350,000		73,405

Source: BLM 2013b

Other Values

Public lands provide a range of goods and services that benefit society in a variety of ways. Some of these goods and services, such as timber and minerals, are bought and sold in markets, and hence have a readily observed economic value (as documented in the sections above); others have a less clear connection to market activity, even though society derives benefits from them. In some cases, goods and services have both a market and a non-market component value to society. This section provides an overview of several “non-market” values described through a qualitative and quantitative economic valuation analysis.

The non-market values associated with public lands can be classified as values that derive from direct or indirect use (e.g., recreation) and those that do not derive from use, such as existence values held by the general public from self-sustaining populations of GRSG. This section and **Appendix N**, Socioeconomics Data and Methodology, describe the use and non-use economic values associated with recreation, populations of GRSG, and land that is currently used for livestock grazing and ranch operations. The sections that follow discuss each of these values in turn. **Appendix N**, Socioeconomics Data and Methodology, provides more discussion of the concepts and measurement of use and non-use non-market values. It is important to note that these non-market values are not directly comparable to previous sections that describe output (sales or expenditures) and jobs associated with various resource uses on BLM-administered and National Forest System lands (see **Appendix N**, Socioeconomics Data and Methodology, for more information).

Values Associated with Recreation

Actions that promote the conservation of GRSG habitat may result in changes in recreation activity, by changing opportunities or access for different recreational activities. Opportunities for some activities such as wildlife viewing may increase as the amount of habitat may increase for species that depend on public lands including GRSG. The **Chapter 4**, Environmental Consequences,

addresses this issue for each of the management alternatives. This section documents baseline non-market values visitor receive associated with recreation activities. This is measured by what economists call consumer surplus, which refers to the additional value that visitors receive over and above the price they pay. **Appendix N**, Socioeconomics Data and Methodology, provides an explanation of consumer surplus. Fees to use public lands for recreation are typically very low or non-existent, so the value people place on public land recreation opportunities is not fully measured simply by the entrance fees people pay.

Economists estimate the consumer surplus from recreation by measuring how the variation in visitors' travel costs corresponds to the number of visits taken. This "travel cost method" has been developed extensively in academic literature and is used by federal agencies in economic analyses; the method is explained more fully in **Appendix N**, Socioeconomics Data and Methodology. Conducting original travel cost method studies can be time-consuming and expensive; for this project BLM and Forest Service relied on estimates of consumer surplus from prior recreation studies in the same geographic region, using an established scientific method called "benefit transfer." Based on the studies reviewed and cited in **Appendix N**, Socioeconomics Data and Methodology, visitors to natural areas, such as lands managed by BLM and Forest Service, gain values (in excess of their direct trip cost) ranging from approximately \$31 per day for camping, to about \$175 per day for mountain biking.

To calculate the aggregate "consumer surplus" value of recreation in the study area, BLM multiplied this per-day value of recreation by the estimated number of visitor days associated with each activity type. Visitation estimates by activity are derived based on the BLM Recreation Management Information System database and the Forest Service National Visitor Use Monitoring program for the study area.

Accounting for the value per day and the number of days, the total non-market value of recreation on BLM and Forest Service lands in the study area was estimated to be about \$180 million per year (see **Appendix N**, Socioeconomics Data and Methodology, for details). Based on the quantity of recreational trips and the economic value of each type of activity, the largest annual non-market values are associated with hunting, camping, fishing, hiking, sightseeing, and pleasure driving. These categories omit downhill skiing, because there is little or no overlap between GRSG habitat and lands used for downhill skiing. **Chapter 4**, Environmental Consequences, discusses if and how recreational visits and total non-market value for recreation may change under the alternatives being considered.

Values Associated with Populations of Greater Sage-Grouse

The existence and perseverance of the ESA and similar acts reflects the values held by the American public associated with preventing species from going extinct. Economists have long recognized that rare, threatened and endangered species have economic values beyond those associated with active “use” through viewing. This is supported by legal decisions and technical analysis (see **Appendix N**, Socioeconomics Data and Methodology, for details), as well as a number of conceptual and empirical publications that refine concepts and develop methods to measure these non-use or existence values.

The dominant method uses surveys to construct or simulate a market or referendum for protection of areas of habitat, or changes in populations of species. The survey asks the respondent to indicate whether they would pay for an increment of protection, and if so how much they would pay. Economists have developed increasingly sophisticated survey methods for non-use value over the last two decades to improve the accuracy of this method. **Appendix N**, Socioeconomics Data and Methodology, offers an in-depth discussion of this method of value estimation.

Original surveys to estimate non-use values are complex and time-consuming; rather than perform a new survey, BLM and Forest Service reviewed existing literature to determine if there were existing non-use value studies for GRSG. No existing studies on valuation specific to the GRSG were found. However, there are several studies published in peer-reviewed scientific journals for bird species that BLM judged to have similar characteristics with GRSG, including being a candidate for listing as threatened or endangered and being a hunted species. These studies find average stated willingness to pay of between \$15 and \$58 per household per year in order to restore a self-sustaining population or prevent regional extinction (see **Appendix N**, Socioeconomics Data and Methodology, for details). These values represent a mix of use and non-use values, but the non-use components of value are likely to be the majority share, since the studies primarily address species that are not hunted. Since GRSG protection is a public good available to all households throughout the intermountain west, if similar per-household values apply to the species the aggregate regional existence value could be substantial.

Values Associated with Grazing Land

Public land managed for livestock grazing provides both market values (e.g., forage for livestock) and non-market values, including open space and western ranch scenery, which provide value to some residents and outside visitors, and may also provide some value to the non-using public (e.g., the cultural icon of the American cowboy). Many people who ranch for a living or who otherwise choose to live on ranches value the ranching lifestyle in excess of the income generated by the ranching operations. This could be seen as a non-market value associated with livestock grazing. On the other hand, some residents and visitors perceive non-market opportunity costs associated with livestock

grazing. Although some scholars and policy makers have discussed non-market values associated with livestock grazing, the process for incorporating these values into analyses of net public benefits remains uncertain, and BLM and Forest Service did not attempt to quantify these values for the present study.

Furthermore, some of the lifestyle value of ranching is likely to be captured in markets, such as through the property values of ranches adjacent to public lands with historic leases or permits for grazing on public land. Economists typically use a method called the hedonic price method to estimate values associated with particular amenities; this method may be used to explain the factors that influence the observed sale prices of ranch land. **Appendix N**, Socioeconomics Data and Methodology, provides more information about this method, as well as additional information to address potential non-market values associated with grazing.

Fiscal

Table 3.94 shows the main sources of revenues for counties in the Socioeconomic Study Area. For most counties, approximately half of their revenues are generated by taxes, with another 20 percent to 40 percent attributable to intergovernmental transfers. The main exception is Jackson County, which receives over half of its revenues from intergovernmental transfers. The table shows Payments in Lieu of Taxes, which are federal government payments based on the presence of federal lands within each county. The non-taxable status of BLM-administered lands is important to local governments, which must provide services to county residents and provide public safety and law enforcement services on BLM-administered lands. Federal revenue-sharing programs provide resources to local governments in lieu of property taxes because state and local governments cannot tax federally owned lands the way they would if the land were privately owned.

Intergovernmental transfers include a proportion of the mineral royalties and other revenues (such as lease/rent payments and bonus payments from lease sales) collected by the federal government from minerals leased by the federal government (including oil and gas and coal) in Colorado. Fifty percent of the royalties and payments collected by federal government related to mineral leases in Colorado are returned to the state (net of administrative charges). Colorado then distributes 50 percent of these funds (up to a limit) to the counties of origin and 50 percent to the state school fund, the Department of Local Affairs and the Water Conservations Board. Funds above the limit are distributed, in varying proportions, to the state school fund, counties, school districts, towns and the Department of Local Affairs (Garfield County, undated). Intergovernmental transfers also include transfers from Colorado state revenues to counties including revenues generated from the State Severance Tax on mineral extraction.

Table 3.94
Revenues Received in the Socioeconomic Study Area by County, Government Funds, 2010
(Thousands)

Geographic Area (Colorado)	Tax Revenues ¹	Payments in Lieu of Taxes ²	Other Transfers ³	Other Revenues ⁴	Total
Eagle County	\$46,201	\$2,010	\$14,730	\$14,990	\$77,931
Garfield County	\$77,696	\$392	\$56,775	\$11,283	\$146,146
Grand County	\$18,175	\$852	\$8,345	\$6,482	\$33,863
Jackson County	\$1,004	\$169	\$2,042	\$497	\$3,712
Mesa County	\$58,521	\$512	\$49,122	\$10,658	\$118,813
Moffat County	\$14,647	\$551	\$11,280	\$5,779	\$32,257
Rio Blanco County	\$16,504	\$494	\$8,842	\$8,906	\$34,746
Routt County	\$21,197	\$1,463	\$8,216	\$4,750	\$35,626
Socioeconomic Study Area	\$253,945	\$6,443	\$159,361	\$63,345	\$483,094

Sources: US Department of the Interior 2012; Eagle County 2011; Garfield County 2011; Grand County 2011a; Mesa County 2011; Moffat County 2011; Rio Blanco County 2011; Routt County 2011.

¹ Minor differences with **Table 3.95** reflect difference between government-wide revenues and fund revenues.

² Includes Payments in Lieu of Taxes received from BLM, Forest Service, US Bureau of Reclamation, National Park Service, and USFWS.

³ Inter-governmental transfers excluding Payments in Lieu of Taxes

⁴ "Other revenues" includes charges for services, licenses and permits, investment earnings and other unidentified revenues.

Table 3.95 shows tax revenues for the Socioeconomic Study Area, by county, for 2010. Property taxes are the main source of tax revenues for counties. Counties typically collect taxes on real property (e.g., oil and gas improvements and structures) located on public lands. Expenditures by visitors to BLM-administered and National Forest System lands also generate tax revenues through state, county, and municipality sales and use taxes.

Table 3.95
Tax Revenues Received in the Socioeconomic Study Area by County, 2010 (Thousands)

Geographic Area (Colorado)	Sales Tax	Property Tax	Other Tax ²	Total Tax Revenues
Eagle County	\$15,575	\$29,770	\$1,060	\$46,405
Garfield County	\$4,077	\$71,028	\$6,144	\$81,248
Grand County ¹	\$2,954	\$14,670	\$551	\$18,175
Jackson County ¹	\$240	\$610	\$154	\$1,004
Mesa County	\$24,275	\$28,072	\$5,985	\$58,332
Moffat County	\$2,752	\$10,631	\$706	\$14,089
Rio Blanco County ¹	\$4,203	\$10,432	\$1,869	\$16,504
Routt County	\$4,486	\$16,711	\$0	\$21,197
Socioeconomic Study Area	\$58,453	\$181,786	\$16,441	\$255,954

Sources: Eagle County 2011; Garfield County 2011; Grand County 2011a; Mesa County 2011; Moffat County 2011; Rio Blanco County 2011; Routt County 2011.

¹ Government Funds

² "Other taxes" may include use tax, specific ownership tax, insurance premium tax, and/or other unidentified form of tax.

BLM and FS Expenditures and Employment

BLM field offices and Forest Service units provide a direct contribution to the economy of the local and surrounding area. BLM and Forest Service operations and management make direct contributions to area economic activity by employing people who reside within the area and by spending dollars on project related goods and services. Contracts for facilities maintenance, shuttling vehicles, and projects contribute directly to the area economy and social stability as well. **Table 3.96** provides available information on the number of employees at each field office and the Routt National Forest. It also presents the contributions to the local economy, in terms of labor income, resulting from BLM and Forest Service operations and management expenditures. BLM and Forest Service contribute directly to area economic activity by employing people who reside in the area and by spending dollars on project-related goods and services. BLM and Forest Service expenditures also result in indirect contributions when BLM and Forest Service purchases supplies and services from other industries in order to produce their product.

Table 3.96
BLM and Forest Service Employment and Related Expenditures
in the Socioeconomic Study Area

Agency	Management Unit	Number of Field Office Staff (Full-Time Equivalent Employees)	Labor Expenditures (millions of dollars)
BLM	CRVFO	43.8	\$3.3
BLM	GJFO	49.2	\$3.7
BLM	KFO	22.9	\$1.7
BLM	LSFO	27.3	\$2.2
BLM	Northwest District Office	15.4	\$1.3
BLM	WRFO	41.7	\$3.2
Forest Service	Routt National Forest	221 ¹	\$12.1 ²

Source: BLM 2012c; Forest Service 1998.

¹ Represents the number of full time employees supported by Forest Service in the Routt National Forest, not the number of field office staff.

² The Routt National Forest EIS reported Forest Service expenditures of \$8.7 million in 1996 dollars. This value was converted to 2010 dollars using the Consumer Price Index (US Bureau of Labor Statistics 2012a).

Environmental Justice

Executive Order 12898 requires federal agencies to “identify and address the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The BLM Land Use Planning Handbook (BLM 2005) reiterates BLM’s commitment to environmental justice – both in providing meaningful opportunities for low-income, minority, and tribal populations to participate in decision-making, and to identify and minimize any disproportionately high or adverse impacts on these populations. Similarly, the US Department of

Agriculture's Departmental Regulation on Environmental Justice (US Department of Agriculture 1997) provides direction to agencies for integrating environmental justice considerations into US Department of Agriculture programs and activities, including those of Forest Service. Specifically, the Departmental Regulation on Environmental Justice calls for the identification, prevention, and/or mitigation of disproportionately high and adverse human health or environmental effects of US Department of Agriculture programs and activities on minority and low-income populations and provision for the opportunity for minority and low-income populations to participate in planning, analysis, and decision making that affects their health or environment.

According to the CEQ's Environmental Justice Guidance Under the National Environmental Policy Act (CEQ 1997), "minority populations should be identified where either: (a) the minority population of the affected region exceeds 50 percent or (b) the minority population percentage of the affected region is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." The same document states that "In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect."

Additionally, the CEQ guidance (CEQ 1997) advises that "In order to determine whether a proposed action is likely to have disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes, agencies should identify a geographic scale, obtain demographic information on the potential impact area, and determine if there is a disproportionately high and adverse effect to these populations. Agencies may use demographic data available from the Bureau of the Census to identify the composition of the potentially affected population. Geographic distribution by race, ethnicity, and income, as well as a delineation of tribal lands and resources, should be examined."

Minority Populations

Table 3.97 summarizes the percentage of the population made up of ethnic minority groups in each county of the Socioeconomic Study Area and in Colorado and the US as a whole.

With the exception of Eagle and Garfield Counties, which have a slightly greater minority population percentage than Colorado as a whole, the remaining counties within the Socioeconomic Study Area have a much lower minority population by percentage than Colorado or the US as a whole. The dominant minority group in Eagle and Garfield Counties is the Hispanic or Latino population, which makes up approximately 30 percent of each county's

Table 3.97
Population Race and Ethnicity, 2010

Geographic Unit Analyzed	Total Population	Percent of Total Population								Total or Minorities ²
		White	Black or African American	Alaska Native or American Indian	Asian	Native Hawaiian & Other Pacific Islander	Other Race	Two or More Races	Hispanic or Latino ¹	
Eagle County, CO	52,197	83.2	0.7	0.7	1.0	0.0	12.3	2.1	30.1	32.7
Garfield County, CO	56,389	82.2	0.7	1.1	0.7	0.1	12.6	2.6	28.3	31.0
Grand County, CO	14,843	93.5	0.4	0.5	0.8	0.1	3.1	1.6	7.5	10.2
Jackson County, CO	1,394	92.5	0.0	1.2	0.1	0.0	5.0	1.1	10.8	12.6
Mesa County, CO	146,723	89.4	0.6	1.1	0.8	0.1	5.4	2.7	13.3	16.7
Moffat County, CO	13,795	90.0	0.3	0.9	0.6	0.1	5.9	2.2	14.4	17.3
Rio Blanco County, CO	6,666	91.9	0.8	0.9	0.3	0.2	3.7	2.3	10.0	13.6
Routt County, CO	23,509	94.8	0.4	0.5	0.6	0.1	2.1	1.6	6.8	9.3
Socio-economic Study Area	660,288	89.2	0.7	0.8	1.3	0.1	5.4	2.4	14.2	18.1
Colorado	5,029,196	81.3	4.0	1.1	2.8	0.1	7.2	3.4	20.7	29.9
US	308,745,538	72.4	12.6	0.9	4.8	0.2	6.2	2.9	16.3	36.0

Source: US Census Bureau 2010b.

¹ Individuals who identify themselves as Hispanic or Latino might be of any race; the sum of the other percentages under the "Percent of Total Population" columns plus the "Hispanic or Latino" column therefore does not equal 100 percent, and the sum of the percentages for each racial and ethnic category does not equal the percentage of "total minorities".

² The total minority population, for the purposes of this analysis, is the total population for the geographic unit analyzed minus the non-Latino/Hispanic white population.

population. Other ethnic minorities each accounts for 2 percent or less of the population in each county within the Socioeconomic Study Area. Smaller communities (at the sub-county level) where minority presence is "meaningfully greater" than in the state as a whole may also exist in the primary study area and would be relevant in the analysis of site-specific projects and measures.

Low Income Populations

Table 3.98 summarizes the percentage of the population below poverty levels in each county of the Socioeconomic Study Area and in Colorado and the US as a whole. Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to detect what part of the population is considered to be in poverty (US Census Bureau 2012b).

Table 3.98
Low-Income Populations, 2006-2010 Average

Geographic Area	Percent Population Below Poverty Line
Eagle County, CO	9.4
Garfield County, CO	9.2
Grand County, CO	6.6
Jackson County, CO	13.9
Mesa County, CO	12.4
Moffat County, CO	13.0
Rio Blanco County, CO	5.3
Routt County, CO	6.9
Socioeconomic Study Area	11.6
Colorado	12.2
US	13.8

Source: US Census Bureau 2010c

Of the eight counties in the Socioeconomic Study Area, two counties have higher percentages of residents below the poverty level than the overall Colorado percentage (12.2 percent): Mesa (12.4 percent) and Moffat (13.0 percent). One county, Jackson County, has a higher percentage (13.9 percent) of residents below the poverty level than the national percentage (13.8 percent). Smaller communities (at the sub-county level) where minority presence is “meaningfully greater” than in the state as a whole may also exist in the primary study area and would be relevant in the analysis of site-specific projects and measures.

To ascertain whether there are disproportionate effects of the alternatives on low-income populations, data on effects by each alternative are reported in **Chapter 4, Environmental Consequences**.

Tribal Populations

There are two federally recognized Indian tribes in the State of Colorado: the Southern Ute Tribe and the Ute Mountain Ute Tribe (US Department of Interior, Bureau of Indian Affairs 2011). While neither is located within the Socioeconomic Study Area, feedback received during public scoping and the June 2012 Economic Strategies Workshop for this planning document emphasized the significance of the GRSG in Native American culture and the need for continued consultation and engagement of area tribes throughout the planning process (BLM and Forest Service 2012; BLM 2013a).

3.24.2 References

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