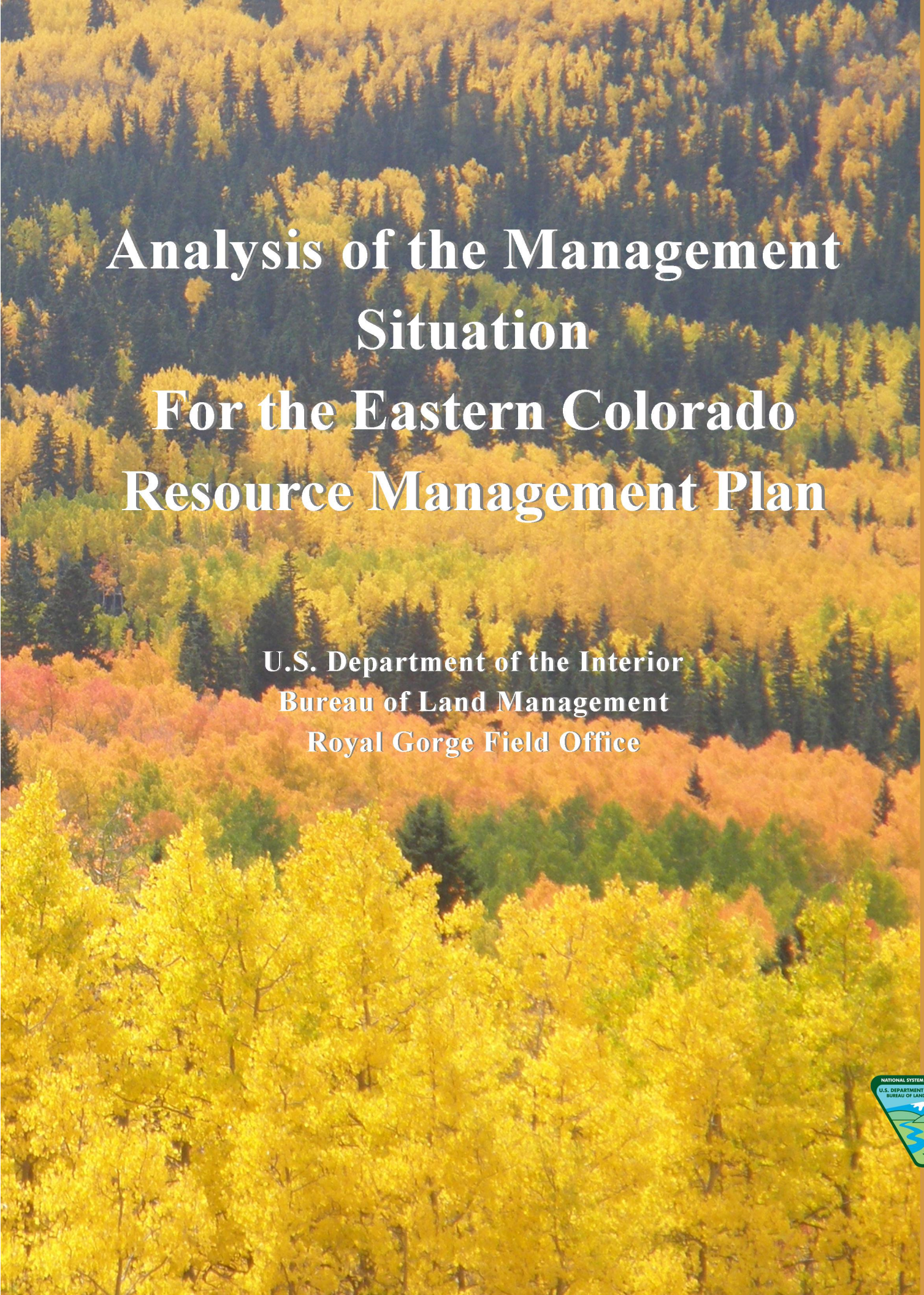

Analysis of the Management Situation For the Eastern Colorado Resource Management Plan

U.S. Department of the Interior
Bureau of Land Management
Royal Gorge Field Office

BLM

Royal Gorge Field Office • COLORADO

Analysis of the Management Situation for the Eastern Colorado Resource Management Plan

Prepared by
U.S. Department of the Interior
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June 2015

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Acronyms and Abbreviations

ACEC Area of critical environmental concern

AMP Allotment management plan

AMS Analysis of the management situation

APCD Colorado Department of Public Health and Environment, Air Pollution Control Division

APD Application for permit to drill

ATV All-terrain vehicle

AUM Animal unit month

BLM Bureau of Land Management

BMPs Best management practices

CCR Colorado Code of Regulations

cfs Cubic feet per second

CPW Colorado Parks and Wildlife

CDPHE Colorado Department of Public Health and Environment

CFR Code of Federal Regulations

CWCB Colorado Water Conservation Board

CWQCC Colorado Water Quality Control Commission

DOE Department of Energy

DOI U.S. Department of the Interior

DV or dv Deciview

EA Environmental assessment

EIS Environmental impact statement

EPA U.S. Environmental Protection Agency

ESA Endangered Species Act

°F Degrees Fahrenheit

FLPMA Federal Land Policy and Management Act

FMP Fire management plan

FMU Fire management unit

FRCC Fire regime condition class

FWFMP Federal Wildland Fire Management Policy

FWS U.S. Fish and Wildlife Service

GHG Greenhouse gas

GIS Geographic information system

IAP Integrated activity plan

IMPROVE Interagency Monitoring of Protected Visual Environments

LHA Land health assessment

MOU Memorandum of understanding

NAAQS National ambient air quality standards

n.d. No data

OHV Off-highway vehicle

ppm Parts per million

PSD Prevention of significant deterioration

RGFO Royal Gorge Field Office

ROV Recreational off-highway vehicle, also known as a side-by-side

ROW Right-of-way

R&PP Recreation and public purpose

RPS Renewable energy portfolio standards

SRMA Special recreation management area

SRP Special recreation permit

SVR Standard visual range

T&E Threatened and endangered

TMP Travel management plan

U.S. United States

U.S.C. United States Code

USDA U.S. Department of Agriculture

USFS U.S. Forest Service

USGS U.S. Geological Survey

VOCs Volatile organic compounds

VRM Visual resource management

WRCC Western Regional Climate Center

WSA Wilderness study area

WUI Wildland-urban interface

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Executive Summary

The United States (U.S.) Department of the Interior (DOI), Bureau of Land Management (BLM), Royal Gorge Field Office (RGFO), has initiated a land use planning process that will cover all BLM-administered public lands and Federal mineral estate in the RGFO. The RGFO currently manages public lands through two resource management plans (RMPs) and associated amendments: the Royal Gorge Resource Area RMP (BLM 1996), as amended by the South Park land tenure adjustment plan (BLM 2009b), four travel management plan amendments (see BLM 2004a, BLM 2008d, BLM 2002d, and BLM 2004c) and the 1997 amendment for land health standards (BLM 1997); and the Northeast RMP (BLM 1986b), as amended in 1991 by the oil and gas amendment (BLM 1991c). The RGFO's current management decisions are based on the records of decision for each of these respective plans. The new RMP, which will be called the Eastern Colorado RMP, will combine both of the original planning areas into one cohesive plan.

The planning area covers a large percentage of eastern Colorado; however, BLM surface management of the area is relatively small, being confined mainly to seven counties in south central Colorado, the remainder existing as small isolated tracts scattered over the rest of eastern Colorado. The BLM does administer federally owned mineral estate over a large portion of the area, including under privately held surface (split estate), State lands, and under lands managed by other Federal agencies. Surface areas within the planning area administered by other Federal agencies such as the U.S. Forest Service (USFS), Department of Defense, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service (FWS), and the National Park Service (NPS), and by State agencies such as the Colorado State Land Board, are not the subject of this planning effort. In addition, planning decisions and descriptions in the RMP do not apply to private lands, with the exception of Federal minerals that lie beneath private lands (known as split estate).

This analysis of the management situation (AMS) is a summary document that describes the physical and biological characteristics and condition of resources within the planning area, provides a snapshot of how those resources are currently being managed, and identifies observable and measurable trends in resources and resource uses between past and present, as well as future management opportunities.

Since the current RMP was approved, almost all of the resources have been further stressed due to population growth, greater demands for commodities, and new technologies that allow greater access to the resources. The adequacy of current management direction provided by the existing RMPs is variable. For some resources, current management direction is adequate, and few changes have been identified. For other resources, the current RMPs are silent or severely lacking in management direction. The new RMP should fill these gaps and formulate adequate stipulations.

According to the guidance found in 43 CFR 1610, BLM RMPs and amendments must be consistent, to the extent practical, with officially approved or adopted resource-related plans of State and local governments, other Federal agencies, and tribal governments, so long as the guidance and RMPs are also consistent. BLM RMPs must also be consistent with the purposes, policies, and programs of the Federal Land Policy and Management Act (FLPMA) and other Federal laws and regulations applicable to public lands, including Federal and State pollution control laws. See 43 CFR 1610.3-2 (a). Because the plan covers a vast area, the BLM will need to coordinate extensively with cooperating agencies. In order to do this, close to 100 cooperators will be invited to help in the RMP revision process.

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Chapter 1. Introduction

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1.1. Overview

The U.S. Department of the Interior (DOI), Bureau of Land Management (BLM), Royal Gorge Field Office (RGFO), has initiated a land use planning process that will cover all BLM-administered public lands and Federal mineral estate in the RGFO. The RGFO currently manages public lands through two resource management plans (RMPs) and associated amendments. These RMPs are the Royal Gorge Resource Area RMP (BLM 1996), as amended by the South Park land tenure adjustment plan (BLM 2009b), four travel management plan amendments (see BLM 2004a, BLM 2008d, USFS and BLM 2002, and BLM 2004c), and the 1997 amendment for land health standards (BLM 1997); and the Northeast RMP (BLM 1986b), as amended in 1991 by the oil and gas amendment (BLM 1991c). The RGFO's current management decisions are based on the records of decision for each of these respective plans. The new RMP, which will be called the Eastern Colorado RMP, will combine both of the original planning areas into one cohesive plan.

An environmental impact statement (EIS) will be prepared as part of the RMP revision. An EIS is a document required by the National Environmental Policy Act (NEPA) for Federal Government agency actions "significantly affecting the quality of the human environment." A tool for decision making, an EIS describes the positive and negative environmental effects of a proposed agency action and cites alternative actions.

This analysis of the management situation (AMS) is one of the first steps in revising the RMP. The purpose of the AMS is to summarize current management of the public lands, analyze available inventory data and current resource condition, and identify opportunities for management changes. The AMS will be used to inform internal scoping and aid in formulating reasonable alternatives in the new RMP. Information in the AMS will also be used to prepare the "affected environment" and the "no action alternative" sections of the draft Eastern Colorado RMP/EIS. The AMS focuses on the issues relevant to resource management in the RGFO and is not an exhaustive review of everything known about the area.

Areas within the planning area administered by other Federal agencies, such as the U.S. Forest Service (USFS), Department of Defense, U.S. Bureau of Reclamation (BOR), U.S. Fish and Wildlife Service (FWS), National Park Service (NPS); and by State agencies, such as the Colorado State Land Board, are not the subject of this planning effort. In addition, planning decisions and descriptions in the RMP do not apply to private lands, with the exception of Federal minerals that lie beneath private lands (known as split estate).

1.2. Purpose of and Need for the Resource Management Plan

The Federal Land Policy and Management Act of 1976 (FLPMA) requires that the BLM "develop[s], maintain[s], and, when appropriate, revise[s] land use plans" (43 U.S.C. 1712 (a)). As a result of new and complex issues arising since the last land use plan revision, the BLM finds it necessary to revise the current RMPs. As the planning process progresses, the BLM will further refine and focus the purpose and need for the revision. There will be opportunities for public involvement, such as scoping and envisioning, which will allow the BLM to focus on what it is trying to achieve and what the priorities are. The RGFO currently operates under the guidance of two RMPs, the Royal Gorge Resource Area RMP of 1996 (BLM 1996) and the Northeast RMP of 1986 (BLM 1986b). In 1992, the Royal Gorge Resource Area, managing the southeast portion of the State, administratively absorbed the Northeast Resource Area, which managed the northeast

portion of the State. Currently, the public lands and Federal mineral estate of the eastern half of Colorado are administered by the RGFO. It is the purpose of this revision to consolidate and update management under a single land use plan.

The new plan will provide updated planning level analysis and decisions in response to new challenges and changing conditions not only on a local and regional scale but also on a national scale. These planning level decisions will lay the groundwork for the manager to make informed implementation-level decisions. Major goals and objectives for the RMP revision include the following:

- To consider a master leasing plan for South Park and re-examine the fluid mineral objectives to balance energy needs with environmental stewardship.
- To effectively manage the ever-increasing pressures of the recreational community on the public lands.
- To address the complexities of growing populations and their interface with public lands.
- To maintain and promote wildlife and land health while embracing the concepts of multiple use and sustained yield.
- To consider land tenure adjustments, split estate, withdrawals, and utility/energy corridors.

1.3. Purpose of the Analysis of the Management Situation

This AMS is a summary document that describes the physical and biological characteristics and condition of resources within the planning area, provides a snapshot of how those resources are currently being managed, and identifies observable and measurable trends in resources and resource uses between past and present as well future management opportunities.

The AMS is an early component of the planning process, providing a reference for how a given resource might behave in response to issues presented during RMP development, and it should not be regarded as a comprehensive or detailed analysis of specific resources. It is intended to provide a framework from which to resolve planning issues through the development of alternatives.

1.4. Planning Process Overview

The BLM will invite members of the public to share their vision for the future of their community and how BLM-managed public lands and Federal minerals fit into that vision, at a series of public meetings. These envisioning meetings will help guide the BLM as they develop the Eastern Colorado RMP. For further information, please visit the Eastern Colorado RMP website: http://on.doi.gov/1HVULcA.

The BLM RGFO will issue a notice of intent (NOI) in the *Federal Register*, which will formally notify the public of the BLM's intent to prepare the Eastern Colorado RMP and will initiate the public scoping period. Below are the remaining major steps and supporting tasks of the land use planning process:

- Meet with public to discuss vision.
- Conduct public scoping:

  - Publish notice of intent to prepare an RMP/EIS.
  - Develop planning criteria and identify planning opportunities.
  - Invite the public to participate and analyze public comments.
  - Identify issues raised by the public.
  - Refine issue descriptions and prepare scoping report.
- Prepare alternatives and impact analysis strategy:
  - Prepare draft alternatives
  - Refine planning criteria and purpose and need
  - Prepare draft impact analysis strategy
  - Public review of draft alternatives and impact analysis strategy
  - Prepare report(s) with final alternatives and impact analysis strategy to be used in the draft RMP/EIS
- Prepare draft RMP/EIS:
  - Refine issues, formulate management alternatives, and conduct impact analysis.
  - Provide a 90-day public comment period.
- Resolve all protests.
- Prepare proposed RMP/final EIS:
  - Address public comments and make changes as appropriate.
  - Develop a "proposed alternative."
  - Provide a 30-day protest period and 60-day Governor's consistency review.
- Prepare record of decision and approved RMP:
  - Identify selected alternative.

1.5. Description of Planning Area and Decision Area

The *planning area* is the geographical area about which the BLM will make decisions during the land use planning effort. The planning area boundary includes all lands regardless of jurisdiction; however, the BLM will only make decisions on lands that fall under the BLM's jurisdiction (including subsurface minerals).

The planning area is the Royal Gorge Field Office. It is bordered on the west by the Pike–San Isabel and Arapahoe-Roosevelt National Forests, on the north by Wyoming, on the east by Nebraska and Kansas, and on the south by New Mexico and Oklahoma. The RGFO is located east of the Continental Divide within the BLM Front Range District (it excludes the San Luis Valley

Field Office, also located east of the Continental Divide in Colorado). The RGFO lies within three ecological provinces of Eastern Colorado: the Southern Rocky Mountain province, the High Plains province, and the Southwestern Tablelands province. BLM lands within the planning area vary from short grass prairie (<4,000-foot elevation) to alpine tundra (>14,000-foot elevation). The area has varied topography, climate, geology, soil, and flora and fauna, including prairie, riparian habitat, high elevation parks, pinyon-juniper woodlands, mountain shrublands, ponderosa pinelands, spruce-fir forests, and alpine tundra.

The planning area encompasses approximately 45,100,000 acres of Federal, State, and private lands in 38 counties (see Table 1.1). Numerous distinct and diverse communities exist within the RGFO. The communities have very different economic bases, values and resources, and include large cities, resort communities, farm and ranching communities, and others. Many communities and subdivisions are also in the wildland-urban interface (WUI). The planning area is crossed by major power transmission lines that are critical for maintaining service to the entire western United States power grid. Mineral development is also expected to continue at a rapid pace over the next decade, adding to the complexity of managing the public lands in this field office.

Within the planning area, approximately 668,000 acres are BLM-managed public lands (surface lands and Federal minerals) located mainly in Chaffee, Custer, Fremont, Lake, Park, Huerfano, and Teller Counties. The planning area contains approximately 3,895,000 acres of Federal minerals under other Federal land, as well as 2,679,000 acres of Federal minerals under local government, private, and State lands.

The *decision area* is the lands within the planning area for which the BLM has the authority to make land-use and management decisions. The Eastern Colorado RMP decision area comprises approximately 668,000 acres of BLM-administered public lands and approximately 6.6 million acres of Federal mineral estate. The majority of BLM-administered public lands within the RGFO are located in Fremont County and surrounding counties (Figure 1.1). Federal mineral estate can be found throughout all of eastern Colorado (Figure 1.2).

Table 1.1. Land Status and Mineral Estate in the Planning Area

Surface management in the planning area	Approximate acres (in the planning area)
BLM	668,138
Bureau of Reclamation	78
Military reservation	466,165
State, county and city lands	211,340
National Park Service	173,763
Other Federal	71,160
Private	28,372,913
State	2,195,664
U.S. Forest Service	2,877,306
Bankhead-Jones land use lands (P.L. 75–210)	621,139
U.S. Fish and Wildlife Service	3,097

Counties within planning area	BLM surface acreage (in the planning area)	BLM subsurface acreage (in the planning area)
Adams	0	26,283
Arapahoe	0	48,879
Baca	337	210,034
Bent	1,401	148,144
Boulder	3,297	176,316
Broomfield	0	162

Chaffee	54,273	519,659
Cheyenne	0	4,217
Clear Creek	8	169,913
Crowley	3,156	31,376
Custer	13,135	257,425
Denver	0	1,767
Douglas	0	145,006
El Paso	5,767	335,175
Elbert	0	118,497
Fremont	354,616	600,896
Gilpin	1,054	48,621
Huerfano	70,045	420,406
Jefferson	357	125,080
Kiowa	8,105	19,141
Kit Carson	0	21,087
Lake	19,506	175,733
Larimer	909	450,572
Las Animas	8,289	1,090,984
Lincoln	1,733	20,914
Logan	137	19,082
Morgan	715	29,274
Otero	3,001	263,580
Park	76,327	982,125
Phillips	0	6,575
Prowers	711	43,502
Pueblo	15,355	223,331
Saguache	117	24,127
Sedgwick	80	2,046
Teller	24,688	180,911
Washington	284	22,418
Weld	343	196,590
Yuma	322	51,431

Federal mineral estate in the planning area	**Approximate acres (in the planning area)**
No Federal minerals	28,379,253
All Federal minerals[a]	6,451,970
Coal only	436,671
Oil and gas only	86,204
Oil, gas, and coal only	1,569
Other[b]	242,114

[a]All Federal minerals: The Federal Government owns rights to all mineral resources (i.e., coal, oil, gas, uranium, gravel, sand, moss rock, and all others).

[b]Other: The Federal Government owns rights to other mineral resources, either singly or in combination. Other mineral resources include uranium, moss rock, gravel, sand, and others not listed in this table.

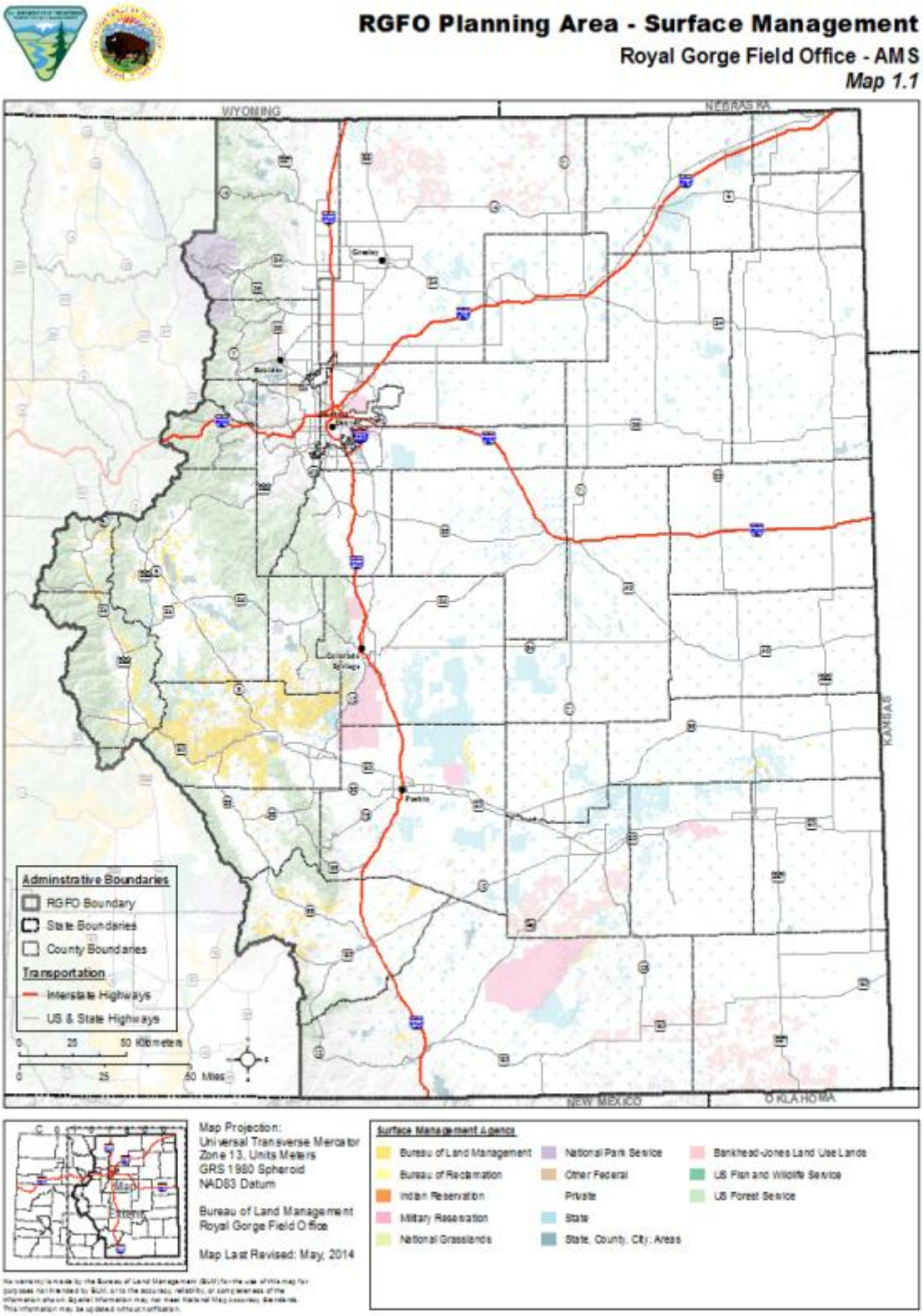

Figure 1.1. BLM-Administered Public Lands in the Royal Gorge Field Office

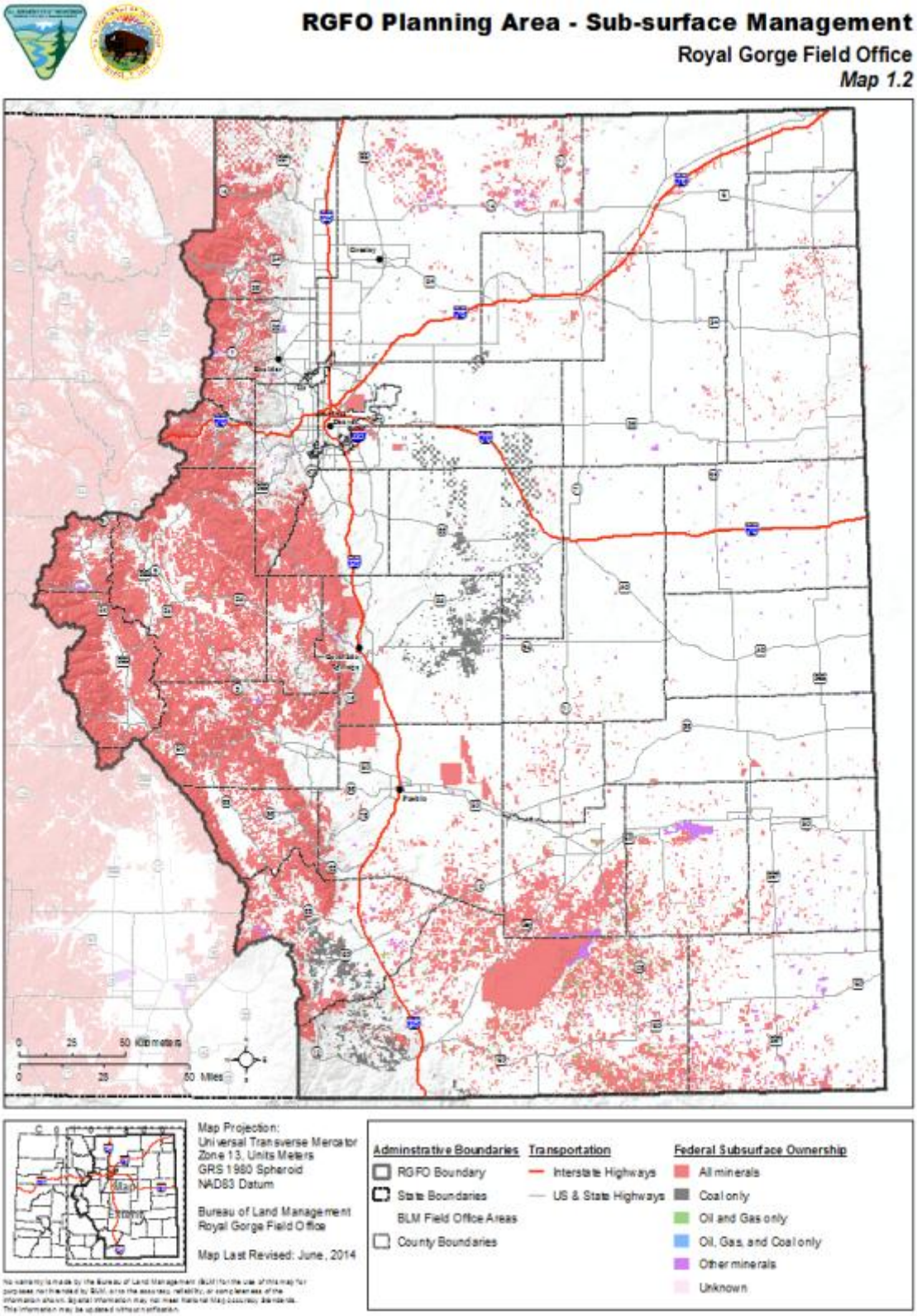

Figure 1.2. BLM-Administered Federal Mineral Estate

1.6. How This Document Is Organized

Chapter 1 explains why this document was written and gives an overview of the planning process.

Chapter 2 profiles the planning area, detailing the existing condition of resources, resource uses, special designations, and social and economic conditions.

Chapter 3 describes the management direction (including objectives and decisions) prescribed by current RMPs and RMP amendments.

Chapter 4 outlines the ability of current management direction to achieve desired conditions, addresses resource demands, and describes management opportunities identified by resource specialists. This chapter will guide public scoping of possible management actions and aid in formulating alternatives in the draft Eastern Colorado RMP/EIS.

Chapters 5 and *6* list other plans, mandates, and authorities the BLM will consider during development of the revised RMP.

Chapter 2. Area Profile

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2.1. Introduction

The area profile describes the current (also known as "baseline") condition of all resources and resource uses on public lands in the RGFO. The area profile also analyzes lands currently under special designation, such as wilderness study areas (WSAs), as well as the social and economic values associated with public lands. This chapter incorporates information compiled at multiple levels to provide a context for the resources and their various uses. The information provided here will become the basis for the affected environment chapter of the Eastern Colorado RMP/EIS.

The area profile contains four sections:

- **Resources (section 2.2)**
- **Resource uses (section 2.3)**
- **Special designations (section 2.4)**
- **Social and Economic Conditions (section 2.5)**

For each *resource* (e.g., vegetation or wildlife), the area profile does the following:

- **Indicators**— identifies factors that describe the condition of the resource.
- **Current condition**— describes the location, extent, and current condition of the resource within the planning area.
- **Trends**— describes the current degree and type of change for the resource and predicts future changes in the condition of the resource given current management and natural trends.
- **Forecast**— describes the current degree and type of change for the resource and predicts future changes in the condition of the resource given current management and natural trends.
- **Key features**— describes the features that guide land use allocation or management decisions.

For each *resource use* (e.g., recreation or mineral development), the area profile does the following:

- **Current level of use**— describes the current level and locations of the resource use.
- **Trends and forecast**— describes the current changes in the demand or location of a resource use and predicts anticipated demand for the use in the future.
- **Key features**— describes the current degree of use and areas with a high potential for future use.

For the *special designations*—e.g., WSAs, or areas of critical environmental concern (ACECs)—the area profile does as follows:

- Identifies their locations and discusses the special values of existing special designations.

For the *social and economic features*, the area profile does the following:

- **Tribal interests** — identifies Native American tribes with an interest in the planning area.

- **Public safety** — identifies areas or conditions where public safety is an issue.
- **Social and economic conditions**— gives a baseline socioeconomic report.

2.2. Resources

2.2.1. Air Quality and Climate

2.2.1.1. Indicators

Indicators that are related to air quality can be described in terms of pollutant classes, standards, and concentrations. The overall health of any region's air quality is determined by monitoring for certain pollutants and determining if the measured concentrations are below an applicable standard limit. Areas where air quality concentrations are below the applicable standard are said to have attained the National Ambient Air Quality Standards (NAAQS), whereas areas that currently violate a standard or have violated one in the past are designated as non-attainment or maintenance areas.

Criteria pollutant concentrations

The NAAQS are set for six common air pollutants often referred to as criteria pollutants, which include carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 and 2.5 microns ($PM_{10}$and $PM_{2.5}$, respectively), ozone (O_3), and nitrogen dioxide (NO_2). The Environmental Protection Agency (EPA) regulates criteria pollutants by developing science-based human health and/or environmental criteria for setting permissible levels. The limits based on human health are called primary standards. Limits intended to prevent environmental and property damage are called secondary standards. EPA regularly reviews the NAAQS (every five years) to ensure that the latest science on health effects, risk assessment, and observable data such as incidence rates are evaluated in order to re-propose any NAAQS to a lower limit if the data support the finding. In Colorado, the Colorado Department of Public Health and Environment, Air Pollution Control Division (APCD), has regulatory authority for authorizing sources of air pollution emissions and maintaining or attaining the NAAQS, by means of an approved State implementation plan (SIP) and/or delegation by EPA. Further, the Air Pollution Control Commission can establish State ambient air quality standards for any criteria pollutant that is at least as stringent as the Federal standards. Ambient air quality standards must not be exceeded in areas where the general public has access. Figure 2.1 below is taken directly from the EPA's NAAQS website (http://www.epa.gov/air/criteria.html and Table 5 of APCD's Colorado modeling guideline for air quality permits, as amended May 20, 2011 (State of Colorado 2011) and lists the Federal and State ambient air quality standards applicable to the RGFO.

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		primary and secondary	Rolling 3 month average	0.15 µg/m³	Not to be exceeded
Nitrogen Dioxide		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual Mean
Ozone		primary and secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary and secondary	Annual	12 µg/m³	Annual mean, averaged over 3 years
			24-hour	35 µg/m³	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary	Annual	0.03 ppm	Arithmetic Average
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Figure 2.1. National Ambient Air Quality Standards

Prevention of significant deterioration increments

Other relative indicators of air quality are the prevention of significant deterioration (PSD) increments. PSD increments, or the amount of pollution an area is allowed to increase, prevents the air quality in clean (i.e., attainment) areas from deteriorating to the level set by the NAAQS, or beyond the relative baseline limit that was set for the area when the first PSD permit application was approved. Although the PSD rule is only applicable to major stationary sources of air pollution, an increment analysis can provide a useful measure to determine how likely new sources of pollution (major or minor) could have a significant impact on regional air quality. Figure 2.2 below (Table 7, State of Colorado 2011; also available online: http://www.colorado.gov/airquality/permits/guide.pdf) shows the applicable PSD increments for different air quality class designations in Colorado in µg/m³. Note that official PSD increment analyses are the sole responsibility of the APCD. Any subsequent analysis done for NEPA purposes will be used for informational purposes only.

Pollutant	Period	Class I	Class II	Class III
Nitrogen Dioxide (NO_2)	Annual	2.5	25	50
Sulfur Dioxide (SO_2)	3-hr	25	512	700
	24-hr	5	91	182
	Annual	2	20	40
Particulate Matter < 10 µm (PM_{10})	24-hr	8	30	60
	Annual	4	17	34
Particulate Matter < 2.5 µm ($PM_{2.5}$)	24-hr	2	9	18
	Annual	1	4	8

Figure 2.2. Prevention of Significant Deterioration Increments

Hazardous air pollutants

Toxic pollutants are another class of air contaminants and are commonly referred to as hazardous air pollutants (HAPs). HAPs are either known or suspected to cause cancer or other serious health effects, such as reproductive or birth defects, or adverse environmental effects. Standards do not exist for this class of pollutants; however, mass-based emissions limits and risk-based exposure thresholds have been established as significance criteria to require maximum achievable control technologies (MACTs) for certain industrial source classes. For the purposes of NEPA disclosure, project level implementation, and mitigation thresholds, an upper limit of a 1 to 100 in a million cancer risk for lifetime exposure levels is used depending on the pollutant that is being analyzed. There are currently 187 compounds or classes of compounds listed on the EPA Technology Transfer Network air toxics website (http://www.epa.gov/ttnatw01/allabout.html) that have been designated as HAPs.

Air-quality-related values

Air-quality-related values (AQRVs) provide a measure of air quality with respect to atmospheric phenomena such as visibility impairment and pollutant deposition. Measuring AQRVs is particularly important in federally mandated Class 1 lands, which include areas such as national parks, national wilderness areas, and national monuments. Class 1 areas are granted special air quality protections under Section 162(a) of the Federal Clean Air Act of 1970.

Visibility impairment or haze is caused when sunlight encounters tiny pollution particles in the atmosphere and is either absorbed or scattered, which reduces the clarity and color of what can be seen. Visibility can be expressed in terms of deciviews (dv) or standard visual range (SVR). A change of one dv is approximately a 10 percent change in the light extinction coefficient (i.e., light that is scattered or absorbed and does not reach the observer), which is a small but usually perceptible scenic change. Class 1 areas have legislative mandates to provide for natural visibility conditions such that visitors can experience a pristine environment free of observable pollution effects. The ability of a pollutant to cause various degrees of visibility impacts is primarily a function of its physical size, chemical composition, and properties. Various pollutant species that affect visibility have been monitored through the Interagency Monitoring of Protected Visual

Environments (IMPROVE) network (http://vista.cira.colostate.edu/improve/) in many of the sensitive Class 1 areas around the country since the 1980s.

Deposition is the process by which pollutants are removed from the atmosphere through mechanical and chemical processes. When air pollutants such as sulfur and nitrogen are deposited into ecosystems, they may cause acidification or enrichment of soils and surface waters. Atmospheric nitrogen and sulfur deposition may affect water chemistry, resulting in impacts to aquatic vegetation, invertebrate communities, amphibians, and fish. One common measure of water chemistry impacts is referred to as acid neutralization capacity (ANC) change, as described in *Screening Methodology for Calculating ANC Change to High Elevation Lakes* (USFS 2000a). Deposition can also cause soil chemistry changes that alter soil microorganisms, plants, and trees. Although nitrogen is an essential plant nutrient, excess nitrogen from atmospheric deposition can put stress on ecosystems by favoring some plant species and inhibiting the growth of others. These processes are measured by means of two distinct methodologies: wet and dry deposition monitors. The National Atmospheric Deposition Program (NADP) is a conglomerate of various wet chemistry monitoring networks designed to measure wet atmospheric deposition and study its effects on the environment. The network currently operates approximately 250 sites, many since the early 1980s. The Clean Air Status and Trends Network (CASTNET) is a national air quality monitoring network designed to provide data to assess trends in air quality, dry atmospheric deposition, and ecological effects due to changes in air pollutant emissions. CASTNET began collecting data in 1991 with the incorporation of 50 sites from the National Dry Deposition Network. CASTNET provides long-term monitoring of air quality in rural areas to determine trends in regional atmospheric nitrogen, sulfur, and ozone concentrations, and in deposition fluxes of sulfur and nitrogen pollutants.

Greenhouse gas concentrations

There is broad scientific consensus that humans are changing the chemical composition of the Earth's atmosphere. Activities such as fossil fuel combustion, deforestation, agriculture, and other changes in land use are resulting in the atmospheric accumulation of trace greenhouse gases (GHGs) such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several industrial gases. An increase in GHG concentrations results in an increase in the Earth's average surface temperature, primarily by trapping and thus decreasing the amount of heat energy that would normally be radiated back into space (radiative forcing). The phenomenon is commonly referred to as global warming. Global warming, in turn, is expected to affect regional weather patterns, average sea level rise, ocean acidification, and precipitation rates, which are collectively referred to as climate change. The global scale and complexity of climate change are enormous and reach across the entirety of the geopolitical spectrum, making a discussion of these issues beyond the scope of this document. The only relative indicator the BLM can use to differentiate potential management actions is the mass of the GHG emissions themselves that might be emitted from such actions. Any correlations and conclusions drawn from the data are limited given the inherent uncertainty of such a complex system as Earth's climate.

2.2.1.2. Current Condition

Climate

The climate of the RGFO is relatively uniform from place to place given the overall size of the area. Characteristic features include low relative humidity, abundant sunshine, infrequent rain and

snow, moderate to high wind movement, and a large daily and seasonal range of temperatures. Summer daily maximum temperatures are often 95 °F or above, and 100 °F temperatures have been observed at elevations of about 5,000 feet. The usual winter extremes in the RGFO are from zero to −15 °F but can reach low readings of −30 to −40 °F during some of the most extreme cold weather.

A large proportion of the area precipitation (70–80 percent of the annual total) falls during the growing season from April through September. Winter precipitation is light and infrequent and usually brings dry air and strong winds that contribute to the aridity of the area. Summer precipitation over the plains comes largely from thunderstorm activity and is sometimes extremely heavy, which can contribute to localized flooding. It is more common, however, for the area to be very dry. The region frequently suffers from drought, and multi-year drought is more common than not.

At the western edge of the plains and near the foothills of the mountains, there are a number of significant changes in climate. Average wind movement is less, but areas very near the mountains are subject to periodic, severe, turbulent winds, as high westerly winds move over the Front Range peaks. Day-to-day temperature changes are not quite as great, summer temperatures are lower, and winter temperatures are higher. Precipitation gradually decreases from the eastern border to a minimum near the mountains, but rapidly increases with the increasing elevation of the foothills and proximity to higher mountains. This milder corridor close to the mountains is where the majority of Colorado's residents live. Figure 2.3 (Western Regional Climate Center, 1996−2008, http://www.wrcc.dri.edu/) shows a composite (average) of the available climate data for nine cities (Burlington, Colorado Springs, Denver, La Junta, Lamar, Limon, Pueblo, Springfield, and Trinidad) within the RGFO.

TEMPERATURE (F)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Average
Avg Max Temp	45.2	48.0	57.2	64.9	75.6	84.7	91.3	87.4	79.9	68.0	55.5	45.4	66.9
Avg Min Temp	16.4	18.8	26.1	33.9	44.0	53.1	60.0	58.2	48.8	36.2	24.9	16.4	36.4
Avg Temperature	30.8	33.5	41.6	49.4	59.8	68.9	75.7	72.8	64.4	52.1	40.2	30.9	51.7
Extremes:													
Extreme Max Temp	76.1	78.0	82.3	89.2	99.9	102.8	105.2	104.2	97.9	90.8	82.2	75.3	105.4
Date of Ext-Day	7	25	22	15	27	15	20	3	7	5	13	6	
-Year	2000	2005	2002	2004	2001	2001	2004	2007	2000	2003	2005	2002	
Extreme Min Temp	-13.0	-11.9	-3.4	8.9	22.8	34.1	46.2	44.8	25.3	10.6	-3.6	-17.1	-17.1
Date of Ext-Day	12	7	3	9	5	7	9	26	28	27	24	18	
-Year	2002	2006	2002	1998	2008	2004	2000	2004	1999	1998	2003	2001	
Heating Degree Days	1,059	891	724	470	201	43	2	8	107	408	744	1,056	5,715
Cooling Degree Days	0	0	0	2	40	160	333	249	87	7	0	0	879
Avg Number of Days:													
Max Temp >= 90	0	0	0	0	3	11	20	13	6	1	0	0	53
Max Temp >= 75	0	0	3	8	18	25	30	29	22	10	3	0	148
Max Temp <= 32	6	4	1	0	0	0	0	0	0	0	2	5	18
Min Temp <= 32	30	27	24	13	2	0	0	0	1	10	24	30	162
Min Temp <= 20	20	15	7	1	0	0	0	0	0	1	8	20	73
Min Temp <= 0	2	1	0	0	0	0	0	0	0	0	0	2	5
Avg Dew Point Temp	15.8	17.3	22.3	27.7	38.4	45.9	52.1	52.7	43.1	32.0	21.6	15.8	32.1
Avg Wet Bulb Temp	25.0	27.1	33.5	39.8	48.9	56.0	61.2	60.2	52.5	42.2	32.1	25.0	42.0
PRESSURE (in. Hg)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year Average**
Avg Sea Level Pres	30.11	30.09	30.06	30.07	29.98	29.94	29.90	29.93	29.97	30.04	30.11	30.10	30.02
WEATHER	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year Average**
Avg Number of Days:													
Thunderstorms	0	0	0	2	4	6	7	6	2	1	0	0	29
Heavy Fog	3	3	3	2	1	1	1	1	1	2	2	1	20
Fog	8	8	8	8	7	6	5	6	5	6	6	5	77
Hail	0	0	0	0	0	0	0	0	0	0	0	0	1
PRECIPITATION (In)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year Average**
Average Monthly	0.26	0.26	0.77	1.63	1.45	1.79	2.30	2.41	0.97	0.98	0.33	0.28	13.43
Maximum Daily	0.40	0.45	1.11	2.10	1.36	1.74	2.21	2.12	1.30	1.67	0.66	0.56	2.63
Date of Ext-Day	22	13	18	24	9	14	22	14	18	14	11	19	
-Year	2002	2001	2001	2001	2000	2002	2000	2003	1998	2003	2000	2005	
Avg Number of Days:													
>= 0.01	3.5	3.5	5.8	7.2	7.8	8.4	8.8	10.2	6.4	5.2	3.8	3.3	73.9
>= 0.10	0.9	0.9	2.2	3.6	3.5	4.2	4.4	5.1	2.7	2.3	1.0	0.8	31.6
>= 0.25	0.2	0.2	0.9	1.9	1.8	2.2	2.6	2.9	1.2	1.3	0.3	0.2	15.8
>= 0.50	0.0	0.0	0.3	0.9	0.9	1.0	1.4	1.5	0.4	0.5	0.1	0.1	7.0
>= 1.00	0.0	0.0	0.1	0.3	0.2	0.3	0.6	0.5	0.1	0.1	0.0	0.0	2.2

Figure 2.3. RGFO Composite Climate Data

Air quality (monitoring)

Colorado Department of Public Health and Environment (CDPHE) maintains a comprehensive monitoring network to assess criteria pollutant emissions across much of Colorado. The State is divided in monitoring regions for which CDPHE produces annual reports for the data (see Figure 2.4 below). Regions occupied by the RGFO are as follows: Denver Metro/Northern Front Range, Eastern Plains, Pikes Peak, South Central, and the eastern portion of the Central Mountains. The overwhelming majority of air quality monitors are located within the Denver Metro/Northern Front Range Area. Table 2.1 below shows the RGFO monitoring sites and pollutants that have been monitored for at least the past three years.

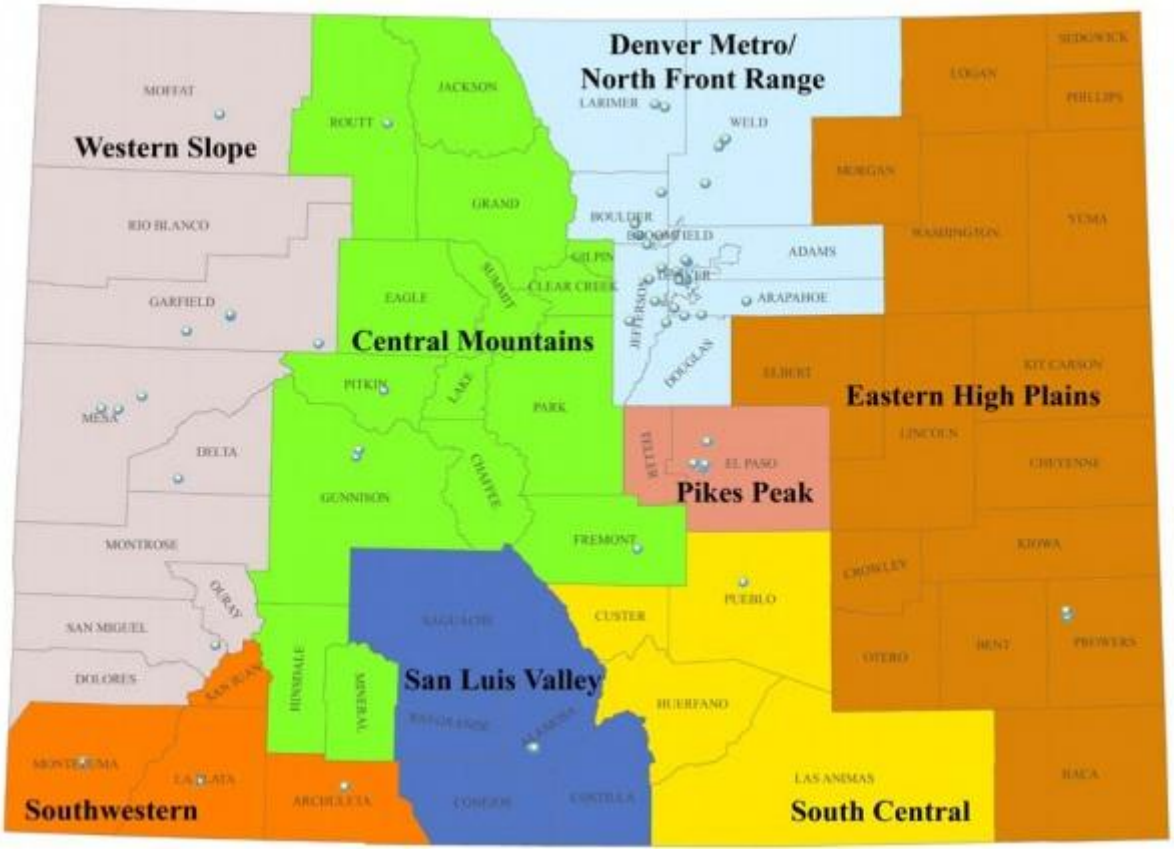

Figure 2.4. CDPHE Monitoring Districts

Table 2.1. RGFO Monitoring Sites and Pollutants

County	Site ID	Location	CO	SO_2	NO_X	O_3	PM_{10}	$PM_{2.5}$
Adams	80013001	3174 E. 78th Avenue	X	X	X	X	X	
Adams	80010006	7101 Birch Street					X	X
Adams	80010006	7101 Birch Street						X
Arapahoe	80050006	36001 E. Quincy Avenue				X		
Arapahoe	80050005	6190 S. Santa Fe Drive						X
Arapahoe	80050002	8100 S. University Boulevard				X		
Boulder	80130011	1405 1/2 S. Foothills Parkway				X		
Boulder	80130012	2440 Pearl Street					X	X
Denver	80310002	2105 Broadway	X	X	X	X	X	X
Denver	80310017	225 W. Colfax Avenue					X	
Denver	80310014	2325 Irving Street				X		
Denver	80310026	4545 Navajo Street					X	
Denver	80310023	4650 Columbine Street						X
Denver	80310025	678 S. Jason Street	X	X		X	X	X
Douglas	80350004	11500 N. Roxborough Park Road				X		X
El Paso	80410016	101 Banks Place				X		
El Paso	80410017	130 W. Cache La Poudre					X	X
El Paso	80410015	690 W. Highway 24	X					
El Paso	80410013	Road 640, USAF Academy				X		
Fremont	80430003	128 Main Street					X	
Jefferson	80590005	12400 W. Highway 285				X		

County	Site ID	Location	CO	SO_2	NO_X	O_3	PM_{10}	$PM_{2.5}$
Jefferson	80590006	16600 W. Colorado No. 128				X		
Jefferson	80590011	2054 Quaker Street				X		
Jefferson	80590013	26137 Conifer Road				X		
Larimer	80690012	11835 Rist Canyon Road				X		
Larimer	80690009	251 Edison Drive					X	X
Larimer	80690011	3416 La Porte Avenue				X		
Larimer	80691004	708 S. Mason Street	X			X		
Larimer	80699991	Rocky Mountain NP HQ				X		
Larimer	80690007	Rocky Mountain NP				X		
Prowers	80990001	100 N. 2nd Avenue					X	
Prowers	80990002	104 E. Parmenter Street					X	
Pueblo	81010015	925 N. Glendale Avenue					X	X
Weld	81230008	1004 Main Street					X	
Weld	81230006	1516 Hospital Road					X	X
Weld	81230009	3101 35th Avenue				X		
Weld	81230010	905 10th Avenue	X					

Table 2.2 below shows monitoring data for criteria pollutants (with the exception of lead) for each of the counties listed in Table 2.1 above. An average monitoring value is shown where multiple monitors that monitor for the same pollutant exist within a single county. All pollutant monitored values are shown in the form of the standard with applicable units and averaging periods (example: ozone is shown as the 3-year average of the 4th highest daily 8-hour average for 2010–2012 in parts per million (ppm), while 1-hour NO_2 data are the 98th percentile maximum 1-hour concentration averaged over three years—see standard form data in Figure 2.1 above).

Table 2.2. RGFO Monitoring Values for Criteria Pollutants

County	CO 1-hr	CO 8-hr	SO_2 1-hr	SO_2 3-hr	SO_2 annual	NO_2 1-hr	O_3 8-hr	PM_{10} 24-hr	$PM_{2.5}$ 24-hr	$PM_{2.5}$ annual
Adams	2.4	2	31.7	0.017	0.0008	61.3	0.069	113	22.5	7.9
Arapahoe	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.074[a]	n.d.	18.3	6.4
Boulder	8.6	2.6	n.d.	n.d.	n.d.	n.d.	0.074	72	20	6.7
Denver	4.3	3.1	35	0.034	0.002	71.6	0.069	123	21	7.6
Douglas	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.079	n.d.	16.3	5.8
El Paso	4.6	2.3	n.d.	n.d.	n.d.	n.d.	0.071	64	15.7	6.3
Fremont	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	71	n.d.	n.d.
Jefferson	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.076	n.d.	n.d.	n.d.
Larimer	2.9	2	n.d.	n.d.	n.d.	n.d.	0.074[a]	72	21	6.5
Prowers	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	133	n.d.	n.d.
Pueblo	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	117	15	6.2
Weld	4.2	2.5	n.d.	n.d.	n.d.	n.d.	0.074	102	22.3	7.5

[a]Average data from multiple monitors obscure exceedance of the NAAQS at one or more sites.

In general, air quality within the RGFO is good on most days. The northern Front Range area has experienced problems with attaining the eight-hour NAAQS for ozone and is currently designated as a non-attainment area. The RGFO has also had issues in the past with attaining the carbon monoxide and particulate matter (PM_{10}) standards. Figure 2.5 provides details for the non-attainment and maintenance areas as well as monitoring locations and the surface ownership and airshed classifications within and adjacent to the RGFO boundaries.

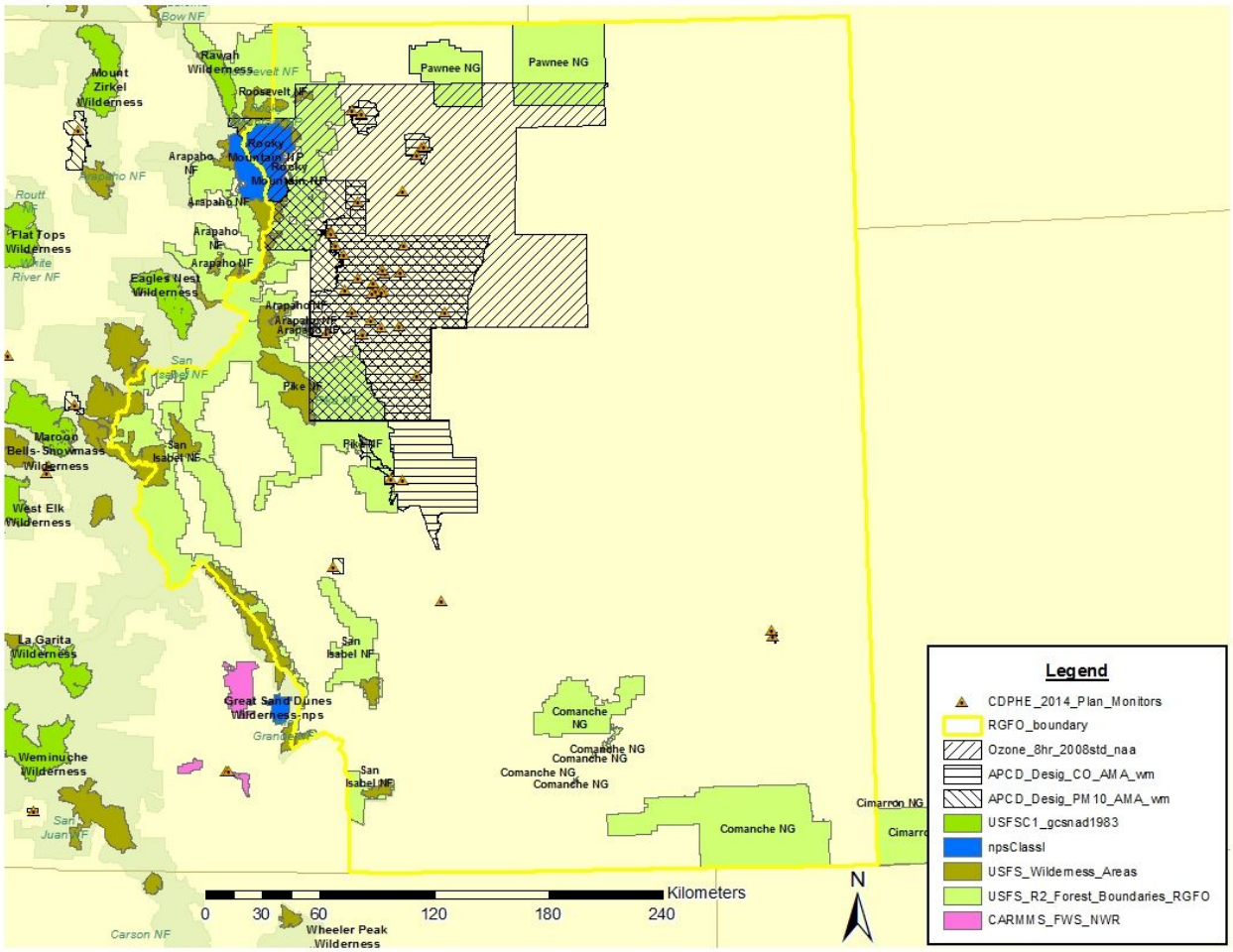

Figure 2.5. Air Quality Map for RGFO (National Ambient Air, Maintenance, and Class 1 Areas)

Air pollutant emissions

Air pollution within the RGFO arises from numerous sources and activities, including a multitude of industrial point sources, agricultural activities, energy production, transportation, residential activities, and consumer product use. Table 2.3 below shows the current emissions inventory data from the most recent EPA National Emissions Inventory (NEI) assessment for the Colorado counties with RGFO boundaries. Most of the counties are wholly contained within the RGFO save for Larimer County. However, most of the population in Larimer County resides in the RGFO and produces almost all of the anthropogenic emissions in that county, so it is reasonable to include all of the NEI emissions from Larimer County in the RGFO emissions inventory data.

Table 2.3. Current Emissions Inventory Data for RGFO

Pollutant	Annual tons emitted
PM_{10}	222,387
$PM_{2.5}$	63,187
NO_X	197,516
VOC	640,846

Pollutant	Annual tons emitted
CO	982,480
SO_2	32,266
NH_3	57,957
CO_2	27,190,088
CH_4	9,089
N_2O	919
HAPs	103,808
Source: 2011 EPA NEI for RGFO counties (http://www.epa.gov/ttnchie1/net/2011inventory.html)	

Air-quality-related values (visibility)

Colorado has seven IMPROVE visibility monitors. Only one is located within the RGFO boundary at Rocky Mountain National Park (RMNP). Another is nearby at the Great Sand Dunes National Park and Preserve (GRSA). Figure 2.6 shows the 20-percent worst visibility days within the RMNP and GRSA for both deciview (DV) and standard visual range calculations. In general, the results show that DV impedance is declining, which is producing a corresponding increase in SVR on the worst visibility days. The data indicate that progress toward restoring natural background visibility conditions is being made.

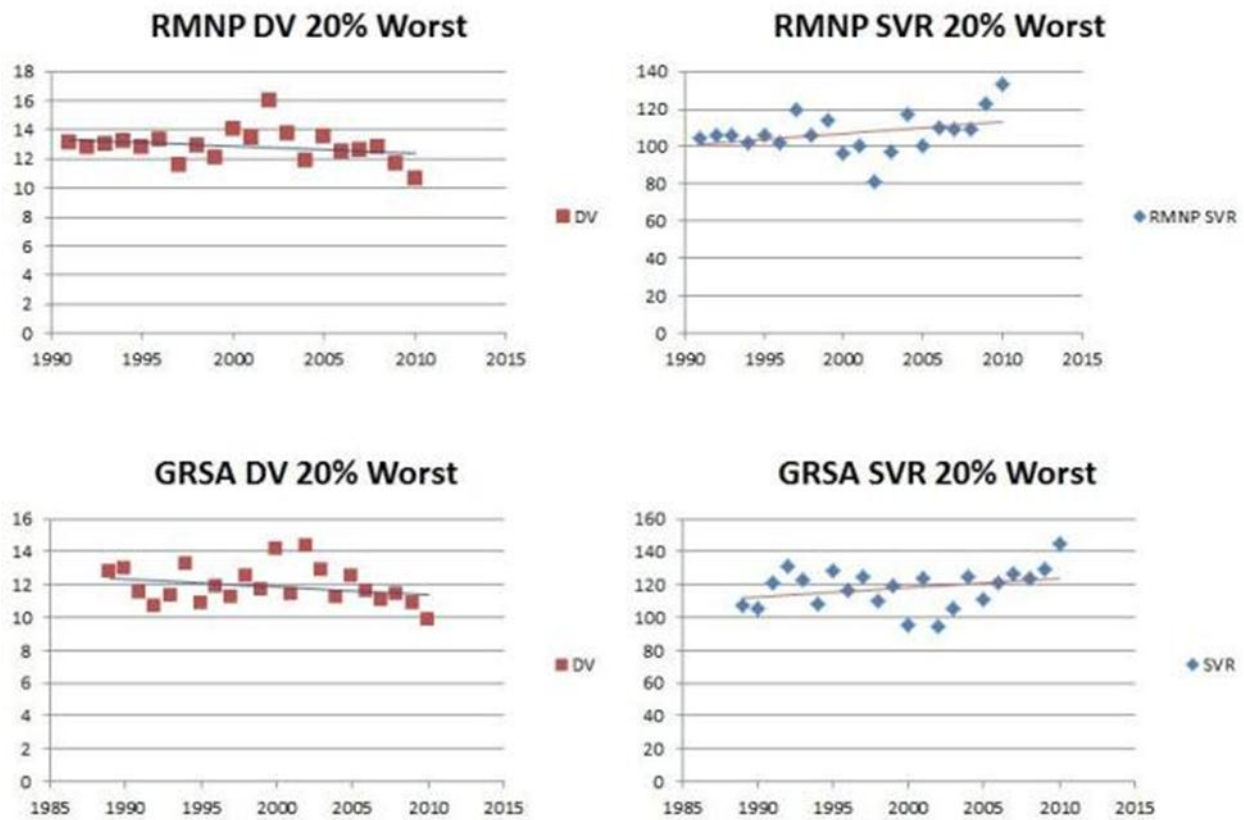

Figure 2.6. The 20-Percent Worst Visibility Days for RMNP and GRSA

Air-quality-related values (deposition)

As previously stated, deposition occurs through chemical and mechanical means and is broadly defined as either wet or dry. Wet deposition is monitored via the NADP - National Trends Network (NTN). The network has eight monitors located with the RGFO in Weld, Larimer, Boulder, Teller, and Bent counties. Five of the NADP monitors are closely co-located in two clusters within Larimer and Boulder counties. Dry deposition is monitored via the CASTNET network, which has two monitors located within the RGFO, both within RMNP (Larimer County). Total deposition is the summation of both wet and dry deposition. There are only two co-located dry and wet deposition monitors within the RGFO. Both are within Larimer County (at RMNP). Figure 2.7 shows the total deposition data for the co-located monitors. The remaining wet deposition (NADP) values are shown in Figures 2.8 to 2.11 below. In general, deposition of SO_2 has been declining across the region for some time. Tighter controls on coal burning power plants (the primary source of SO_2 in the region) have contributed to the decline. However, deposition of NO_2 has remained relatively steady despite better controls on multiple emitting sources. The trend can probably be attributed to the substantial population increases that have occurred across the Front Range in the past decade.

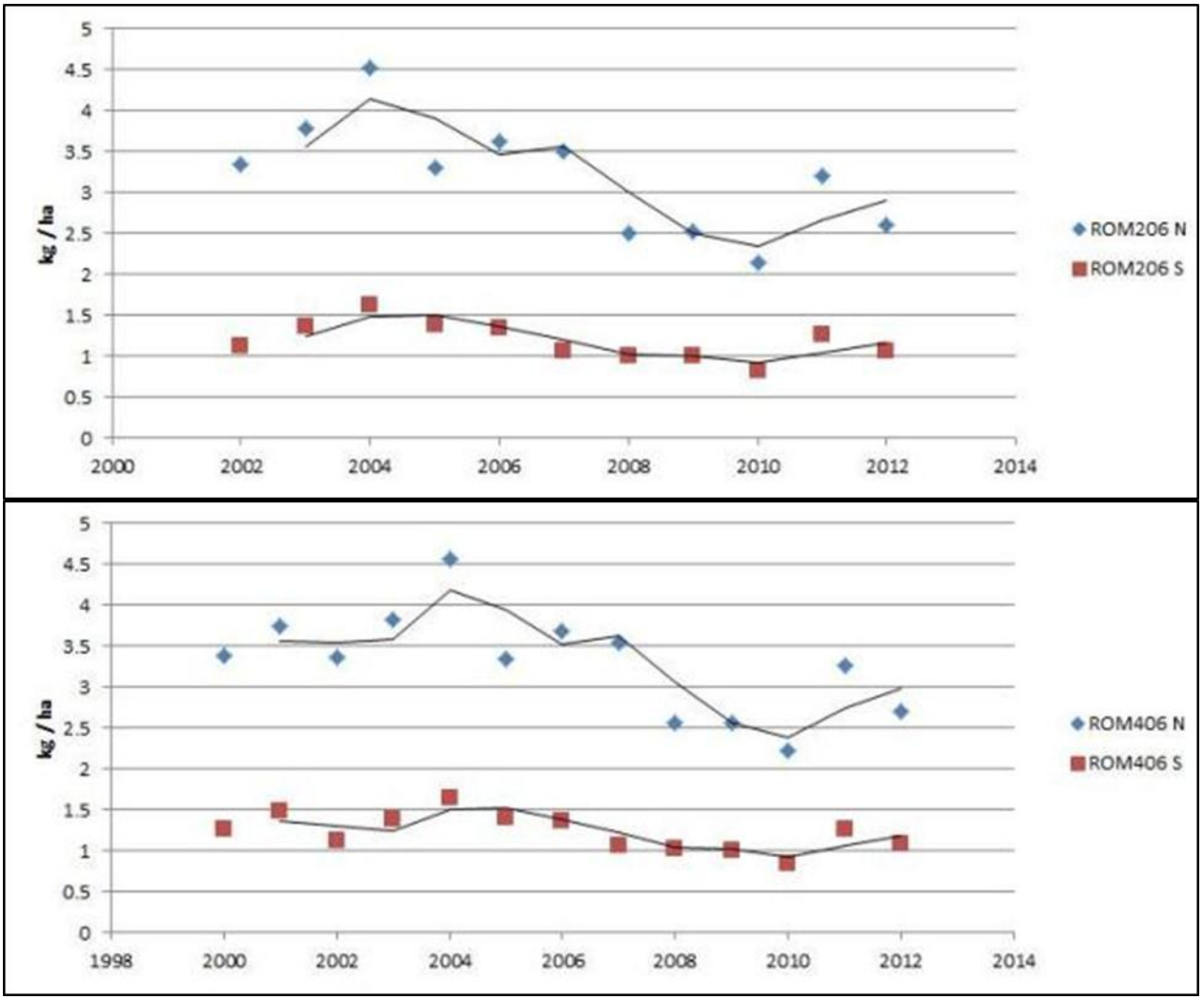

Figure 2.7. Total Nitrogen and Sulfur Deposition (Wet and Dry) at Rocky Mountain National Park (Larimer County)

Figure 2.8. Wet Nitrogen and Sulfur Deposition (Weld County)

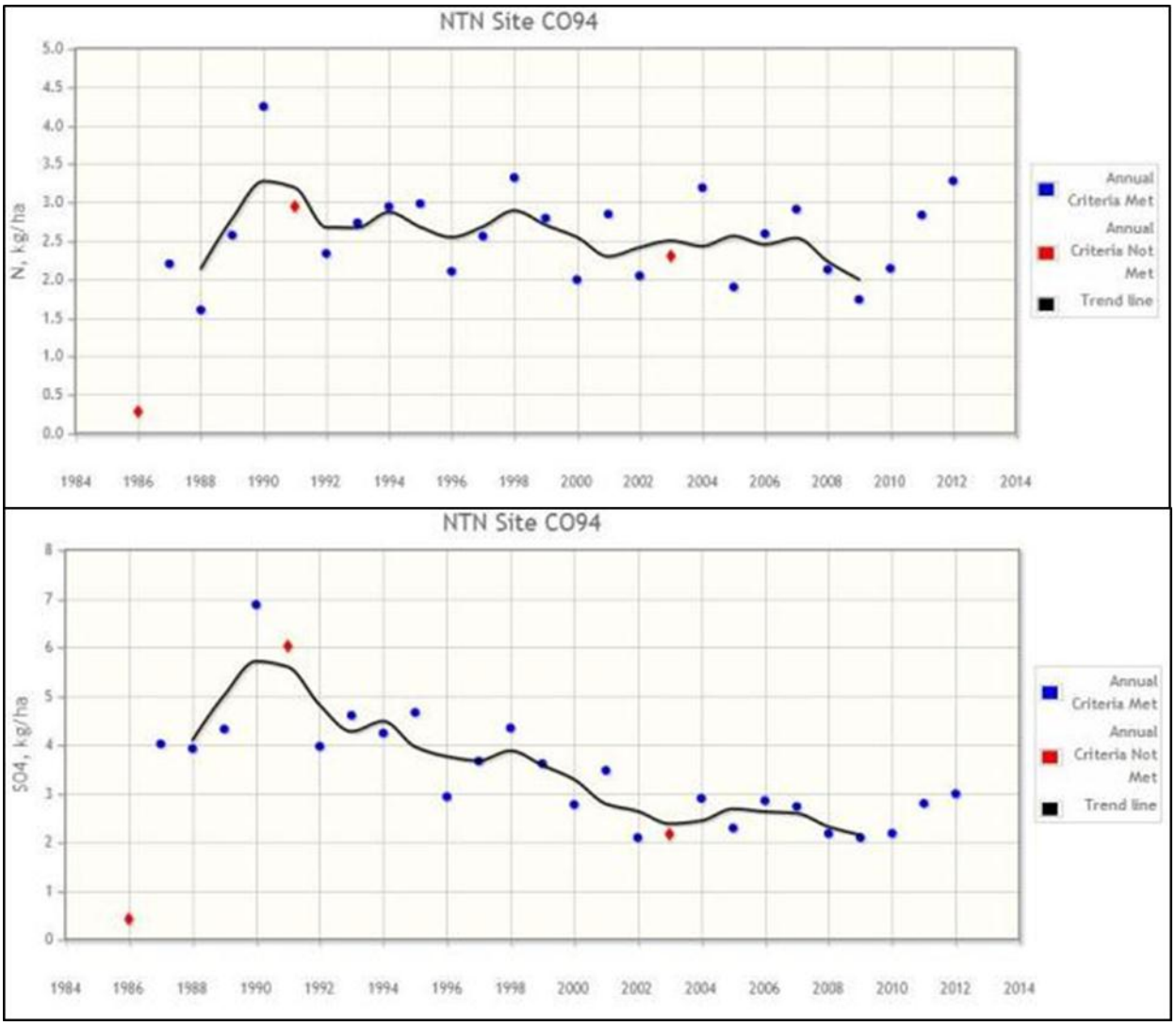

Figure 2.9. Wet Nitrogen and Sulfur Deposition (Boulder County)

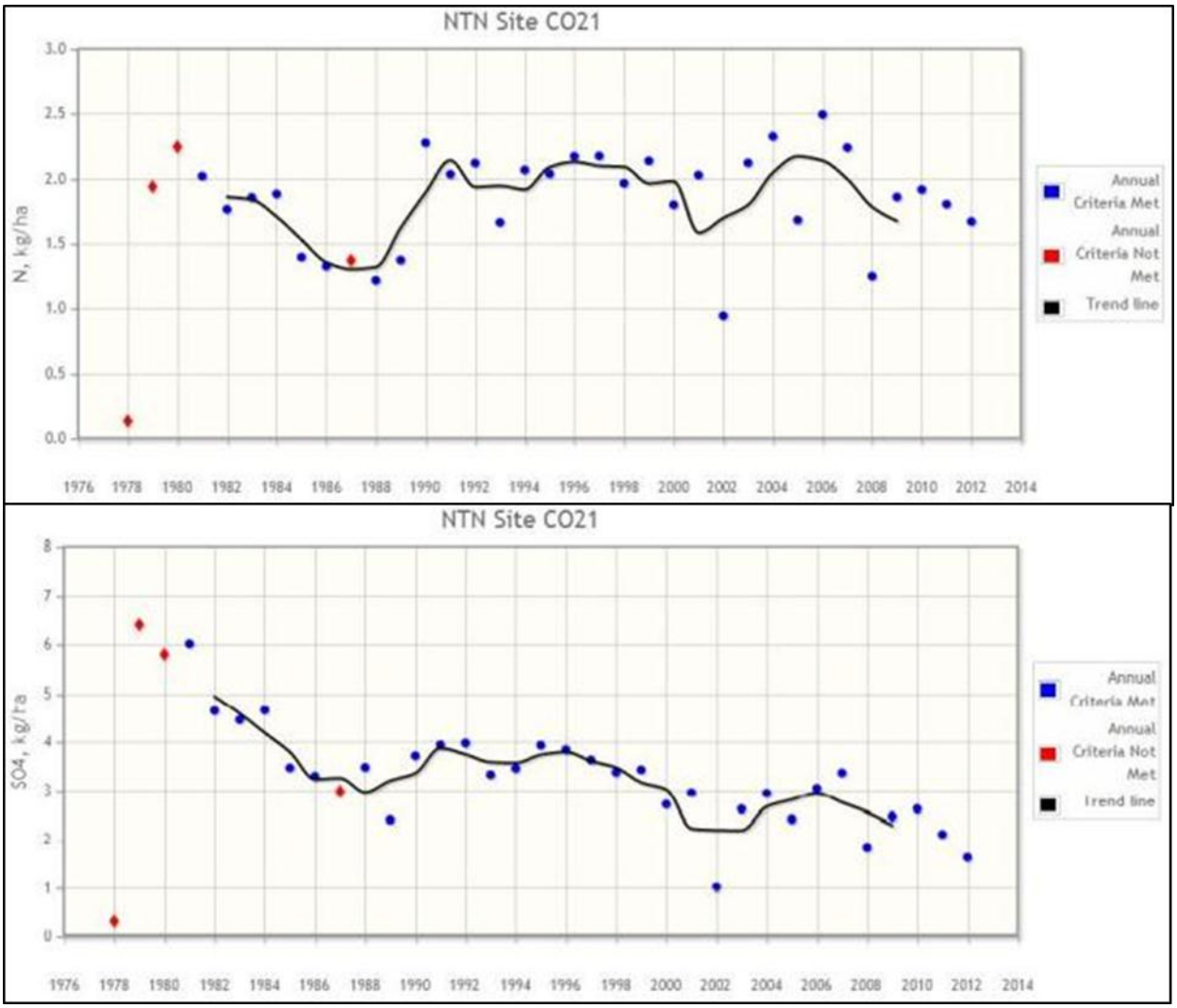

Figure 2.10. Wet Nitrogen and Sulfur Deposition (Teller County)

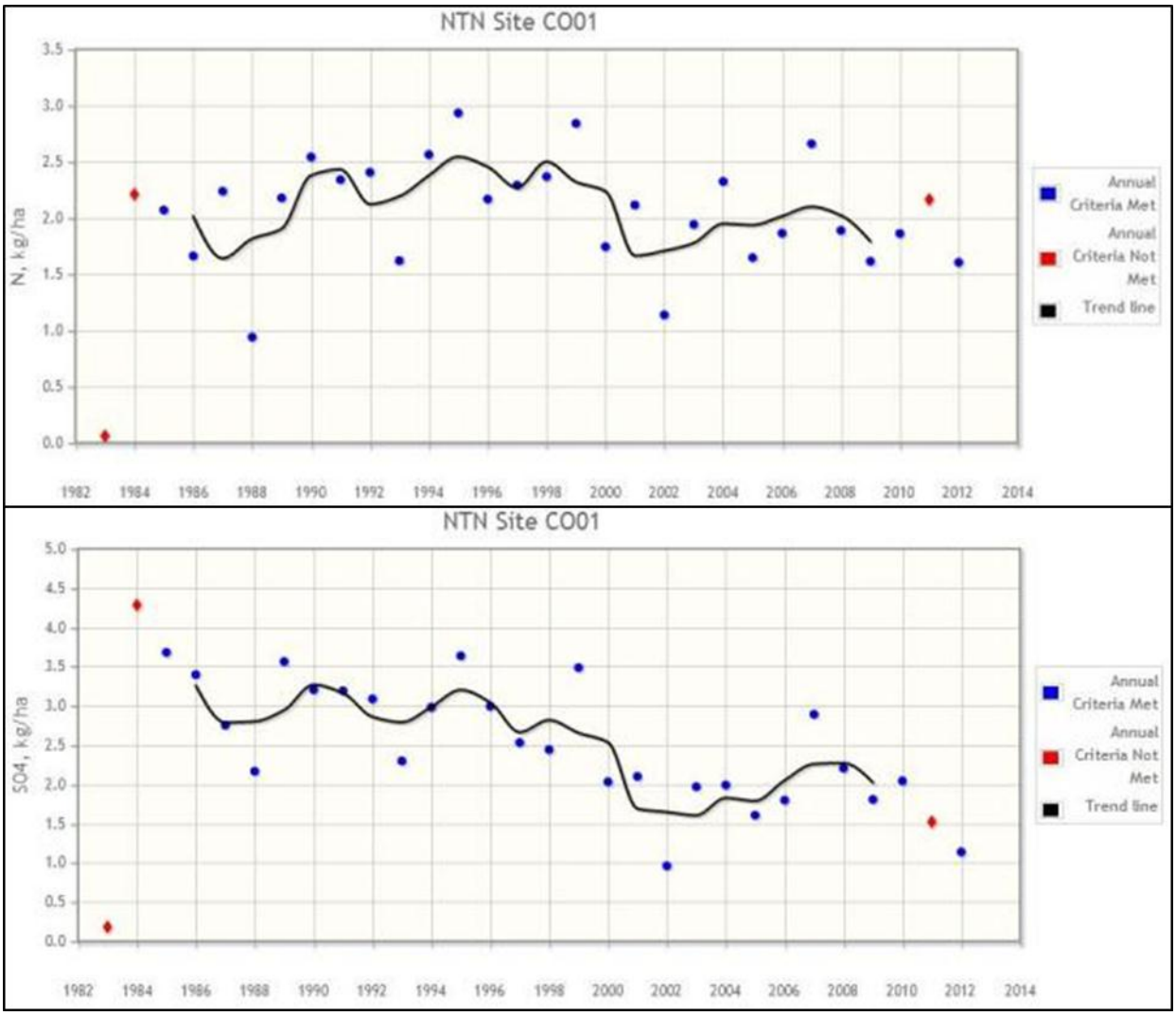

Figure 2.11. Wet Nitrogen and Sulfur Deposition (Bent County)

2.2.1.3. Trends and Forecast

Air quality and emissions

For the most part, Colorado's emission increases are a direct result of population increases the State has experienced over the past couple of decades. Despite these increases, air quality has remained relatively stable, and the State has made measurable progress toward meeting a majority of their air quality goals. In fact, all of the maintenance areas for CO and PM_{10} within the RGFO have remained in attainment of the standards. Most of this is attributable to tighter emission control regulations over several types of engines, such as non-travel-related engines and those found in the transportation industry. Tighter emission controls and an increase in the corporate average fuel economy (CAFE) standards are projected to decrease emissions even further into the future as the various fleets of vehicles age and are replaced (according to the National Highway Traffic Safety Administration, see http://www.nhtsa.gov/fuel-economy). Best available retrofit technology (BART) has also produced or is projected to produce large emission reductions at a

majority of western power plants. Colorado has very low reporting and permitting thresholds relative to other states, which provides for a very good understanding of where emissions are generated and how to provide effective rule-making to achieve desired results. Relative to the BLM's mission and the country's shift toward energy independence, emissions from the oil and gas sector should increase in the coming years. Most other emission-generating activities authorized by the BLM as part of its mission (mining, grazing, recreation) should remain stable or decrease in the future.

Air-quality-related values

Colorado has a regional haze State implementation plan (SIP) that describes how the State intends to achieve natural background visibility standards across much of Colorado. The BLM should ensure that future decisions or implementation of those decisions do not interfere with the Colorado SIP. Attaining the visibility standards will be directly correlated to reducing deposition rates across Colorado, given that SO_2 and NO_2 are important visibility-impairing compounds (either directly as condensable particulates or by participating in reactions that generate derivatives of visibility-impairing pollutants). If the current trends continue (see Figures 2.5–2.9 above) and projected emission reductions from the described source class reductions above occur, NO_2 deposition should eventually start to decline as well.

Greenhouse gases and climate

Although GHG concentrations in the atmosphere have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, from approximately 280 ppm in 1750 to 394 ppm in 2013 (as of October). The rate of change has also been increasing as industrialization and population growth increase around the globe. This is demonstrated by data from the Mauna Loa CO_2 monitor in Hawaii that document atmospheric concentrations of CO_2 going back to 1958, at which point the average annual CO_2 concentration was recorded at approximately 317 ppm. The record shows that approximately 65 percent of the increases in atmospheric CO_2 concentration since pre-industrial times occurred within the last 55 years (approximately 21 percent of the total time period since the beginning of the Industrial Revolution). From 1750 to 2011, CO_2 emissions from anthropogenic sources released approximately 375 gigatons of carbon (GtC) to the atmosphere, while deforestation and other land use change released an estimated 180 GtC. This resulted in cumulative anthropogenic emissions of 555 GtC. Of these cumulative anthropogenic emissions, 240 GtC accumulated in the atmosphere, 155 GtC were taken up by the ocean, and 160 GtC accumulated in natural terrestrial ecosystems (i.e., the cumulative residual land sink) (Stocker et al. 2013).

The Intergovernmental Panel on Climate Change (IPCC) has predicted that GHG emissions will continue to increase in the coming decades as population and industrial growth increases. The current understanding of the climate system indicates that humanity should strive to curtail emissions so that global net warming is exceeded by no more than 2 °C. The 2 °C threshold is expected to produce climate changes that—although apparent and potentially very disruptive for some regions and ecosystems around the globe—could be mitigated or managed on broad scales so that the impacts do not cause widespread loss of resources and associated productivity. Current models indicate (with >50-percent probability) that the corresponding cumulative emission value associated with the radiative forcing to produce a 2 °C warming target is not more than 4,440

$GtCO_2$.[1] This amount is reduced to about 3,010 $GtCO_2$ when non-CO_2 forcings are accounted for. Relative to the year 1880 (first modeled time period), approximately 515 GtC (1,890 $GtCO_2$) have been cumulatively emitted, which suggests a remaining "global budget" of around 1,120 $GtCO_2$ in order to have a >50 percent probability of attaining the 2 °C target.

According to the *Draft Colorado Greenhouse Gas Inventory—2013 Update* (Arnold, Dileo, and Takushi 2013), Colorado's gross GHG emissions are projected to grow to 128 million metric tons ($MMtCO_2e$ or 0.128 $GtCO_2e$) by 2020. Globally, annual anthropogenic emissions of CO_2 were approximately 38.14 $GtCO_2$ in 2011.[2] Colorado's contribution to global GHG emissions (2020−2011 basis) is approximately 0.03 percent.

The EPA made the following predictions for Colorado[3] with respect to climate change:

- The region will experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow will be earlier, weeks before the peak needs of ranchers, farmers, recreationists, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts will occur.
- Crop and livestock production patters could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.
- Drier conditions will reduce the range and health of ponderosa and lodgepole pine forests, and increase their susceptibility to fire.
- Grasslands and rangelands could expand into previously forested areas.
- Ecosystems will be stressed, and wildlife such as mountain lion, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

If these predictions are realized, as mounting evidence suggests they will be, they could adversely affect resources within the region. For example, if global climate change results in a warmer and drier climate, there could be increased airborne particulate matter resulting from increased wind-blown dust from drier and less stable soils. Warmer temperatures with decreased snowfall could affect the ability of a particular plant species to survive within its current range. A longer growing season in higher elevations could lead to a corresponding change in vegetation diversity species composition. These types of changes would be most significant for special status plants that typically occupy a very specific ecological niche. The spatial ranges of cool-season plant species are predicted to shift north and to higher elevations, and the extinction of endemic threatened or endangered plants may be accelerated. Invasive plant species would be more likely to outcompete native species.

[1] Data are relative to the year 1880, which was the first modeled year; approximately 515 GtC have been emitted since that time.
[2] 2011 data added to average land use change emissions from 2002–2011.
[3] http://www.epa.gov/climatechange/

Increases in winter temperatures in the mountains could have impacts on traditional big game migration patterns, either due to loss of habitat or due to competition from other species whose ranges may shift northward. The population of some animal species may be reduced. Warmer winters with less snow would affect the Canada lynx by removing a competitive advantage they have over other mountain predators. Earlier snowmelt could also have impacts on cold-water fish species that occupy streams throughout the planning area. Climate change could affect seasonal frequency of flooding and alteration of floodplains, which could affect riparian habitat. More frequent and severe droughts would have impacts on many wildlife species throughout the region as well as on vegetative composition and availability of livestock forage. Climate change could increase the growing season within the region; however, a longer growing season would—in theory—result in more forage production provided there is sufficient precipitation. Drier conditions could have severe impacts on forests and woodlands, leaving them more susceptible to insect damage and at higher risk for catastrophic wildfires. Increased fire activity and intensity would lead to increases in greenhouse gas emissions.

2.2.2. Geology

2.2.2.1. Indicators

Geological resources are defined through descriptions of the surficial and bedrock geology and stratigraphy of the planning area. Geological information is used to evaluate the potential for development of mineral resources as well as to regulate land use on the basis of slope stability and accessibility. Figure 2.12 shows the physiographic provinces of Colorado (Cappa and Wallace 2007).

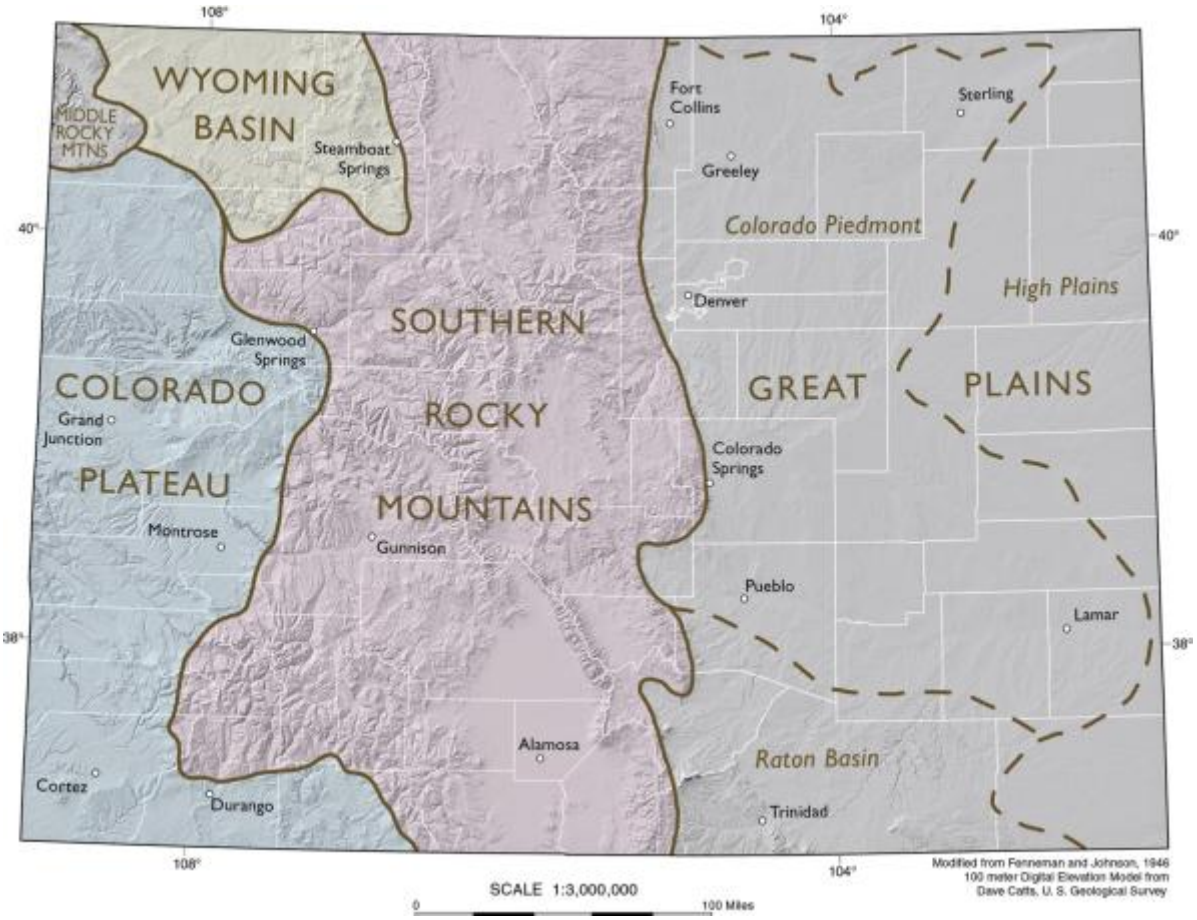

Figure 2.12. Physiographic Provinces of Colorado

The geology of RGFO is varied and mostly dominated by three major structural features: the Front Range Uplift, the Denver Basin, and the Raton Basin. These structures were created as a result of the Laramide Orogeny, which began in the Late Cretaceous Period. Figure 2.13 shows the approximate locations of Laramide uplifts and basins (modified from Tweto 1980). Shaded areas are Laramide uplifts that were topographically prominent. Those that are buried, subsided, or topographically inconspicuous are labeled but not shaded. Outlines of the Laramide basins are denoted by the thin lines with paired couplets of tick marks.

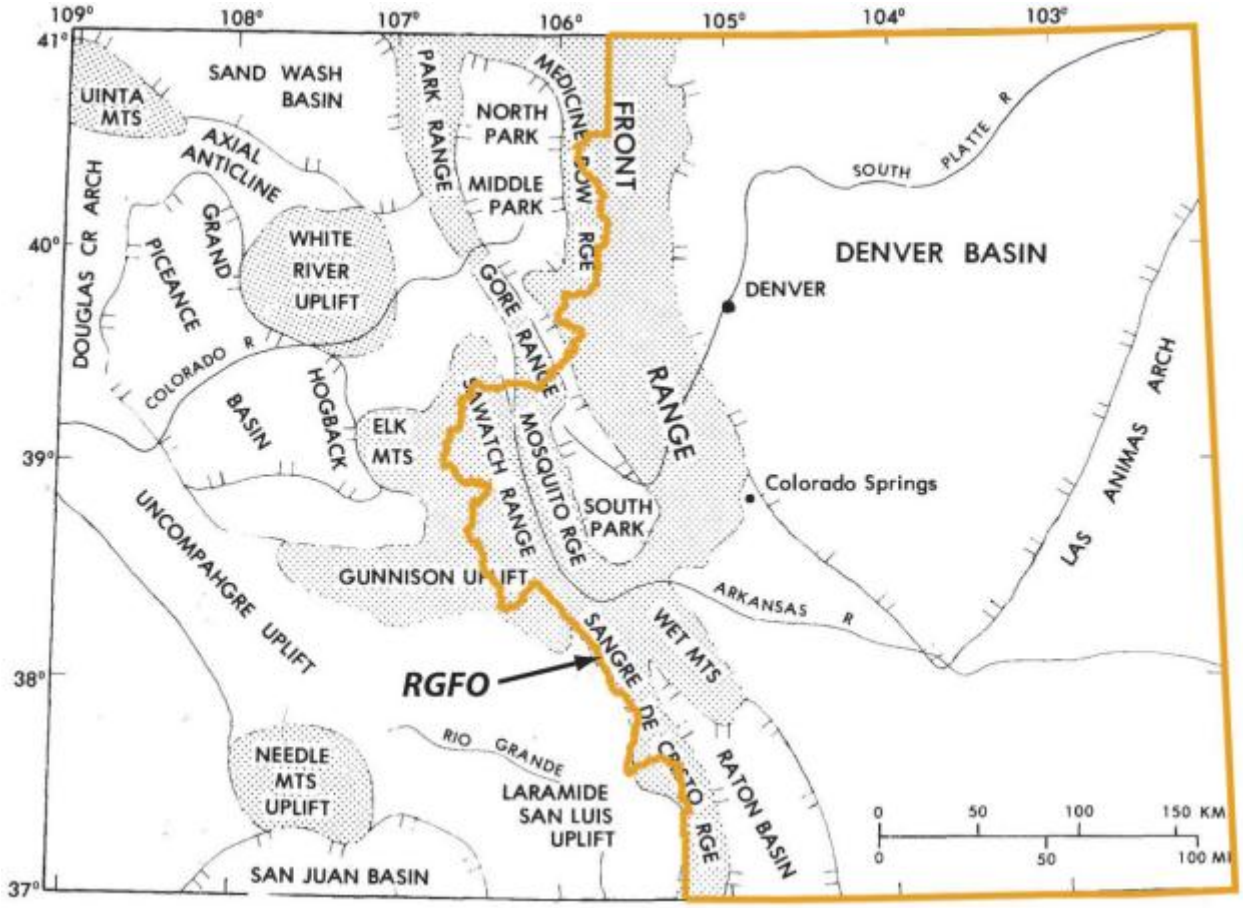

Figure 2.13. Approximate Locations of Laramide Uplifts and Basins in the RGFO

2.2.2.2. Current Condition

The plains area is underlain by several large tectonic elements, one of which is the Denver Basin at a depth of 11,000–12,000 feet. The basin is markedly asymmetric with gentle dips on the eastern flank, but with a very steep western margin bordering the Front Range. The Denver Basin contains sedimentary rocks of almost every period of geologic history from the Cambrian to the Holocene. The Cambrian through Mississippian sequence is characterized by marine sandstones, dolomites, and limestones.

The uplifting of the Front Range sharply bent the sedimentary rocks at its edge as those on the crest were carried upward. The inland sea drained away as the entire area was uplifted. Debris eroding from the Front Range was deposited as Late Cretaceous and Early Tertiary conglomerates, sandstones, and shales, with soft coal beds forming in the rapidly subsiding Denver Basin. Following tectonic quiescence, a series of regional uplifts of the area resulted in the deposition of vast sheets of alluvial material across the Denver Basin during the late Tertiary.

Part of the shallow Hugoton Embayment of the Anadarko Basin lies in southeasternmost Colorado, east of the Sierra Grande and Las Animas Arches. The Raton Basin extends northwestward from New Mexico into Colorado on the southwestern side of the Apishapa Uplift. Topographically, the Raton Basin appears as an area of raised tablelands capped by Tertiary sediments. This elevation

of this raised area of the Park Plateau and Raton Mesa varies from 500 feet higher than the plains below to a maximum of 13,623 feet at West Spanish Peak. The west flank, bordering the Sangre de Cristo Mountains, has a much steeper structural inclination than the eastern side. Northward, between the Wet and Sangre de Cristo Mountains, the Raton Basin connects with the narrow syncline underlying both the Huerfano Park and the Wet Mountain Valley.

At the southern end of the Front Range and northwest of the Wet Mountains, a narrow and shallow tongue of the Denver Basin extends westward along the course of the Arkansas River. It is known as the Cañon City embayment and is separated from the main part of the basin by a gently anticlinal threshold extending southeastward from the Front Range as an extension of the Red Creek Arch.

On the southwest, the Denver Basin is limited by the Apishapa Uplift, a feature that has Pennsylvanian ancestry. The southeastern end of the Apishapa Uplift joins the Sierra Grande Uplift, a structural arch with similar history that forms another bordering element of the Denver Basin and extends southward into New Mexico. Trending northeastward from the Sierra Grande Uplift is the broad Las Animas Arch. It appears to have been a weak but persistently positive structural element through much of geologic time, and now forms part of the eastern margin of the Denver Basin. Topographically, the plains area slopes from about 6,000 feet in elevation where it borders the Front Range to about 3,400 feet where the Arkansas River flows into the Kansas River.

The Front Range and the Wet Mountains, which form a southern prong of the Front Range, are anticlinal in nature, modified by faulting. The Front Range reaches an elevation of 14,110 feet at Pikes Peak. These ranges are bordered on the west by a discontinuous series of valleys or parks. The Wet Mountain Valley-Huerfano Park borders the Wet Mountains, connects with the Raton-Basin on the south, and is bordered by Precambrian rocks to the north. This valley is not a simple synclinal valley, as it underwent complex structural modifications. The elevation of the Wet Mountain Valley at Westcliffe is 7,888 feet.

South Park borders the Front Range on the west and consists of complexly folded and faulted Precambrian, Paleozoic, and Mesozoic rocks, intruded and covered in the southern part by Tertiary volcanics. Erosional remnants of the Precambrian reach elevations of 11,000 feet in the Tarryall Mountains. The valley floor ranges from 8,800 feet at Hartsel to 9,850 feet at Fairplay. The long chain of mountains making up the Park and Sangre de Cristo ranges borders South Park and the Wet Mountain Valley on the west. These ranges, generally anticlinal in structure, are modified by folding and faulting and have peaks greater than 14,000 feet.

The upper Arkansas River Valley is a long narrow valley ranging in elevation from 7,050 feet at Salida to 10,200 feet at Leadville. This valley is structurally a northward extension of the Rio Grande Rift Zone and is bordered to the west by the Collegiate range, which reaches elevations of over 14,000 feet. Precambrian rocks underlie the Great Plains and are exposed in all of the mountain ranges in the RGFO. They form an outcrop on the western sides of the Sangre de Cristo and Park ranges and make up most of the Wet Mountains and Front Range. These rocks are mostly granite, schist, gneiss, and undivided metamorphic rock.

Widespread intrusion and extrusion of igneous rocks accompanied the tectonism of the Late Cretaceous to more recent times. These rocks are highly variable in composition. A notable area of Tertiary intrusions in the northern Raton Basin near Trinidad contains the Spanish Peaks and their radiating dikes. Other important areas of Cretaceous to Cenozoic igneous rocks include the Mesa de Maya area, where volcanics cap large plateaus rising from the Great Plains along the

southern boundary of the State; a large area south of South Park and north of the Arkansas River, which is covered by Tertiary volcanics; and the eastern portion of the Wet Mountain valley.

As part of the planning effort, a mineral potential report is being prepared for the entire field office that will be complete before alternatives are developed for the Draft Resource Management Plan. This report will include a comprehensive geological overview of the planning area and will provide additional mineral resource details to enhance the current geologic descriptions.

2.2.3. Soil Resources

2.2.3.1. Indicators

Soil types within the Royal Gorge Field Office are extremely diverse due to the vast amount of terrain and varying conditions encountered throughout the area. Soils of the eastern plains are derived primarily from sedimentary rocks and materials deposited by wind. Soils in the mountains are formed from glacial and alluvial deposits, and a variety of sedimentary, igneous, and metamorphic rocks. Climate has had a significant influence on the types of soils that developed and their subsequent limitations. Impacts on soil resources result from a wide variety of activities that include energy development, grazing, recreation, and climate-related events. Soil resources support range and forest plant communities that stabilize the soil surface and protect the watershed. The potential for maintaining or restoring these communities and conserving the soil depends on the soil types and how they are managed.

A healthy, vigorous, vegetative cover is the key to maintaining or improving soil productivity and protecting the soil from erosion. Above ground, vegetation and litter provide protection from wind and rain, slowing runoff as water is forced to find passage through the mass of vegetative material. The vegetation protects the soil surface from the direct rays of the sun and creates a microclimate that benefits insects and other organisms dwelling on or near the surface. These creatures till the soil, and in conjunction with soil microorganisms, decompose dead plant material and incorporate it into the soil. This increases soil fertility and also creates favorable conditions for water to infiltrate the soil. Below ground, roots bind soil particles together, making the soil more resistant to erosion.

Soil surveys

The RGFO uses soil surveys available from the Natural Resources Conservation Service (NRCS) to help in making land management decisions based on soil-related hazards or limitations. Soils are mapped according to the boundaries of major land resource areas, which are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses. Each soil survey describes the specific properties of soils in the area surveyed and shows the location of each kind of soil on detailed maps. The BLM uses soil map units to make management decisions that are likely to affect soils. Each soil survey describes soil map units by their individual soil. These descriptions indicate the limitations and hazards inherent in each soil type and include soil depth, range of elevation, origin, climate, physical properties, runoff capabilities, erosion hazard, associated native vegetation, wildlife habitat use, and capability for community development and other uses. Third-order soil surveys, provided by the NRCS, cover most of the planning area. There are over 41 unique soil surveys and over 1,000 different soil map units within the RGFO.

Fragile soils

For the purposes of this RMP, fragile soils are defined as those soils prone to erosion by wind or water or to impacts from drought conditions.

The local climate, landscape position, land uses, and soil properties largely dictate the density and composition of the vegetation cover in most of the planning area. Vegetation cover and plant litter (leaf litter and other dead plant material on the surface) are important components for maintaining a healthy soil surface. At higher elevations in the planning area, mountain shrub and ponderosa pine vegetation communities provide cover, usually at relatively high densities. At lower elevations, pinyon-juniper and grassland communities dominate.

Soils eroded by wind and water

All soils are subject to erosion from wind and water. Their inherent susceptibility to erosion depends on many factors, including soil structure, texture, chemistry, slope, exposure, depth, and vegetative cover. In the case of water erosion, slope and vegetative cover are the predominant factors. For wind erosion, exposure and vegetative cover are most important. Vegetative cover is the one variable highly susceptible to impacts from human activities. The potential for soil erosion from wind or water action varies across the planning area. Known as the "K" or erodibility factor, this potential represents the susceptibility of soil to erosion as well as the rate of runoff.

Soils affected by drought

Drought-affected soils have a low capacity to retain water in the root zone of the soil profile (calculated at a soil depth of 40 inches, or a limiting layer such as bedrock).

Colorado standards for public land health

BLM Colorado finalized its land health standards, *Standards for Public Land Health and Guidelines for Livestock Grazing Management*, in March 1997 (BLM 1997). The BLM applies these standards to public lands on a landscape scale to help describe a landscape's potential, various uses, and the conditions needed to sustain land health. The five Colorado standards are described in two parts: a statement that describes conditions relating to the potential of a landscape, followed by a series of indicators that help define the standard and are observable on the land. Colorado Land Health Standard 1 identifies the characteristics and standards for healthy soil resources (Table 2.4).

Table 2.4. Colorado Public Land Health 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 minimizes surface runoff. Indicators: ● Expression of rills and soil pedestals is minimal ● Evidence of actively eroding gullies (eroding channels) is minimal. ● Canopy and ground cover are appropriate. ● There is litter accumulating in place, and it is not sorted by normal overland water flow. ● There is appropriate organic matter in the soil. ● There is a diversity of plant species with a variety of root depths. ● Upland swales have vegetation cover or density greater than that of adjacent uplands. ● There are vigorous, desirable plants.

2.2.3.2. Current Condition

Much of the resource area was overused by livestock, miners, and woodcutters in the early part of this century. This resulted in erosion and loss of soil productivity. By the 1950s, a great deal of BLM-administered land was in a deteriorated but stable condition. These conditions continued into the 1960s, when BLM began a substantial erosion control program. This program consisted mainly of reseeding and small erosion control structures. These efforts were only marginally successful, but they were the beginning of a gradual trend toward improvement. In the late 1970s, the BLM began an aggressive program to improve grazing management practices. This program continues today, and there has been a noticeable improvement in soil productivity and decreased erosion in several watersheds and grazing allotments.

Land health assessments

Soil resources on lands within the planning area were rated according to one of three categories on the basis of Land Health Standard 1: meeting the standard, meeting the standard with problems, or not meeting the standard.

The *meeting the standard with problems* category implies that less than half of the assessment sites within a soil polygon (see Glossary) had a soil indicator rating of less than satisfactory; however, overall, the soil condition in the polygon was meeting the standard.

The most common soil indicators to result in a rating of *meeting the standard (but) with problems* or *not meeting the standard* were as follows:

● High levels of bare-exposed soil surface

- Low densities of live-perennial plant basal cover
- Low amounts of plant litter cover
- High levels of annual-invasive weed species
- The presence of gullied (incised) stream channels

The causal factors for not meeting the soil standard were also numerous and often caused by the following:

- Historic livestock grazing
- Historic wildfire suppression
- Proximity to private lands

Prime or unique farmlands

Four categories of farmlands are federally regulated by the U.S. Department of Agriculture (USDA) under the Farmland Protection Policy Act of 1981: prime farmlands, unique farmlands, farmlands of statewide importance, and farmlands of local importance. Impacts from Federal actions on public lands to farmlands identified as prime or unique must be analyzed and disclosed to the public during development of an RMP/EIS. In addition, the USDA delineates *important farmlands* as those having soils that support the crops necessary for the preservation of the Nation's domestic food and other supplies, specifically the capacity to preserve high yields of food, seed, forage, fiber, and oilseed with minimal agricultural amendment of the soil, adequate water, and a sufficient growing season.

2.2.3.3. Trends and Forecast

The BLM's past monitoring of the planning area shows that considering soil problems will be an important part of an adaptive management approach, ensuring that land management actions are appropriate for a particular site. At present, the BLM uses guidelines for both recreational use and livestock grazing to develop appropriate site management activities. Land health assessments (LHAs) identify causal factors (including activities other than grazing and recreation) responsible for soils not meeting Colorado's Public Land Health Standard 1. In the future, management guidelines or best management practices (BMPs) should be developed for all significant land use activities that have the potential to prevent soils from meeting public land health standards.

Although BMPs for mineral and energy development help to minimize soil surface disturbance, projected increases in oil and natural gas extraction mean additional soil disturbance and accelerated rates of erosion are likely.

Travel management planning

Soil resources across the planning area should benefit from the ongoing preparation and implementation of travel management plans (TMPs). The Gold Belt, Fourmile, and Arkansas River TMPs (BLM 2004a, BLM 2002d, and BLM 2008d, respectively) already eliminate open, off-route travel with motorized and mechanized vehicles. The BLM anticipates that it will develop TMPs for the remaining lands in the RGFO in the future. Because of the level of

current OHV use in the planning area, eliminating off-route motorized travel would benefit the condition of soil surfaces, protective vegetation, and soil supports. Not only will the BLM close and rehabilitate some existing routes, it will also implement a trail maintenance plan and seasonal restrictions when drought or excessively wet conditions occur. Benefits to resources will be realized by enforcing allowed uses on designated routes, rerouting trails to more sustainable locations, and promoting the ethics of responsible land use through public education programs.

Predicted changes in climate

Many prominent climatologists predict some change to Colorado's climate in the near term. A recent report, *Climate Change in Colorado* (Lukas et al. 2014), analyzes past and present climate data, and it predicts that eastern and south-central Colorado will experience warmer temperatures in the coming decades. The report summarizes potential issues for land and water managers in light of this prediction, concluding that increasing temperatures would

- Raise evapotranspiration by plants
- Lower soil moisture
- Alter growing seasons
- Alter disturbances such as wildland fire and insect outbreaks
- Shift existing plant communities to higher elevations.

Although difficult to predict, impacts to the health of soil surfaces could occur from a changing climate, including reduced vigor in native plant communities that provide needed soil surface protection; higher levels of bare, exposed surface soil; and higher densities of annual invasive weed species, which may not provide a protective soil cover. These changes could affect most if not all of the soil resources in the planning area.

2.2.4. Water Resources

2.2.4.1. Indicators

Water quantity

Surface water

The Eastern Colorado RMP planning area covers parts of three major sub-basins, the Upper Arkansas, Upper South Platte, and Republican Rivers (see Table 2.5).

Runoff from these river basins provides a major contribution to eastern Colorado surface water supply. The cities of Denver, Aurora, Thornton, Colorado Springs, and Pueblo depend heavily on these waters, which are supplemented by imports from the western slope. Numerous small cities and towns such as Trinidad, Cañon City, Salida, Leadville, Fairplay, Cripple Creek, and Victor (to mention a few), also obtain all or part of their municipal water from surface streams.

Table 2.5. Major Hydrological Units in Planning Area

Hydrological unit	4th-level HUC[a]	BLM acres	Percentage of watershed
Arkansas Headwaters	11020001	360,000	18
Upper Arkansas	11020002	133,000	9
South Platte Headwater	10190001	57,800	6
Huerfano	11020006	66,000	6
Upper Arkansas-Lake Meredith	11020005	15,000	1
Saint Vrain	10190005	3,300	1
Upper Arkansas-John Martin Reservoir	11020009	10,400	<1
Purgatoire	11020010	7,100	<1
Apishapa	11020007	3,400	<1
Horse	11020008	2,400	<1
Clear	10190004	1,350	<1
Fountain	11020003	1300	<1
Big Sandy	11020011	850	<1
Cache La Poudre	10190007	750	<1
Middle South Platte-Sterling	10190012	750	<1
Middle South Platte-Cherry Creek	10190003	700	<1
Cimarron Headwaters	11040001	430	<1
Upper South Platte	10190002	300	<1
Two Butte	11020013	280	<1
Arikaree	10250001	250	<1
South Fork Republican	10250003	250	<1
Big Thompson	10190006	200	<1
Bijou	10190011	80	<1
North Fork Republican	10250002	80	<1
Chico	11020004	50	<1
Upper Cimarron	11040002	35	<1
Sand Arroyo	11040004	17	<1
Whitewoman	11030002	15	<1
North Fork Cimarron	11040003	8	<1

[a]Hydrologic unit code

Currently, agriculture accounts for the largest amount of water used in these basins. In the Arkansas River drainage in Colorado, 428,000 acres are irrigated. In the South Platte watershed, 831,000 acres are irrigated inside the planning area, mainly in the South Platte valley below Denver (CWCB 2011). Most stream flow in the South Platte and Arkansas Rivers originates from snowmelt in the high mountains above 10,000 feet. The majority of this water-producing land is administered by the U.S. Forest Service in the Park, Sawatch, and Sangre de Cristo mountain ranges. Runoff from BLM-administered land contributes little to the total water supply. The only perennial streams that receive significant flow from lands administered by BLM are Sacramento Creek and Mosquito Creek in the South Platte watershed, and the East Fork of the Arkansas, Hamilton Creek, and Badger Creek in the Arkansas watershed. For the most part, runoff from BLM-administered land is the result of short lived snowmelt or intense thunderstorms. Several minor live streams flow through these lands, and proper management of BLM-administered land within these water sheds is of prime concern.

Flows in both rivers are modified by numerous transmountain diversions. The Hoosier Pass Tunnel and the Boreas Pass Ditch bring water from the Colorado River Basin into the South Platte drainage. Water from the Hoosier Pass Tunnel is diverted a second time, from the South Platte into the Arkansas watershed, where it becomes part of the water supply for Colorado Springs.

Eight diversions bring water from the Colorado River Basin into the Arkansas Basin (Table 2.6). The largest of these are the Boustead Tunnel, the Homestake Tunnel and the Twin Lakes Tunnel. Homestake water is further diverted from the Arkansas River to the South Platte River via the Aurora-Homestake pipeline. A portion of this water is diverted a third time, back into the Arkansas watershed, where it is finally used by Colorado Springs.

Table 2.6. Transmountain Diversions into the Arkansas River Basin

Diversion name	Management entity	Purpose	Diversion via
Ewing Ditch	Pueblo Water Board	Municipal	Tennessee Creek
Columbine Ditch	Pueblo Water Board	Municipal	Chalk Creek
Wurtz Ditch	Pueblo Water Board	Municipal	Tennessee Creek
Homestake Tunnel	Colorado Springs and Aurora	Municipal	Lake Fork (Turquoise Reservoir)
Boustead Tunnel	Frying Pan–Arkansas Project	Irrigation Municipal Industrial Power	Lake Fork
Busk-Ivanhoe Tunnel	Pueblo Water Board	Municipal	Lake Fork (Turquoise Reservoir)
Twin Lakes Tunnel	Twin Lakes Reservoir and Canal Company, Pueblo Water Board	Irrigation Municipal	Lake Creek (Twin Lakes Reservoir)
Larkspur Ditch	Catlin Canal Company	Irrigation	Poncha Creek

Groundwater

Many different aquifers with a variety of hydrologic characteristics are in the planning area. These aquifers can be divided into three general categories on the basis of their geological properties: unconsolidated rock deposits, sedimentary rocks, and crystalline rocks.

Unconsolidated rock aquifers

The most productive aquifers in the planning area are unconsolidated rocks consisting of alluvial, glacial, and basin-fill deposits. Alluvial deposits occur along the Arkansas and South Platte Rivers, except in the canyon reaches. Glacial deposits occur in the mountains near Leadville, Buena Vista, Salida, Fairplay, and Jefferson. Thick, extensive, basin-fill deposits of Tertiary age occur in the Leadville, Buena Vista, and Salida area, and in the Wet Mountain Valley. The water-yielding potential of these aquifers varies greatly, but it generally increases with saturated thickness, increased sorting of rocks, gravels and sands, and a decrease in clay and silt content. Where clay or silt beds overlie sand and gravel units, artesian conditions may occur. Where the artesian pressure is strong enough, wells drilled into the confined (artesian) beds will flow above the land surface.

Sedimentary rock aquifers

Sedimentary rock aquifers of Cambrian through Tertiary age occur throughout the planning area. Depths to water, the water yield, and water quality vary greatly, according to geologic setting and the characteristics of the aquifer. The best known and most productive of these aquifers is the Dakota Sandstone, which occurs in the eastern parts of the planning area. Other significant sedimentary aquifers include the Purgatoire Formation, the Trinidad Sandstone, and the Niobrara, Morrison, Fountain, and Denver Formations.

Crystalline rock aquifers

The crystalline rock aquifers include volcanic and intrusive rocks of Tertiary age and Precambrian igneous and metamorphic rocks. Water in the volcanic rocks occurs in interstices of tuffs and fractures in the volcanic flows. Some water may be present in sand and gravel units that exist between individual flows and tuffs. Water in Precambrian rocks occurs only where the rock has been fractured. Generally, wells drilled into crystalline rocks yield small quantities (1–10 gallons per minute) of good quality water.

Crystalline rock aquifers occur in the mountainous parts of the planning area. BLM depends on these aquifers to supply most of the springs and wells used for management purposes. They are also important sources of water for ranches and subdivisions in Fremont, Custer, Chaffee, Park, and Teller Counties.

Climate

The planning area is situated within portions of three Level 3 ecoregions: the Southern Rockies, the High Plains, and Southwestern Tablelands (Wilken, Jiménez Nava, and Griffith 2011). About 92 percent of BLM-managed surface in the planning area lies within the Southern Rockies ecoregion. Many higher order streams that headwater at high elevations in the Southern Rockies ecoregion exhibit perennial flow while many of the lower elevation streams within the planning area in this ecoregion exhibit more intermittent flow. Additionally, about 8 percent of the public land in the planning area lies in the Southwestern Tablelands ecoregion. Most area streams originating in this ecoregion exhibit intermittent or ephemeral flow regimes, due to the semi-arid climate. Additionally, much of the planning area in the Southwestern Tablelands ecoregion is dominated by sedimentary sandstones and shales, which characteristically intercept stream flow, resulting in a losing stream (a stream that gradually loses flow as it progresses downstream). Stream flow records for a number of planning area streams are available from the U.S. Geological Survey (USGS).

The annual precipitation over the planning area varies from less than 10 inches on lands around Buena Vista, Colorado, to more than 25 inches on higher elevation lands at the headwaters of the Arkansas River Basin. The data indicate that 50 percent of the planning area receives 15 inches or less of precipitation annually, and 2 percent of the area receives more than 25 inches.

Runoff and flood potential

Large drainages with headwaters at higher elevations experience high flows from spring snowmelt, which can last for several weeks. Base flow in these drainages occurs from late summer through February or March. In all area drainages, high magnitude, short duration floods can occur in summer months due to high intensity, short duration precipitation events associated with southwest monsoonal airflow. The frequency and magnitude of these events is highly variable from year to year. Localized flooding from these events can be significant in ephemeral channels, as floodwaters commonly contain large amounts of accumulated vegetation debris and sediment. Additionally, watershed characteristics such as size, shape, slope, orientation, watershed cover condition, and soils can affect the magnitude of flood peaks produced by localized summer storms.

Planning area soils have been evaluated by the NRCS for their capacity to infiltrate water and categorized into one of four hydrologic soil groups. Category A and B soil groups have higher infiltration capacities and produce low amounts of runoff during storm events, while the inverse

occurs with categories C and D. Many of the planning area soils fall into Categories C and D, having high runoff potential.

High magnitude flood events commonly originate from public lands in the Arkansas River Canyon, due to the steep slopes, limited vegetative cover, and soils with high runoff potential, as well as small watershed size and linear shape, which allow for rapid runoff concentration.

Floodplains along some reaches of higher order rivers, such as the Arkansas and South Platte, are mapped by the Federal Emergency Management Agency (FEMA). In reaches that are not incised, lower order streams without a delineated floodplain are commonly considered to include the extent of the riparian zone bordering the channel. The floodplain width on these streams is partially determined by the degree of valley confinement, but even at downstream locations within the planning area, floodplains typically extend less than 50 feet from active channel banks.

Water rights

Water rights in Colorado are established and administered under a concept of water law called the Prior Appropriation Doctrine, or the rule of "First in Time, First in Right." This concept originated in the arid American West, where miners and farmers took (appropriated) water out of the streams and put it to use at locations remote from the streams. In times of scarcity, the earliest appropriator has the first right to take water from the stream. This is in contrast to the principles of the Riparian Doctrine, which guide the rules of water law in the humid East. Under the riparian system, each person owning land bordering a water body (lake, stream, etc.) shares equal "riparian rights" to that water. The landowner is entitled to a "reasonable" use of the water, as long as his use does not interfere with the water rights of other riparian landowners. Nineteen western states recognize the Prior Appropriation Doctrine as their official rule. Nine states, with some wetter land areas, include some elements of the Riparian Doctrine in their water law. Colorado is a pure appropriation state, and it is the only state requiring a decree from a special water court to perfect a water right. Some salient features of the Prior Appropriation Doctrine, as applied in Colorado, are as follows:

- A water right is established by taking steps to put water to beneficial use. A "conditional" water right can be established by providing evidence of the intent to appropriate water. An "absolute" water right is established when the water is actually put to beneficial use.

- Water rights are administered on the basis of seniority. The priority date determines the seniority of the water right. Priority is established by the date water was first put to beneficial use (or the intent to use was formulated), and the date the water right was adjudicated in court. In other words, if a senior appropriator neglects to have his right adjudicated in court, a junior appropriator may adjudicate ahead of the senior and obtain a better priority date.

- Water rights are property rights and can be sold. Any change in use or point of diversion, however, must be approved by the water court, and it cannot result in injury to other water-right holders.

Groundwater that is hydraulically connected to streams is considered tributary to the streams, and laws governing surface water apply to groundwater. Most groundwater in Colorado is considered tributary.

In Colorado, non-tributary groundwater belongs to the owner of the land above the aquifer. By law, nontributary groundwater "is that which will not, within a period of 100 years, deplete

the flow of a stream at an annual rate greater than one-tenth of 1 percent of the annual rate of withdrawal from the well being pumped" (Hobbs 2004).

Wells used for domestic or stock water purposes (that pump less than 15 gallons per minute) do not have to be adjudicated; however, permits to use such wells must be obtained from the State engineer.

Long-recognized beneficial uses of water are for agricultural, domestic, municipal, industrial, and commercial purposes. Only recently, and with limited application, has water needed for environmental purposes been acknowledged as a beneficial use.

Under current law, rights to maintain stream flows for environmental purposes can only be held by the Colorado Water Conservation Board (CWCB). Interested parties, however, can recommend the need for such flows, and can donate water rights to the board for environmental purposes.

Water can be diverted from one watershed to another. Water from the contributing basin is diverted in priority from that basin. In the receiving watershed, imported water can be used without regard to priorities existing in that basin. Imported water can be used over and over to extinction. By contrast, water native to the basin of origin can be used only once, for the purposes it is decreed. The reason for this is to protect the rights of junior appropriators dependent on unused return flows from seniors.

Until about 1980, the water rights situation in the planning area was fairly stable. Starting in the 1970s, the population growth along the Colorado Front Range began to result in increasing demands on the water resources of the South Platte and Arkansas Basins. Cities began to buy up agricultural water rights, which drove up the price of water. In South Park almost half of the irrigated land was dried up (in 1980, there were 79,000 irrigated acres in South Park; in 1990, there were 40,000 acres). In the Arkansas Basin, Pueblo has acquired enough water to supply 300,000 people. Aurora has purchased water and dried up irrigated land downstream from Pueblo. This picture is not limited to the planning area, or even to the State of Colorado. The State of Kansas initiated litigation against the State of Colorado to ensure that Kansas receives its equitable share of flow from the Arkansas River, pursuant to the Arkansas River Compact of 1948 that allocates the flow of the river. Southern California wants more Colorado River water, which would affect future diversions from that basin to the eastern slope. Wastewater from Colorado irrigators flows across the State line and is used by farmers in western Nebraska and Kansas.

Other forces are at work to change the water rights picture. Organizations such as The Nature Conservancy and Colorado Water Trust are interested in buying or leasing water for instream flows, wetlands, and other environmental purposes.

During the 1980s, the rafting industry requested augmented water flows from the Bureau of Reclamation (BOR) on several occasions. After approval of the Arkansas River Recreation Management Plan, the industry asked Colorado State Parks and BLM to request flow augmentation from BOR, which was done in 1990. These flows were requested for July and the first half of August at a minimum rate of 700 cubic feet per second (cfs). Requests were also made to augment flows year-round to benefit fisheries. Colorado Trout Unlimited disagreed with this request, as they believe elevated summer flows are detrimental to fish. The organization obtained a court injunction against BOR, which was ultimately dismissed. The request to BOR was slightly modified in 1991 to maintain flows at 700 cfs. The same request was made in 1992. Although neither rafters nor anglers own water rights, they were able to negotiate with water users and water-right owners to obtain flows that are supportive of angling and rafting uses. This led to the

current program called the Voluntary Flow Management Program (VFMP), where BOR carefully manages flows in the Arkansas River throughout the year. This program lays out a framework for how water management operations are conducted in the Arkansas River Basin upstream of Pueblo Reservoir in order to enhance recreational values and protect aquatic habitat.

Congress has chosen to defer to State water laws and local customs of water use. In 1952, Congress enacted the McCarren Amendment, which waived sovereign immunity in regard to water rights. This Act allows the United States to be joined in State water adjudications, so that agencies can quantify their water rights and fit them into the State administration.

In the late 1970s, BLM was joined under the McCarren Amendment to quantify its reserved water rights in the Cañon City District. BLM's RGFO has only one kind of reservation that applies to water rights. These are the public water reserves, which are the result of Executive orders that reserved the 40 acres surrounding a spring or waterhole from homestead entry. The purpose of these reserves is to prevent monopolization of public springs and water holes. The courts decided the uses of water necessary to fulfill the purposes of the reservations were domestic and stock water.

In Colorado, BLM would continue to claim water rights in accordance with State law. Most of these claims would be for livestock and wildlife watering out of springs. Where instream flows are needed, the BLM would make recommendations to the CWCB and work with interested parties to achieve mutual goals. The current emphasis is to perfect water rights on springs not included in the BLM's previous adjudication of its reserved water rights.

In 2000, the RGFO, along with the USFS, BOR, and the Colorado Department of Natural Resources, completed a multi-agency effort called the Arkansas River Water Needs Assessment (Smith and Hill 2000).This assessment involved an evaluation of the stream flows needed in the river to meet the objectives of various water-dependent resource values. Because of the relationships between stream flows and the influence of both upstream and downstream reservoirs, the scope of the assessment included these reservoirs. The study area for the assessment included Twin Lakes, Turquoise and Clear Creek Reservoirs, the main stem of the Arkansas River from Leadville to Pueblo, and Pueblo Reservoir. The resource values considered included fish and wildlife habitat, recreational fishing, recreational boating, water quality, riparian habitat, and esthetics. Specialist teams looked at these resource values in three groupings: water resources, recreation, and biological resources. The data are used by the involved agencies to make recommendations or decisions that affect the Arkansas River and the related reservoirs.

Water quality

Surface water

The quality of surface water in the area is influenced by many factors, including geology, mine drainage, runoff from snowmelt or rainfall, groundwater inflow, water imports, reservoir operations, and water use. These factors are present in both the South Platte and Arkansas River Basins, but effects are more pronounced on public lands in the Arkansas River. The Arkansas River exhibits distinct spatial and seasonal variations of water quality. There are spatial variations where stream quality is significantly influenced by mineralized drainage from mines. There is also a general downstream deterioration of water quality resulting from inflows from groundwater and tributary streams, changes in geology and chemical composition of rocks, and increased water

use. Seasonal variations result from snowmelt runoff, releases of water from upstream reservoirs (during the irrigation season), and sediment-laden runoff from summer rainstorms.

Groundwater

The quality of groundwater in the planning area varies tremendously, according to the rate of groundwater movement and the chemical composition of rocks in the aquifer. Generally speaking, the best quality (least mineralized) water comes from alluvial and crystalline rock aquifers. Throughout most of the area, groundwater is suitable for domestic and livestock watering purposes.

State and Federal guidelines

The Colorado Water Quality Control Act (2013)gives authority to the Colorado Water Quality Control Commission (CWQCC) to classify and assign numeric standards to State waters. State waters are classified according to present beneficial uses or beneficial uses that may be reasonably expected in the future. Beneficial use classifications include aquatic life, recreation, agriculture, and various uses of water supplies. Numeric standards are assigned in order to define allowable concentrations of various parameters under the following categories: physical and biological; inorganic and metals. Water quality classifications and numeric standards for surface and downstream receiving waters in the planning area are contained in the Commission's Regulation No. 32, *Classifications and Numeric Standards for Arkansas River Basin* and Regulation No. 38, *Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smokey Hill River Basin*. It is BLM policy that agency projects shall meet or exceed water quality standards established by the State of Colorado for all water bodies located on or influenced by BLM-administered lands.

Surface waters where water quality standards are not being met are identified on Colorado's 303(d) list of impaired waters or on the monitoring and evaluation list (CDPHE 2012). The monitoring and evaluation list identifies river and stream segments that are suspected of being impaired, but existing data are insufficient to make an absolute determination. Several stream segments within the planning area appear on both lists (as shown in Table 2.10 of this AMS: Colorado 303(d) List of Impaired Waters on BLM Lands within the RGFO).

Compliance with the Clean Water Act requires Colorado to prioritize Section 303(d) listed waters and prepare a total maximum daily load assessment calculating the maximum quantity of a pollutant that may be added to a water body from all sources—including point sources, nonpoint sources, and natural background sources—without exceeding the applicable water quality criteria for that pollutant. The assessment quantifies the amount of a pollutant that an impaired water body can assimilate from future sources without violating applicable water quality standards.

In addition to State water quality classifications and numeric standards, all surface waters in Colorado are subject to CDPHE Regulation No. 31, *The Basic Standards and Methodologies for Surface Water*, which states in part that "state surface waters shall be free from substances attributable to human-caused point or nonpoint source discharge in amounts, concentrations or combinations [that can] settle to form bottom deposits [such as silt and mud] detrimental to the beneficial uses [or] are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life [or] produce a predominance of undesirable aquatic life."

The intent of this narrative standard is to address and prohibit water quality degradation from excessive sediment, nutrients, or toxic compounds.

BLM Colorado standards for public land health

In March 1997, BLM Colorado finalized its land health standards, *Standards for Public Land Health and Guidelines for Livestock Grazing Management* (BLM 1997). The standards were developed to describe conditions needed to sustain the health of the landscape and were intended to apply to all uses of public land. The five Colorado standards contain two parts: 1) a statement describing the conditions of a landscape's potential, followed by 2) a series of indicators that help to define the standard and are observable on the land. Colorado Public Land Health Standard 5 pertains to water quality (Table 2.7).

Table 2.7. Colorado Public Land Health Standard 5

The water quality of all water bodies, including groundwater where applicable, located on or influenced by BLM lands will achieve or exceed the water quality standards established by the State of Colorado. Water quality standards for surface and groundwater include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law as found in the Code of Colorado Regulations (5 CCR 1002-81), as required by Section 303(c) of the Clean Water Act. Indicators: ● Appropriate populations of macroinvertebrates, vertebrates, and algae are present. ● Surface water and groundwater contain only substances (such as sediment, scum, floating debris, odor, and heavy metal precipitates on channel substrate) attributable to humans, within amounts, concentrations, or combinations directed by water quality standards established by the State of Colorado (5 CCR 1002-8).

2.2.4.2. Current Condition

Water quantity

The BLM pursues legal and valid water rights from various sources in amounts necessary to achieve resource management objectives throughout the planning area (as shown in Table 2.8). Common uses include domestic, wildlife, livestock, fire suppression, and recreation. The BLM applies to the State for both ground and surface water rights, which are administered by the Colorado Division of Water Resources.

In the Royal Gorge Field Office planning area, BLM filed claims on about 271 small springs for stock water. BLM total water claims were only 1.55 cfs for springs. Most BLM water rights are on sources that are not directly connected to surface streams, so the BLM is not regularly asked to curtail its water uses to make water available for more senior water rights. BLM's largest reserved water right is on the Park Center Well. This well was drilled in the late 1920s for oil exploration purposes, but struck water instead. The United States acquired the well during the 1930s and leases water produced by the well for municipal use by the Park Center Water District. The Colorado Supreme Court awarded the BLM a reserved water right on the well in 1990 for 2.67 cfs.

Within the planning area, BLM has approximately 50 stock water wells. These wells all pump less than 15 gallons per minute and are exempt from administration. Well data in the field office need refining, as the State water well database shows that over 750 wells are on public lands within the planning area with 100 of them owned by the BLM. Of those 100, 49 are listed as being complete or the permit is issued with an unknown status. BLM also owns over 545 small dams

built for stock water and erosion control. These small impoundments are located on ephemeral drainages and are also exempt from administration.

Table 2.8. Consumptive Water Rights in the Planning Area

Water source type	Number[a]
Ditches	3 (1 active)
Wells	49
Federal appropriative water rights (springs)	207
Springs (decreed)	64
Reservoirs	545

[a]Water source data come from the RGFO water source inventory database.

Approximately 207 of 271 spring water rights in the planning area are Federal reserved water rights claimed under the 1926 Executive order known as “Public Water Reserve No. 107.” The purpose of this Executive order was to reserve natural springs and water holes yielding amounts in excess of homesteading requirements. The order states that "legal subdivisions of the public land surveys which is vacant, unappropriated, unreserved public land and contains a spring or water hole, and all land within one-quarter of a mile of every spring or water hole [be] reserved for public use.” All kinds of wildlife depend on water from BLM springs, wells, stock-water reservoirs, and streams flowing through BLM-administered land. BLM will work within the State water rights system to see that these water sources are protected for fish and wildlife needs.

Livestock tanks

In addition to water rights, the BLM applies to the State of Colorado for permits to construct livestock water tanks (ponds). Livestock tanks are permitted through the Colorado Division of Water Resources and typically have storage capacities of less than one acre-foot. They are required to be located on intermittent or ephemerally flowing channels and typically contain water only after snowmelt or large precipitation events. BLM records show over 500 existing livestock tanks in the RGFO. However, because many livestock tanks were constructed prior to State permit filings or cataloging in BLM databases, the actual number is considered to be much higher. Many of the tanks are poorly maintained or non-functional and cause accelerated levels of erosion and sedimentation. Invasive weed species commonly become established in areas disturbed by livestock tanks, which can degrade watershed conditions.

Instream flow

Instream flow water rights to protect aquatic resources are secured for a number of streams in the planning area (as shown in Table 2.9). Although only the CWCB can hold an instream flow water right in Colorado, the BLM staff makes recommendations to the State for candidate streams and provides the channel surveys and assessments necessary for quantifying the flow. Instream flow water rights are secured to protect habitat for both warm and cold water fish species and can vary in amount throughout the year.

Table 2.9. Stream Segments on RGFO Lands with Instream Flow Rights

HUC[a]	Stream	Case number	Reach length
11020001	Badger Creek	2-74W4205	17.7
11020001	Badger Creek	2-07CW117	16.0
11020002	Barnard Creek	2-98CW162	4.4
11020001	Bear Creek	2-80CW072	6.9

HUC[a]	Stream	Case number	Reach length
11020001	Big Cottonwood Creek	2-80CW074	6.6
11020001	Birdseye Gulch	2-04CW079	3.4
11020001	Brown's Creek	2-75W4287	12.9
11020001	Cache Creek	2-98CW164	4.5
10190001	Crooked Creek	1-76W8235	9.7
11020001	Currant Creek	2-04CW081	6.9
11020001	Currant Creek	2-04CW080	16.0
11020001	Currant Creek	2-95CW231	2.9
11020001	East Fork Arkansas River	2-77W4646	14.1
11020001	East Tennessee Creek	2-77W4650	8.1
11020002	Eightmile Creek	2-98CW157	11.4
11020002	Eightmile Creek	2-98CW158	7.7
10190005	Fourmile Creek	1-95CW258	7.1
11020002	Fourmile Creek	2-00CW101	7.6
11020002	Fourmile Creek	2-00CW102	3.5
11020002	Fourmile Creek	2-00CW103	3.7
11020002	Fourmile Creek	2-00CW105	1.2
11020002	Fourmile Creek	2-00CW106	2.2
11020001	Fourmile Creek	2-04CW083	2.1
11020002	Fourmile Creek	2-00CW104	7.2
11020002	Graneros Creek	2-98CW150	5.2
11020001	Green Creek	2-04CW084	4.8
11020001	Halfmoon Creek	2-77W4645	8.8
11020001	Hamilton Creek	2-77W4635	3.5
11020002	High Creek	2-98CW161	10.6
11020006	Huerfano River–Lower	2-10CW089	2.6
11020001	Lake Fork Creek	2-77W4654	4.1
11020002	Little High Creek	2-98CW153	7.4
11020001	Low Pass Gulch	2-82CW147	5.5
10190001	Michigan Creek	1-76W8230	22.4
10190001	Middle Fork South Platte River	1-80CW067	33.8
10190004	North Clear Creek	1-87CW273	5.6
11020002	Oil Creek	2-00CW107	7.9
11020001	Pass Creek	2-76W4438	7.0
11020001	Poncha Creek	2-77W4675	7.6
10190001	Sacramento Creek	1-75W8016	9.7
10190001	Sheep Creek	1-76W8236	5.4
11020006	South Apache Creek	2-76W4436	6.1
10190005	South Boulder Creek	1-80CW379	6.6
10190001	South Mosquito Creek	1-76W8223	2.8
10190005	South Saint Vrain Creek	1-87CW278	9.3
11020002	Saint Charles River	2-76W4435	21.4
11020001	Tallahassee Creek	2-95CW232	9.2
10190001	Tarryall Creek	1-76W8229	25.2
11020001	Tennessee Creek	2-82CW143	2.8
11020001	Tennessee Creek	2-98CW146	2.8
11020001	Texas Creek	2-98CW149	8.9
11020001	Thirtyone Mile Creek	2-04CW087	10.4
10190001	Trout Creek	1-76W8227	6.9
11020001	Trout Creek	2-74W4173	9.8
10190001	Twelvemile Creek	1-76W8231	9.3
11020001	Twobit Gulch	2-82CW144	4.4

[a]Refer to Table 2.5 above for watershed names.

Groundwater and aquifers

Groundwater in the planning area ranges from local, unconsolidated aquifers to extensive, bedrock (consolidated) aquifers and is most common in coarse sedimentary rock formations. The unconsolidated aquifers are most common in alluvial deposits along perennial watercourses and on higher elevation mesa tops. Water yields in these aquifers can vary seasonally and in response to long term climatic variations. The more extensive bedrock aquifers are often interrupted by deeply incised topography over much of the planning area. The bedrock aquifers typically have lower water yields and are higher in dissolved salts compared with water contained in unconsolidated aquifers. Groundwater recharge typically originates from higher elevations and is limited by a semi-arid climate over much of the planning area.

Water quality

Surface water

Achieving high quality water is an important component to an effective water resource management program to ensure the needs of both on- and off-site water uses are met. The water quality of the RGFO surface waters are assessed and monitored by several means. LHAs conducted over the most recent 10-year period assessed water quality against BLM Colorado Land Health Standard 5. Data assessed for LHAs include water chemistry, bacteriological analyses, density, and composition of aquatic macroinvertebrates, and the potential for accelerated levels of sediment, salinity, and selenium. RGFO land management actions also consider potential affects to water quality-impaired rivers and streams on the Colorado 303(d) and monitoring and evaluation lists (CDPHE 2012). Table 2.10 shows the current 303(d) and monitoring and evaluation list of impaired waters within the planning area.

Table 2.10. Colorado 303(d) List of Impaired Waters on BLM Lands within the RGFO

Water source	Portion	Monitoring and evaluation parameters	Clean Water Act Section 303(d) impairment	Priority
Fourmile Creek and tributaries, Cripple Creek to Arkansas River	North Fork Wilson Creek below Independence Mine		Arsenic	N/A
Main stem of Cripple Creek from the source to a point 1.5 miles upstream of the confluence with Fourmile Creek	All		Aquatic Life	Low
Iowa Gulch from ASARCO water supply intake to Paddock No. 1 Ditch (Iowa Ditch)	All		Cadmium Lead Zinc	Medium
Sixmile Creek	All		Fe-Trec Selenium	Low
Apache Creek, Breckenridge Creek, Little Horse Creek, Bob Creek, Wildhorse Creek, Wolf Creek, Big Sandy Creek	All		Selenium	Low

Water source	Portion	Monitoring and evaluation parameters	Clean Water Act Section 303(d) impairment	Priority
Main stem of Adobe Creek and Gageby Creek	Adobe Creek		*Escherichia coli*	High
Main stem of Adobe Creek and Gageby Creek	Horse Creek		Fe-Trec	High
Main stem of Adobe Creek and Gageby Creek	All		Selenium	Low
Cuchares River, from Walsenburg PWS diversion to the outlet of Cucharas Reservoir	All		Selenium	Low
Arkansas River, Fountain Creek to Colorado Canal headgate	All		Selenium SO_4	Low
Arkansas River, Colorado Canal headgate to John Martin Reservoir	All		Selenium	Low
Arkansas River, John Martin Reservoir to state line	All		Selenium Uranium (U)	Low
Purgatoire River, I-25 to Arkansas River	All	Sediment	Selenium	Low
All tributaries to Fountain Creek, which are not on National Forest or Air Force Academy land	All		*E. coli*	High
Fountain Creek and tributaries above Monument Creek	All		*E. coli*	High
Clear Creek, Argo Tunnel to Farmers Highline Canal	All		Cadmium	High
N. Clear Creek and tributaries, lowest water supply intake to Clear Creek	Main stem of N. Clear Creek		Cadmium	High
Main stem of Saint Vrain from Indian Peaks Wilderness Area and RMNP to eastern boundary of Roosevelt National Forest	All		Zinc	H
Left Hand Creek, from source to below confluence with James Creek	(Hwy 72 to James Creek)		pH Copper Zinc	Medium
South Mosquito Creek from the source to the confluence with Mosquito Creek and No Name Creek from the source to the confluence with Mosquito Creek	No Name Creek		Cadmium Zinc	High

Water source	Portion	Monitoring and evaluation parameters	Clean Water Act Section 303(d) impairment	Priority
Main stem of the South Platte from the Weld/Morgan County line to the Colorado/Nebraska border.	All	Aquatic life use	Selenium Manganese	Medium
Cache la Poudre River, Monroe Canal to Shields Street	All		Copper Temperature	Medium

In terms of water quality, the Upper South Platte River is in good condition, and the trend is stable. Further downstream on the South Platte, water quality deteriorates as it flows through urban and agricultural areas. Water quality in the Arkansas River is in need of improvement. Many agencies have studied this problem, including the Colorado Division of Wildlife, the Colorado Water Quality Control Commission, the Colorado School of Mines, the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the U.S. Bureau of Reclamation, and the Environmental Protection Agency. Some studies are still underway, and new ones are being proposed. As the demand for better water quality increases, more money and effort will go into solving these problems.

Some actual pollution abatement has been done. The Colorado Mineral and Geology Division completed a project to stabilize mine wastes and treat mine drainage in Chalk Creek. A large effort helped remedy pollution caused by the Leadville mine drainage tunnel, and the nearby Yak Tunnel. New treatment plants are currently in operation for both these tunnels. An intensive effort is underway in the Lake Fork of the Arkansas watershed to address a problem in that watershed and includes the removal of tailings from wetlands and placing a bulkhead in the Dinero Tunnel. All of these studies and projects indicate that the trend for water quality in the Arkansas River is toward improvement.

Largely through improved grazing management, BLM is making progress towards improving vegetation on streamside and upland areas. Better vegetative cover results in less erosion and better infiltration of rainwater into the soil. This helps retard floods and lowers the amount of sediment moving into the streams. Healthy desired plant communities in riparian zones prevent bank erosion, trap sediment, and dissipate flood water. Management of livestock is the main tool to achieve and maintain desired plant communities; therefore, proper grazing management enhances watershed condition. These continued efforts will result in improved water quality throughout the planning area. BLM-administered timbered lands and areas with pinyon, juniper, and oak canopies provide optimum hydrologic conditions. Forests have a great capacity to absorb intense rainfall and to release runoff gradually. Runoff from forested land usually contains little sediment or dissolved minerals.

Groundwater and aquifers

Water quality in the aquifers within the planning area varies greatly. In the South Platte Basin, some wells yield water with nitrate levels exceeding the standard for drinking water. In parts of Park, and Teller Counties, wells drilled into Pikes Peak granite have fluoride concentrations that exceed drinking water standards. In isolated areas of western Pueblo and eastern Fremont and Custer Counties, groundwater is contaminated by radioactive materials. Some wells in eastern Fremont County produce water too mineralized for domestic purposes yet still suitable for livestock consumption.

Primary water quality issues

The primary water quality issues for waters in the planning area include elevated sediment levels and heavy metals as a result of historic mining activities.

Sediment

There are many sources for excessive sediment loading of surface waters on public lands. Soil surface-disturbing activities have the potential to accelerate the rate of soil erosion, which is strongly correlated with sediment production. Excess sediment has both on- and off-site impacts, lowering soil productivity at its source and affecting downstream uses of water, including instream riverine values.

Heavy metals

Heavy or toxic metal issues affecting water quality are primarily associated with hard rock mining areas in the higher elevations, specifically around Leadville and Cripple Creek. Heavy metal loading in waterways affect aquatic invertebrates, fish, and public health.

Source water protection of public water supplies

Although the BLM has no statewide policy for managing public water supplies or source water areas, the agency is required to comply with the Safe Drinking Water Act of 1974. In 1996, the Safe Drinking Water Act was amended to include requirements that each State develop a source water assessment and protection (SWAP) program to ensure safe public drinking water supplies. Spearheaded by the Colorado Water Quality Control Division, the BLM, along with other agencies and citizen groups, is involved in developing the program. The first phase of the plan is to assess all public water supplies to identify existing and potential pollution sources. Following the assessment phase, a protection phase plan is developed in a collaborative effort involving State and local governments, water providers, and citizens to identify actions to address the problems and risks identified in the assessments. As protection plans are completed for public water supply areas on public lands in the planning area, it is anticipated that agreements will be prepared between the BLM and water providers to ensure that BLM management activities provide adequate protection of public water supplies.

Source water areas—assessment phase

The Colorado Water Quality Control Division has completed initial source water assessments for over 1,700 public water systems in Colorado. Numerous public water supplies and assessment reports exist throughout the planning area where BLM lands are involved. The assessment phase involves understanding where each public water system's source water comes from, the potential contaminant sources that threaten the water sources, and how susceptible each water source is to potential contamination. A high, medium, or low ranking of risk is identified for each potential source of contamination. Assessment results are provided as a starting point for public water suppliers to evaluate a system's potential contaminant risks and develop protection plans to minimize these risks.

The State has established buffer zones to categorize the distance from a potential source of contamination to the drainage network and water supply intake. The drainage network includes all perennial, intermittent, and ephemeral tributaries to the stream segment on which the intake is located. The State distinguishes between three zones of distance from the source

to the drainage network; the premise is that the further away a source is from the intake, the lower the contamination risks. Near-field and far-field areas are used to identify potential risks of contamination from activities within a watershed. Similar zone concepts were applied to groundwater and reservoir sources as described in the source water assessment methodologies for both surface and groundwater.

- **Zone 1** is defined as either a 1,000-foot-wide band on each side of a stream, lake, or shallow alluvial aquifer (where groundwater is under the influence of surface water) or the 100-year floodplain. Land use activities in Zone 1 occur closest to the drainage network and are of greatest concern to the quality of public water supplies.

- **Zone 2** extends one-quarter mile (1,320 feet) beyond each side of the boundaries for Zone 1; Zones 1 and 2 constitute a 2,320-foot buffer on each side of the stream, lake, or alluvial aquifer.

- **Zone 3** encompasses the remainder of the source water area up to the watershed boundary and has the lowest contamination risk of the three zones.

- **Near-fields and far-fields** define the source water or watershed area *near* (within) or *far* (outside of) a 15-mile radius of a water supply, with activities in near areas presenting a higher risk to a water supply than those in far areas.

Within the planning area, the source water assessment area for surface water totals almost all surface acres of public land, while the source water assessment area for groundwater totals several thousand acres. These figures may change when public water suppliers complete a source water protection plan. A confidentiality agreement to withhold the spatial information of public water systems from public disclosure exists between the BLM and the CDPHE Water Quality Control Division, due to homeland security concerns.

Source water areas—protection phase

The second phase of a SWAP is the protection plan phase. Protection plans are collaboratively developed by cities, towns, and municipalities to further identify drinking water protection measures and involve stakeholders in the process. This phase is voluntary, but the State strongly encourages municipalities to develop plans. Currently, there are a few known completed protection plans that affect public lands in the planning area. Recently, the water providers in the Upper Arkansas River watershed including Florence, Cañon City, Salida, and Buena Vista completed plans. In addition, the Upper South Platte Basin has started a plan and includes Denver Water and the City of Aurora. As protection plans are completed, land use activities on affected public lands would be managed to provide adequate protection to public water supplies in coordination with public water supply managers.

RGFO coordination and collaboration with partners

The RGFO continues to coordinate and collaborate with several external groups in managing soil and water resources within the planning area. The RGFO, with other partners, has been active in the Lake Fork Watershed Working Group since its inception and assisted in preparing and implementing the group's watershed plan. The group's accomplishments include the following:

- Moving mine tailing out of wetlands below the Dinero and Nelson Tunnels.

- Constructing the Dinero Tunnel bulkhead.

- Conducting remediation at the Tiger Tunnel.
- Conducting monitoring efforts with the USGS on the effectiveness of past projects.

Other outreach efforts are as follows:

- Participating in the local water roundtable for the Arkansas Basin, a State-based effort to identify, coordinate, and collaborate on water issues throughout the State.
- Collaborating with the NRCS and the State of Colorado in the Badger Creek watershed.
- Participating in wetland focus groups in the Upper Arkansas and South Platte watersheds.
- Working with irrigation companies to better manage flows to help BLM programs.

2.2.4.3. Trends and Forecast

Effectiveness monitoring

Effectiveness monitoring of areas identified as having impaired water quality during LHAs will be an important part of the "adaptive management" process to ensure that land management actions are appropriate for the site. At present, guidelines for both recreation and livestock grazing are used to develop appropriate site management activities. LHAs help to reveal causal factors responsible for water quality not meeting Public Land health Standard 5, which include activities in addition to grazing and recreation.

Best management practices

BMPs for mineral and energy development, livestock grazing, recreation, and other activities help to minimize water quality degradation and should be developed for all significant land use activities with potential for degrading water quality.

Travel management planning

Water resources throughout the planning area should benefit from the implementation of TMPs. The Gold Belt, Fourmile, and Arkansas River TMPs eliminate open, off-route travel by motorized vehicles. Given current OHV use in the planning area, eliminating off-route use would benefit water quality primarily by reducing potential sources of sediment.

Currently, OHV use is restricted to existing travel routes, which provides some benefits to water resources, while future travel plans would designate routes and provide even greater water quality protection. In addition, some existing routes will be closed and rehabilitated. Benefits to water quality and stream channel stability will be further enhanced by the following:

- Implementing a trail maintenance plan and seasonal restrictions when conditions are excessively wet or dry.
- Enforcing allowed uses along designated routes.
- Implementing public education programs to promote responsible land use ethics.

Energy development

Energy development, primarily in the form of oil and natural gas, uranium, and coal has and will continue to impact surface and groundwater quality and quantity. The rate or extent of extraction or mining tends to be cyclical, with boom and bust periods. The Lower South Platte and Purgatoire River watersheds have recently experienced rapidly expanding oil and natural gas development in the past few years, creating a short- and long-term infrastructure of roads, pipelines, well pads, compression stations, and supporting industrial facilities. Natural gas development and its related surface disturbance on a landscape level need to be examined in the RMP revision.

The cumulative impact discussions from individual projects often refer to the RMP, thus it is imperative that they be addressed adequately in this document. Potential water quality impacts from oil and gas development include erosion and sediment production, spills of fuel, chemicals, hydraulic fracturing fluids, produced water, or produced oil and gas. Stream crossings, in particular low water crossings, are numerous and are large sediment contributors to streams. Various stipulations and conditions of approval, as well as Federal and State permit requirements such as Section 404 permits and storm water permits, respectively, help to mitigate surface water impacts. Additional prescriptive measures such as stream buffers may be needed to minimize impacts to water quality.

Predicted changes in climate

Many prominent climatologists are predicting some change to the near term, future climate of Colorado. An analysis of past and present climate data in the 2014 report, *Climate Change in Colorado* (Ray et al. 2014), leads climatologists to forecast warmer temperatures in southern Colorado over the upcoming decades. The report summarizes potential issues for land and water managers given the forecast. Potential issues and impacts affecting resources in the planning area include the following:

- Rising temperatures could raise evapotranspiration by plants, reduce soil moisture, and alter growing seasons, requiring adjustments to vegetation-based programs such as livestock management.
- Earlier runoff could complicate prior appropriation systems and interstate water compacts, affecting which water-right holders and irrigation operations receive water.
- Increased water temperatures and changes in precipitation patterns could affect aquatic resources on public lands and downstream water uses.
- Increasing temperature and soil moisture changes could shift mountain habitats toward higher elevations.
- Stream temperatures are expected to increase as the climate warms, which could have direct and indirect effects on aquatic ecosystems, including the spread of instream non-native species and diseases to higher elevations and the potential for non-native plant species to invade riparian areas. Changes in stream flow intensity and timing may also affect riparian ecosystems.
- Changes in reservoir water storage affect river recreation activities; changes in stream flow intensity and timing will continue to affect rafting directly and trout fishing indirectly.

- Changes in long term precipitation and soil moisture can affect groundwater recharge rates, which could diminish spring and well discharge rates on public lands needed to support a variety of resources.

2.2.4.4. Key Features

The following key features are seen as critical to effectively manage water resources on public lands within the planning area:

- Secure water rights or permits for all water sources on public lands, including ponds, wells, seeps, and springs for flora, fauna, livestock, fire suppression, and recreation uses. The importance of obtaining, maintaining, and protecting the water rights necessary to effectively accomplish management objectives on public lands will increase in response to projected changes in climate and increasing water demand locally and throughout the Arkansas and South Platte River Basins.

- Develop and maintain a geospatial database of water sources such as springs, ponds, wells, etc., on public lands, which is critical in managing these resources.

- Quantify and recommend instream flow water rights to the CWCB as soon as possible, as increasing water demands will make these more difficult to obtain.

- Monitor and manage instream flow water rights to provide the intended benefits. As an example, many tributaries of the Arkansas and South Platte Rivers provide spawning habitat for cold-water fishes.

- Assist the CWCB in monitoring instream flows to ensure that these water rights are administered to provide the intended instream flow benefits in accordance with State law. Many planning area streams with instream flow water right protections are relatively small tributaries, with few having stream flow monitoring gages. Even though the CWCB is the primary instream flow water right holder, it has little capacity to monitor the hundreds of streams statewide, especially those without stream gages. Additionally, to claim injury to an instream flow water right requires proof by the CWCB that upstream out-of-priority water uses are occurring.

- Manage river projects and rights-of-way to preserve channel conditions protecting aquatic habitat.

- As landscape units are revisited for effectiveness monitoring, assess livestock water facilities and implement appropriate follow-up actions. The RGFO has approximately over 500 recorded livestock ponds/reservoirs, along with a number that have not been recorded. Historically, the RGFO has been remiss at adequately maintaining many of these facilities. Reliable water sources have been a priority for maintenance, while those deemed unreliable often become sources of accelerated sediment yield and vectors for invasive weed establishment.

- Ensure that current and future livestock grazers obtain necessary permits and comply with Colorado's livestock tank policy. This will provide a level of protection for livestock water use on public lands, even as water demand increases regionally in the future.

- Collaborate with public water supply providers and water users during assessments for potential pollution sources and development of source water area protection plans to ensure that

management actions are compatible. As population in the region continues to grow, domestic and municipal water sources will become more common in the planning area.

2.2.5. Terrestrial Wildlife

2.2.5.1. Indicators

Indicators are used on the RGFO for a variety of wildlife management purposes. They are used to ensure viable wildlife populations occur within the planning area, in fulfillment of Federal laws such as the Endangered Species Act, Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act. They are also used to fulfill obligations made with other Federal or State agencies to conserve or protect wildlife species—such as memoranda of understanding (MOUs) with the U.S. Fish and Wildlife Service—or used to meet external interests in wildlife species conservation for the greater public good.

Two basic categories of indicators are routinely used in the RGFO: 1) direct measures of wildlife, and 2) indirect measures of the environment or wildlife habitats. Depending on the focus or interest, indicators may be qualitative or quantitative, and they may include relative indices.

Direct measures of wildlife

Many indicators used in the RGFO are direct measurements of wildlife with the intent of providing information about wildlife population trends. Data collected about wildlife species include presence, frequency, occupancy, abundance, demographics, breeding status, health, behavior, migration, immigration/emigration, mortality, and phenology. Indices, such as the Simpson Index or Shannon-Weiner Index, can provide information about the wildlife assemblage or biodiversity of a given area. Indicators used in the RGFO may also be individual species, guilds, suites of taxa, or overall biodiversity. Key wildlife species are sometimes used as bioindicators, umbrella species, or as surrogates for measuring rare wildlife species.

Indicators of positive or stable population trends for wildlife species within the RGFO include the following:

- The wildlife species of interest, or signs of the species, is/are present within expected and appropriate time frames and locations.
- Frequency of occurrence is moderate or high, or within expected fluctuations.
- Individual animals can be detected, and rates of occupancy are stable to increasing.
- The demographic structure has a proper mix of age classes and sexes.
- The species demonstrates positive or stable rates of reproductive success, or rates within expected fluctuations.
- Behaviors, migration, emigration/immigration patterns are stable, or are within expected fluctuations.
- Mortality rates are stable or within expected fluctuations.
- The spatial distribution or density of wildlife species of interest is stable or increasing.

The RGFO works closely with Colorado Parks and Wildlife (CPW) and other partners, such as the Rocky Mountain Bird Observatory, to inventory and monitor wildlife species, populations and assemblages within the planning area.

Although CPW is interested primarily in population dynamics and demographics, the principal indicator used by the BLM is habitat condition based on plant community attributes and a site's capacity to sustain native wildlife species. Within this framework, the BLM focuses on key animal species and their habitats. Indicators of habitat condition include plant species composition, cover, vigor, production, browse levels, and animal indices such as wildlife sign (including scat, tracks, and nests) and animal health.

Indirect measures of wildlife habitats

Indicators that indirectly measure wildlife populations are those that focus on the environmental factors or specific characteristics of their habitat. These indicators provide information on the quantity, quality, and functionality of suitable habitat present, so that the wildlife species of interest can fulfill its life history needs within the planning area. Such measures include occupancy; structure, composition, age class, or diversity of vegetation; temperature; water availability and quality; contaminants; invasive species; and other physical features of the habitat. The quantity, quality, and connectivity of certain types of habitats, such as nesting habitat, hiding cover habitat and foraging habitat, are also important measures.

Key plant species are sometimes used as bioindicators, umbrella species or as a surrogate for a rare wildlife species. In addition to those commonly used for habitats, tools and indicators from *Standards for Public Land Health and Guidelines for Livestock Grazing Management* (BLM 1997) (otherwise referred to as land health assessments) are also used.

Habitat requirements are very specific to individual species. Given this, general indicators that demonstrate positive or stable trends for the habitats of wildlife species include—but are not limited to—the following, when suitable and as appropriate for the wildlife species of interest:

- Reproductive, resting, hiding, foraging, and migration habitats are occupied.
- Habitats are connected, and corridors are present and used.
- The degree of edge-to-interior patch size is appropriate and proportional to the needs of the wildlife species.
- The quantity of suitable reproductive, resting, hiding, foraging, and/or migration habitat is adequate.
- Reproductive, resting, hiding, foraging and migration habitats are in a suitable condition for the wildlife species.
- The quantity and arrangement of coarse woody debris is adequate.
- The quantity of tree cavities, snags, large limbs, and green foliage is adequate.
- The ratio of live to dead plant material is adequate.
- The vegetation structure, species composition, abundance, age class, seral stage, photosynthetic capability, litter accumulation, distribution, and density are adequate.

- The condition or quantity of physical features, such as cliffs, water, temperature, humidity, bare soil, rock, and soil, are adequate.
- The frequency, intensity, and duration of natural disturbances are within the historic range of variability and are adequate.
- Food sources are in adequate supply and within available distance to meet wildlife needs, especially during the breeding season.
- Contaminants, toxins, parasites, noxious weeds, invasive species, and extrinsic disturbances are at endemic or non-detectable levels.

2.2.5.2. Current Condition

Vegetation associated with key wildlife species in the planning area

Dominant vegetation cover types are often used to stratify assemblages of wildlife species as part of landscape-scale analysis. Vegetation species composition and distribution across the planning area are described in detail in section 2.2.7.

Some wildlife species present in the planning area are specialists that use a narrow set of environmental conditions to fulfill their life histories and have a very restricted range of distribution. Other wildlife species are generalists, meaning they can occur and reproduce successfully across a broad range of environmental conditions. Depending on their requirements and availability or condition of suitable habitat, species may be present within the planning area seasonally or year-round.

Shortgrass is dominated by two low-growing warm-season grasses: blue grama (*Bouteloua gracilis*) and buffalo grass (*Bouteloua dactyloides*). Western wheatgrass (*Pascopyrum smithii*) is also present, along with taller vegetation, including widespread prickly pear cactus (*Opuntia phaeacantha*) and yucca (*Yucca baccata*). Sandsage prairie is found where sandy soils occur, and is dominated by sand sagebrush (*Artemisia filifolia*) and the grasses sand bluestem (*Andropogon hallii*) and prairie sandreed (*Calamovilfa longifolia*). Mixed grass communities—needle-and-thread (*Hesperostipa comata*) and sideoats grama (*Bouteloua curtipendula*) occur locally, as do tallgrass communities—big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), and switchgrass (*Panicum virgatum*). Grasslands, especially those containing cool-season bunchgrass and an abundance and diversity of forbs, provide important foraging habitat for big game species , small mammals, pollinators, birds, ferruginous hawk, lark bunting, lark sparrow (*Chondestes grammacus*), and numerous other wildlife species of concern or management interest. The condition of shortgrass prairie and mountain grassland within the planning area varies, with some sites in good condition and other sites in poor condition. Many sites in the planning area appear to have an overabundance of rhizomatous grasses and lack the cool-season bunchgrass and forb component, which is a degraded condition for many, but not all, wildlife species.

Shrubs are a common vegetation component within the RGFO, and whether they occur within the shortgrass prairie portion or the Southern Rockies portion of the planning area, the function they provide is very important for many wildlife species. Shrub species found in the planning area include Gambel's oak (*Quercus gambelli*), mountain mahogany (*Cercocarpus montanus*), Bigelow sagebrush (*Artemisia bigelovii*), Frankenia (*Frankenia jamesii*), willow (*Salix* spp.), gray

alder (*Alnus incana*), rabbitbrush (*Chrysothamnus* spp.), serviceberry (*Amelanchier alnifolia*), Rocky Mountain maple (*Acer glabrum*), wax current (*Ribes cereum*), and gooseberry (*Ribes inerme*) (Neid 2007, USDA NRCS 2015). Shrubs provide browse, berries, nuts and nectar food sources for pollinators, birds and mammals. Their height provides hiding cover for big game species, which can be critical during winter and birthing events, and denning cover for carnivores. Shrubs provide nesting and hiding cover for migratory passerine and resident game birds, and the fruits and insects provide important energy sources for long distance flights during migration.

The pinyon-juniper habitat type is a cold-adapted evergreen woodland situated above grassland vegetation and below mountain shrubland. Depending on site variables, pinyon-juniper may range from an openly spaced savanna to a closed forest. Pinyon-juniper understories within the planning area vary from completely depauperate to quite dense and diverse, the densest and most diverse grass/forb understories occur in open canopy woodland sites and where Gambel's oak is present. Pinyon-juniper woodlands with abundant and diverse grass and forb understories provide hiding cover habitat for big game species, nesting habitat for pinyon jay (*Gymnorhinus cyanocephalus*), and nesting and foraging habitat for a variety of songbirds, such as bushtit (*Psaltriparus minimus*) and juniper titmouse (*Baeolophus ridgwayi*). Dense pinyon-juniper stands are believed to have altered hydrological cycles, causing local desertification within the stand and depauperate understories (Tauch, Miller, and Chambers 2009). Such dense stands with depauperate understories support very few wildlife species and are considered degraded sites in terms of local wildlife species (Miller 2001).

Forests within the planning area provide breeding, foraging, cover, roosting, and resting habitat for several wildlife species. At lower elevations, ponderosa pine (*Pinus ponderosa*) is common, with Douglas-fir (*Pseudotsuga menziesii*) on north-facing slopes and in drainages. Open ponderosa pine stands provide excellent breeding and foraging habitat for flammulated owl (*Psiloscops flammeolus)*, while cool, moist Douglas-fir stands found in drainages provide excellent breeding and foraging habitat for Mexican spotted owl (*Strix occidentalis lucida*). Mixed conifer gives way to spruce-fir at higher elevations. Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) are the dominant tree species in the subalpine portions of the planning area. Engelmann spruce is found without subalpine fir in many portions of the planning area. In cool, moist subalpine forests, stands with abundant young and mid-aged trees and downed coarse woody debris provide good breeding habitat for blue grouse (*Dendragapus obscurus*) , good browse habitat for snowshoe hare (*Lepus americanus*), all around habitat for red-backed vole (*Clethrionmys gapperi*), and good denning and hunting habitat for American marten (*Martes americana*) and Canada lynx (*Lynx canadensis*). Lodgepole pine (*Pinus contorta*) and aspen (*Populus tremuloides*) are often mixed in at lower and middle elevations, and limber pine (*Pinus flexilis*) and bristlecone pine (*Pinus longaeva*) are present at middle and higher elevations in harsh, exposed, windy sites. At the highest elevations, where spruce-fir gives way to alpine tundra, the harsh climate restricts these trees to a small, contorted, often ground-hugging growth form known as "krummholz." Aspen-dominated forests with abundant insect populations provide nesting habitat for numerous bird species, such as violet-green swallow (*Tachycineta thalassina*), house wren (*Troglodytes aedon*), and broad-tailed hummingbird (*Selaphorus platycercus*). Aspen stands with large trees, running water, and a diverse bird populations provide excellent nesting habitat for northern goshawk (*Accipter gentilis*). Within the RGFO, aspen occurs primarily as an early seral species, and is being replaced by surrounding shade-tolerant conifers.

The condition of conifer and aspen stands within the planning area varies. Although large insect outbreaks cause tree mortality, lowers forest product values and increases fire hazard, many wildlife species benefit from the changed forest condition. Insect outbreaks within the RGFO

are likely going through a turnover in the wildlife species assemblage present, with an increase in insect gleaning and cavity nesting birds, but a decrease in forest interior birds. Little to no data on this wildlife species composition change has been collected in the planning area. Some forested stands in the planning area show a diversity of wildlife species, while other stands do not have the forest structure or understory conditions to support the abundance of wildlife species expected for these vegetation types.

Riparian corridors, lakes, wetlands, and their shorelines are very important for a variety of wildlife species, because these sites tend to be highly productive, serve as food sources, breeding grounds and migration routes, yet are generally rare in the landscape. This is especially the case within this planning area, which tends towards drier climatic conditions due to its position relative to the surrounding mountains and the Continental Divide.

Riparian corridors are dominated by a deciduous component, especially narrowleaf cottonwood (*Populus angustifolia*), a variety of willow species; box elder (*Acer negundo*); mountain alder (*Alnus incana*) and river birch (Betula nigra). In other parts of the planning area, Colorado blue spruce (*Picea pungens*)and other coniferous trees dominate or form a mixture with cottonwoods. The understory of these systems is typically moist and has high species richness, with a wide variety of shrubs and herbaceous plants. Riparian and other aquatic sites such as streams, rivers, and springs support nesting, hiding cover and foraging habitat for northern harrier (*Circus cyaneus*), yellow-rumped warbler (*Setophaga coronate*), yellow warbler (*Setophaga petechial*), MacGillivray's warbler (*Geothlypis tolmiei*), lazuli bunting (*Passerina amoena*), Hammond's flycatcher (*Empidonax hammondii*), and Lewis's woodpecker (*Melanerpes lewis*). Well-vegetated riparian corridors provide breeding, denning, and hunting habitat for raccoon (*Procyon lotor*), Preble's meadow jumping mouse (*Zapus hudsonius preblei*), dwarf shrew (*Sorex nana*), long-tailed vole (*Microtus longicaudus*), and foraging habitat for Townsend's big-eared bat (*Corynorhinus townsendii*) and other wildlife species (aquatic species are discussed below). Refer to section 2.2.8, Wetlands and Riparian Resources, for more information about the existing condition of these vegetation cover types.

Cliffs and/or rocky areas are ecologically typical and exceptionally scenic features of the RGFO. Within the planning area, this habitat appears as high cliffs, rocky ledges, small rocky out thrusts, talus, stream cut-banks, bluffs, rim rock, and a few cliff buttes.. Rock complexes are inhabited by nesting cliff swallow (*Hirundo pyrrhonota*), white-throated swift (*Aeronautes saxatalis*), golden eagle (*Aquilachrysaetos chrysaetos*, American peregrine falcon (*Falco peregrinus*), and prairie falcon (*Falco mexicanus*), along with many other bird species. These areas also provide important escape terrain for large mammals such as bighorn sheep (*Ovis canadensis*), hunting habitat for mountain lion (*Puma concolor*), and bobcat (*Lynx rufus*), and denning habitat for small mammals such as ground squirrels, rabbits, and marmots. Numerous bat species roost, hibernate, and reproduce in rock crevices, caves, and mines across the planning area. Few management actions alter conditions of cliffs and rocky areas, and thus the baseline condition remains stable for these sites within the planning area.

Key fish and terrestrial wildlife species

Table 2.11 lists species of high priority for BLM management efforts due to their economic value, regulatory status, high public interest, or other qualities. Special status species are discussed in section 2.2.9.

Table 2.11. Species of Interest within the Royal Gorge Field Office Planning Area

Species or group	Reason for key designation
Birds	
Upland game birds	High interest; economic and recreational value
Migratory birds	High interest and protected by law
Raptors	High interest and protected by law
Mammals	
Rocky Mountain bighorn sheep (*Ovis canadensis*)	High interest; economic and recreational value
Black bear (*Ursus americanus*)	High interest; economic and recreational value
American elk (*Cervus canadensis*)	High interest; economic and recreational value
Mountain lion (*Puma concolor*)	High interest; economic and recreational value
Pronghorn (*Antilocapra americana*)	High interest; economic and recreational value
Bats	High interest

Upland game birds

In the shortgrass prairie portions of the planning area, ring-necked pheasant (*Phasianus colchicus*) and scaled quail (*Callipepla squamata*) are present. In the montane and subalpine areas of the planning area, wild turkey (*Meleagris gallopavo*) and dusky grouse (*Dendragapus obscurus*) are the most widely distributed upland game birds. Mourning dove (*Zenaida macroura*) occupies mainly lower elevation valleys and ecotones within the planning area. White-tailed ptarmigan (*Lagopus leucura*) is an uncommon species that was introduced into this planning area. It occupies subalpine and alpine tundra, but only where willow is abundant. The condition of dusky grouse and white-tailed ptarmigan habitats in the planning area is unknown.

The quality of upland game bird habitat in the planning area varies depending on the availability of mixed shrub and herbaceous vegetation for nesting, brood rearing, foraging, and thermal cover. Riparian habitat plays an important role as a source of food, water, and cover for most upland birds.

Migratory birds

In 2013, BLM published *BLM Strategic Plan for Migratory Bird Conservation* (IM 2013-119) and signed a 2010 MOU with the U.S. Fish and Wildlife Service for managing and conserving migratory birds. The intent is to comply with the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 USC 703), and Executive Order 13186. These documents identify the priority migratory bird species in the planning area within Partners in Flight physiographic areas that need to be considered during planning and analysis (Table 2.12). Consistently with the MBTA, this list includes native resident species and species that move across the planning area from north to south latitudes or between higher and lower elevations. Migratory birds identified as priority species of conservation concern in Colorado's *Land Bird Conservation Plan* (Beidleman 2000) are also included, if their range is within the RGFO planning area.

Table 2.12. BLM Priority Migratory Birds and Colorado Birds of Conservation Concern within the Royal Gorge Field Office Planning Area

Species	Associated vegetation in planning area	Important habitat in planning area	Physiographic area listed by Partners in Flight (PIF)
BLM priority migratory birds			
Black rosy-finch (*Leucosticte arctoa atrata*)	Alpine tundra	Winter	Not listed by PIF for this field office

Species	Associated vegetation in planning area	Important habitat in planning area	Physiographic area listed by Partners in Flight (PIF)
Brown-capped rosy-finch (*Leucosticte arctoa australis*)	Alpine tundra	Breeding, winter	62 Southern Rocky Mountains
Cassin's finch (*Carpodacus cassinii*)	Mountain riparian	Winter	Not listed by PIF for this field office
Cassin's sparrow (*Aimophila cassinii*)	Mountain grasslands	Breeding	36 Central Shortgrass Prairie
Horned lark (*Eremophila alpestris*)5	Shortgrass prairie	Breeding, winter	Not listed by PIF for this field office
Lark bunting (*Calamospiza melanocorys*)	Shortgrass prairie	Breeding	36 Central Shortgrass Prairie
Loggerhead shrike (*Lanius ludovicianus*)	Mountain grasslands	Breeding	Not listed by PIF for this field office
Swainson's hawk (*Buteo swainsoni*)	Mountain grasslands	Breeding	Not listed by PIF for this field office
Virginia's warbler (*Oreothlypis virginiae*)	Mountain riparian, mountain shrubs	Breeding	62 Southern Rocky Mountains
Williamson's sapsucker (*Sphyrapicus thyroideus*)	Mountain riparian, mixed conifer forest	Breeding	62 Southern Rocky Mountains
Colorado Partners in Flight and Land Bird Conservation priority birds			
American dipper (*Cinclus mexicanus*)	High elevation riparian	Breeding, winter	62 Southern Rocky Mountains
American pipit (*Anthus rubescens*)	Alpine tundra	Breeding, winter	62 Southern Rocky Mountains
Band-tailed pigeon (*Patagioenas fasciata*)	Ponderosa pine forest	Breeding	62 Southern Rocky Mountains
Bell's vireo (*Vireo bellii*)	Prairie lowland riparian	Breeding	36 Central Shortgrass Prairie
Black swift (*Cypseloides niger*)	Mountains, cliffs	Breeding	62 Southern Rocky Mountains
Boreal owl (*Aegolius funereus*)	Spruce-fir forest	Breeding, winter	62 Southern Rocky Mountains
Broad-tailed hummingbird (*Selasphorus platycercus*)	Aspen forest	Breeding	62 Southern Rocky Mountains
Cordilleran flycatcher (*Empidonax occidentalis*)	High elevation riparian	Breeding	62 Southern Rocky Mountains
Flammulated owl (*Psiloscops flammeolus*)	Ponderosa pine forest	Breeding	62 Southern Rocky Mountains
Grace's warbler (*Dendroica graciae*)	Ponderosa pine forest	Breeding	62 Southern Rocky Mountains
Grasshopper sparrow (*Ammodramus savannarum*)	Shortgrass prairie	Breeding	36 Central Shortgrass Prairie
Greater prairie-chicken (*Tympanuchus cupido*)	Shortgrass prairie	Breeding, winter	36 Central Shortgrass Prairie
Green-tailed towhee (*Pipilo chlorurus*)	Mountain shrubland	Breeding	62 Southern Rocky Mountains
Hammond's flycatcher (*Empidonax hammondii*)	Spruce-fir forest	Breeding	62 Southern Rocky Mountains
Lazuli bunting (*Passerina amoena*)	Mountain lowland riparian	Breeding	62 Southern Rocky Mountains
Lewis's woodpecker (*Melanerpes lewis*)	Prairie and mountain lowland riparian	Breeding, winter	36 Central Shortgrass Prairie & 62 Southern Rocky Mountains

MacGillivray's warbler (*Geothlypis tolmiei*)	High elevation riparian	Breeding	62 Southern Rocky Mountains
McCown's larkspur (*Calcarius mccownii*)	Shortgrass prairie	Breeding	36 Central Shortgrass Prairie
Northern harrier (*Circus cyaneus*)	Prairie wetland	Breeding, winter	36 Central Shortgrass Prairie
Olive-sided flycatcher (*Contopus cooperi*)	Spruce-fir forest	Breeding	62 Southern Rocky Mountains
Prairie falcon (*Falco mexicanus*)	Shortgrass prairie	Breeding	36 Central Shortgrass Prairie
Purple martin (*Progne subis*)	Aspen forest	Breeding	62 Southern Rocky Mountains
Red-naped sapsucker (*Sphyrapicus nuchalis*)	Aspen forest	Breeding	62 Southern Rocky Mountains
Short-eared owl (*Asio flammeus*)	Prairie & mountain wetland	Breeding, winter	36 Central Shortgrass Prairie
Upland sandpiper (*Bartramia longicauda*)	Shortgrass prairie	Breeding	36 Central Shortgrass Prairie
Violet-green swallow (*Tachycineta thalassina*)	Aspen forest	Breeding	62 Southern Rocky Mountains
Wilson's warbler (*Cardellina pusilla*)	High elevation riparian	Breeding	62 Southern Rocky Mountains
Source: Wickersham 2009			

Raptors

Diurnal raptors known to occur in the planning area include bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawks (*Accipiter cooperii*), American peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*) (eBird 2012), and American kestrel (*Falco sparverius*). Northern goshawk (*Accipiter gentilis*) was also observed in the planning area.

The nocturnal great horned owl (*Bubo virginianus*) occupies a variety of habitats in the planning area. Records show that northern pygmy owl (*Glaucidium gnoma*), flammulated owl (*Psiloscops flammeolus*), northern saw-whet owl (*Aegolius acadicus*), burrowing owl (*Athene cunicularia*), and long-eared owl (*Asio otus*) also occur in the planning area (eBird 2012). However, little is known about the status of owls or their habitats in the planning area, as there have been few nocturnal surveys for these species.

Cliffs, rocky outcrops, and large trees provide suitable nesting habitat for many of these raptor species, and prairies, meadows, shrubs, forests, riparian areas, and wetlands provide foraging grounds. Because they are top (or apex) predators on the food chain, the presence and breeding status of raptors are important indicators of overall ecosystem health within the planning area.

Burrowing owl

The burrowing owl is primarily found in shortgrass prairie and mountain parks, usually in or near prairie dog towns. The burrowing owl also uses well-drained steppes, deserts, prairies, and agricultural lands. The burrowing owl requires abandoned rodent burrows (typically prairie dog) for shelter and nesting. Abandoned prairie dog colonies eventually become unsuitable for burrowing owls due to the collapse of burrow systems.

According to USGS GAP GIS distribution models, suitable habitat for the burrowing owl may exist in the planning area, albeit in limited quantities (USGS 2011; eBird 2012). It is not known if habitat in the planning area is occupied or what the abundance of this species is within the planning area. There are no records of occurrence within the planning area, despite the existence of black-tailed prairie dog colonies. Few inventories for burrowing owl within the planning area have been implemented.

American peregrine falcon

In Colorado, the American peregrine falcon breeds on cliffs and rock outcrops at elevations of 4,500–9000 feet. In this planning area, this species most commonly chooses cliffs that lie within pinyon-juniper and ponderosa pine zones, but this choice probably depends on the nature and location of the cliffs rather than an attraction to these vegetation types. Cliff ledges that have a wide view and plentiful prey in the area are important attributes to nest selection. Most eyries (nest sites) are within a mile of water. The falcon hunts for small mammal and bird prey in adjacent open meadows, forested tree tops, around lakes and rivers, and in shrub steppe environments. Several active nesting sites have been documented within the RGFO, primarily in close proximity to the Arkansas River and other rocky riparian corridors. The RGFO planning area played a very important role in the recovery of American peregrine falcon that contributed to its current distribution and abundance elsewhere in Colorado and the U.S. (Craig and Enderson 2004).

Big game

The BLM manages many big game seasonal ranges within the planning area (Table 2.13). Definitions of ranges were developed by Colorado Parks and Wildlife. Overall range is defined as the area which encompasses all known activity areas within the observed range of a population. Production areas are the range pregnant females occupy during a specific period of spring. Winter concentration areas are that part of the winter range where animal densities are at least 200 percent greater than the surrounding winter range density during the same period used to define the winter range, in the average 5 winters out of 10. Winter range is defined as that part of the overall range where 90 percent of the individuals are located during the average 5 winters out of 10 from the first heavy snowfall to green-up. Severe winter range is defined as that part of the overall range where 90 percent of the individuals are located when the annual snow pack is at its maximum and/or temperatures in the area are at a minimum in the 2 worst winters out of 10.

Table 2.13. Acres of Big Game (Ungulate) Seasonal Ranges Managed by the Royal Gorge Field Office

Big game species	Overall range	Production area	Winter concentration area	Winter range	Severe winter range
Elk (*Cervus canadensis*)	529,934.36	24,295.90	70,661.77	384,892.27	144,693.53
Mule deer (*Odocoileus hemionus*)	664,915.37	N/A	141,329.03	520,436.86	262,664.19
Pronghorn (*Antilocapra americana*)	164,345.07	N/A	13,477.04	50,641.87	8,879.35
Rocky Mountain bighorn sheep (*Ovis canadensis*)	211,675.42	43,428.16	30,778.85	134,448.73	54,027.65
Source: CPW 2010 (acreages are approximate).					

American elk and mule deer

American elk and mule deer are the two most common big game species in the planning area. Several important American elk calving areas are located on BLM-managed lands. Lands administered by BLM in the upper Arkansas valley from Leadville to Salida provide winter range for elk. Calving and summer habitat occur near Jack Hall, Waugh Mountain, and the Sheep Mountains. The most important winter range in terms of elk herd size and the amount of BLM-managed lands is west of Black Mountain, northwest of Cañon City.

Mule deer occur throughout the planning area from the eastern foothills to the high mountain peaks. They inhabit virtually all vegetation types throughout the planning area; however, they are outcompeted for the best areas by American elk and domestic livestock. Mule deer habitat in the planning area varies considerably. Some habitats are in excellent condition with plenty of hiding cover, forage, and browse. Other areas, such as from northern Buena Vista south past Salida, are severely over-browsed, choked with encroaching pinyon pine and juniper trees, and have depauperate understories. Some areas are seeing a conversion from grass-and-forb-dominated understories to cactus-dominated understories, which is an indicator of overuse. In some locations, the poor condition of mule deer habitat in the planning area causes mule deer to congregate in large numbers on privately owned land. Mortality of mule deer along well-traveled roads, even remote roads in the planning area is common; however, it is unknown how this is affecting local mule deer population levels. Winters in the planning area are seldom severe, and heavy browse use rarely occurs in successive years, except as described above.

Bighorn sheep

Rocky Mountain bighorn sheep are common in the planning area because of reintroductions implemented by Colorado Parks and Wildlife, which have restocked almost all of the planning area's suitable historic habitats. Rocky Mountain bighorn sheep require areas with great sighting distances and rocky cliffs, which are used to escape from predators. However, pinyon pine and juniper encroachment in Rocky Mountain bighorn sheep lambing areas, rutting areas, winter range, and migration corridors is an issue throughout most of the planning area where this species resides. Noxious weed invasion in winter range is a big issue. Collaborative efforts with Colorado Parks and Wildlife created swaths for migration routes between suitable habitat patches for Rocky Mountain bighorn sheep in some occupied areas. Telemetry studies to help better understand habitat uses, population sizes and patterns of local herd along the Arkansas River east of Salida are in progress. The results of those studies are preliminary, but it appears that this local population is dependent upon the river, using the length of the river corridor but seldom moving up and down in elevation (Jamin Grigg, CPW terrestrial biologist, personal communication, April 7, 2015). Lamb recruitment appears to be low for some herds in the planning area. This species is very susceptible to disease.

Pronghorn antelope

Pronghorn occurs throughout the planning area in suitable habitats. The planning area encompasses the southeastern plains of Colorado where most pronghorn herds are located. Several herds are present in the open parks of the mountains, often using lands administered by the BLM. The condition of grasses in meadows where this animal congregates is unknown.

Other big game species

Although CPW also regulates population sizes of black bear, mountain lion, mountain goat, and moose, the status of the locally managed populations of these species is unknown. Ranges for

moose and mountain goat have very little spatial overlap into the planning area, so occurrence is incidental (Colorado Parks and Wildlife 2012).

Black bear (*Ursus americanus*) uses a wide variety of mountain vegetation types, including Gambel's oak patches, forested areas, meadows, and riparian areas. Black bear-human conflicts have been reported within the RGFO planning area (Colorado Parks and Wildlife 2012). None of the sites within the planning area that receive large quantities of human use and occupancy have preventative infrastructure on site, such as bear-resistant trash receptors or food storage lockers. Outreach and public education programs to prevent black bear-human conflicts have not been implemented by the RGFO.

Mountain lion (*Puma concolor*) distribution generally coincides with high densities and concentrations of mule deer, which is the lion's main prey. The exception is near well-traveled roads, where mule deer often congregate and mountain lions appear to avoid. Rocky areas and trees with large supporting branches provide mountain lions with excellent stalking tools used to surprise prey. Large boulders, cliffs, and rocky areas are ubiquitous in the mountainous portions of the planning area, and these provide secluded areas for mountain lion dens and food caches. Mountain lions are generalists, so the effects on mule deer from poor quality habitat in the planning area is unknown. CPW also reports mountain lion–human conflicts in the planning area (Colorado Parks and Wildlife 2012). These conflicts are more difficult to prevent, and outreach and public education programs in the planning area are lacking, with the exception of those provided by CPW.

Bats

In Colorado and the RGFO planning area, there is a lack of knowledge concerning the status and population biology of many bat species. There is greater knowledge and understanding regarding habitat requirements of many bat species that occur in the planning area. Where bachelor roosting habitat is located, in particular, is poorly understood. Maternity roosts are better understood. Thirteen of Colorado's 18 species of bats are known to use caves and abandoned mines as roost sites. However, bat species also use habitat beyond abandoned mines, including crack and crevice habitat, trees, and human-made structures.

The numerous rocks, cliffs and trees in the RGFO planning area provide excellent roosting, foraging, hibernation, and maternity habitat for many bat species. Perennial rivers and intermittent streams provide water for bats. Some artificial water sources in the planning area were designed with wildlife ramps, which provide bats with another source of drinking water. Large rivers, some wider open streams, and open woodlands, meadows, grasslands and agricultural areas provide the best foraging habitats, especially for larger bat species. However, there are numerous forest and woodland sites in the planning area that are too dense to provide good forage habitat for bats. Forested stands with older trees and cracked or shredded bark are important solitary roost sites for a handful of bat species.

White-nose syndrome (WNS) is a new emerging fungal disease of North American bat species that appears to have originated from Europe where white fungal growth has been described since the early 1980s. Since 2006, experts estimate that approximately 6 million hibernating bats in the northeastern United States have been found dead, most with signs of a white fungal infection (recently identified as *Pseudogymnoascus destructans* or Pd) on the nose and wings (USGS 2015). Because no other disease or environmental factors have been identified, the working assumption is that Pd is the primary pathogen causing these bat die-offs. The fungus does not cause death in the bats outright, but rather it causes irritation that results in bats being aroused

more often, which causes abnormal depletion of fat reserves and starvation during hibernation. Aroused bats fly out of the caves during unfavorable conditions—often in winter, deplete their energy reserves, and die. Additionally, WNS can cause severe tissue damage on the wings of bats, increasing the likelihood of mortality among infected bats. WNS has not been shown to infect other wildlife or domestic animal species or humans.

Based on infection patterns observed to date elsewhere and hibernation requirements of more than half of all North American bat species, many of Colorado's hibernating native bat species spatially overlap with known infection sites (USGS 2015). This spatial overlap is believed to make many bat species susceptible to WNS infection. Continual spread of WNS into other areas has the potential to affect large numbers of individual bats. At the current time, WNS has spread as far west as Missouri. The USGS, USFS, BLM, CPW, other agencies and local bat working groups are closely monitoring known hibernacula and maternity roosts in and outside of the planning area for signs of WNS. External and internal cave, swarming, and mist-netting surveys of known cave sites has increased, mainly outside of the planning area and elsewhere in Colorado, as a response to concerns regarding WNS. There is a need to collect baseline information in the planning area regarding bat species present, hibernacula, and maternity roosting sites, and to monitor for signs of WNS.

Pollinators

In the past few years, the BLM has paid increasing attention to pollinators and the role they play in providing ecosystem services. Pollinators include not only insects such as bees, butterflies, moths, and flies, but also vertebrates such as hummingbirds, bats, and small mammals. The BLM is adding specialist pollinators and insects to special status species lists in many portions of the west; however, identification, population inventory, and monitoring overall need more attention, especially within the RGFO planning area. The BLM has an MOU with the Pollinator Partnership for pollinator conservation. The existing condition for pollinators within the RGFO is unknown at this time, but common vertebrate pollinators, such as the broad-tailed hummingbird, fringed mytois, and Townsend's big-eared bat are either migratory birds of concern or listed as BLM sensitive species due to declined population trends (see section 2.2.9). Many threatened, endangered, BLM sensitive, rare, and endemic plants depend on pollinators for their continued viability in the planning area (Culver and Lemly 2013).

2.2.5.3. Trends

Trends in wildlife populations

For the purpose of managing big game populations, Colorado Parks and Wildlife divided the State into data analysis units (DAUs) and game management units (GMUs). A DAU is a unit of land that provides needs for big game year around. The GMU is a smaller area within the DAU and aids in administration of the State hunting license program. The administrative boundary of the RGFO encompasses many DAUs for several species; however, the RGFO is the major land manager of few. American elk populations typically exceed management objectives, and mule deer populations typically fall short of CPW population targets for DAUs in the planning area (Tables 2.14 to 2.17). If winters are mild, and hunting regulations and habitat management are effective, populations that exceed objectives are expected to become smaller and more in balance with available habitat, while those that fall below targeted levels are likely to increase.

Table 2.14. 2011 American Elk Population Objectives Set by Colorado Parks and Wildlife

DAU	Population objective	2011 post-hunt population estimate	Acres	BLM surface acres	Percent BLM
E-4	3,600-4,200	4,140	989,703.56	813.57	0.08
E-9	2,200-,2600	2,470	771,721.10	1,012.87	0.13
E-17	3,150-3,850	2,870	608,948.29	24,195.05	3.97
E-18	1,800-2,200	2,330	744,345.50	33,973.15	4.56
E-22	3,150-3,500	3,340	1,076,508.28	223,447.07	20.76
E-23	2,700-3,300	2,780	1,241,211.44	140,978.35	11.36
E-27	1,450-1,650	1,490	609,466.05	121,121.00	19.87
E-28	1,400-1,600	1,980	1,005,810.06	38,308.22	3.81
E-33	14,000-16,000	10,630	2,125,615.38	29,474.81	1.39
E-38	1,000-1,400	1,250	573,764.95	3,943.12	0.69
E-39	2,500	2,390	641,719.44	312.21	0.05
E-51	N/A	1,660	3,204,080.98	39.67	0.00
E-53	N/A	590	1,484,832.58	2,908.24	0.20
Total			15,077,727.63	620,527.30	4.12

Source: Colorado Parks and Wildlife elk population objectives, 2011 post-hunt population estimates, and Bureau of Land Management surface acres for data analysis units (DAUs) located within the Bureau of Land Management, Royal Gorge Field Office planning area (acreage values are approximate). Available online: http://cpw.state.co.us/thingstodo/Pages/HerdManagementPlans.aspx.

Table 2.15. 2011 Mule Deer Population Objectives Set by Colorado Parks and Wildlife

DAU	Population objective	2011 post-hunt population estimate	Acres	BLM surface acres	Percent BLM
D-4	10,000-12,000	7,960	989,703.56	813.57	0.08
D-5	2,400-2,700	2,500	2,578,610.89	309.09	0.01
D-10	N/A	4,970	771,721.10	1,012.87	0.13
D-15	6,300-7,700	4,400	608,948.29	24,195.05	3.97
D-16	16,000-20,000	10,450	1,516,846.86	322,655.94	21.27
D-17	7,500-8,300	6,520	963,437.45	312.21	0.03
D-27	6,000-7,500	7,500	573,764.95	3,943.12	0.69
D-28	N/A	7,780	4,808,361.03	11,614.66	0.24
D-32	9,800-10,800	4,630	800,664.22	19.39	0.00
D-33	N/A	1,890	1,324,951.16	29,455.42	2.22
D-34	16,500-17,500	7,730	1,051,156.45	522.29	0.05
D-38	N/A	2,660	1,615,276.12	159,429.21	9.87
D-44	3,500-3,800	3,690	744,345.50	33,973.15	4.56
D-45	N/A	7,440	1,077,804.75	961.33	0.09
D-46	N/A	4,180	3,003,183.00	19,781.21	0.66
D-47	N/A	5,780	2,717,546.12	2,771.61	0.10
D-48	N/A	1,640	1,645,544.88	241.40	0.01
D-49	5,500-6,500	5,890	2,306,779.01	11,964.00	0.52
D-50	4,000-5,000	3,930	800,872.87	41,769.47	5.22
D-54	2,900-3,100	3,160	3,866,491.92	399.20	0.01
D-55	1,900-2,100	2,080	911,166.46	120.66	0.01
Total			34,677,176.58	666,264.84	1.92

Source: Colorado Parks and Wildlife deer population objectives, 2011 post-hunt population estimates and Bureau of Land Management surface acres for data analysis units (DAUs) located within the Bureau of Land Management, Royal Gorge Field Office planning area (acreage values are approximate). Available online: http://cpw.state.co.us/thingstodo/Pages/HerdManagementPlans.aspx.

Table 2.16. 2011 Pronghorn Population Objectives Set by Colorado Parks and Wildlife

DAU	Population objective	2011 post-hunt population estimate	Acres	BLM surface acres	Percent BLM
PH-1	6,500-7,500	7,130	3,410,855.11	699.41	0.02
PH-2	1,400-1,600	1,490	1,734,661.88	120.06	0.01
PH-4	550-650	580	3,042,996.50	399.80	0.01
PH-5	2,400-3,000	4,670	1,800,987.98	8,119.90	0.45
PH-6	2,250-2,750	3,520	919,578.69	0.00	0.00
PH-7	7,800-8,800	6,910	2,932,148.62	19,782.34	0.67
PH-8	5,400-6,600	7,790	2,306,779.01	11,964.00	0.52
PH-12	1,100-1,350	2,210	2,140,496.55	4,070.60	0.19
PH-13	1,400-1,700	3,310	2,693,902.50	1,966.59	0.07
PH-18	300-500	1,000	1,488,737.68	728.16	0.05
PH-19	N/A	2,240	1,926,233.87	304.06	0.02
PH-20	N/A	2,010	2,646,685.99	188,844.16	7.14
PH-30	1,100-1,200	1,020	2,492,917.99	356,750.38	14.31
PH-31	N/A	240	551,522.67	41,648.18	7.55
PH-33	1,100-1,200	1,330	438,764.68	748.56	0.17
PH-35	4,000-5,000	4,480	1,982,477.90	0.00	0.00
PH-39	N/A	130	527,107.38	19,159.90	3.63
Total			33,036,854.99	655,306.08	2.12

Source: Colorado Parks and Wildlife pronghorn population objectives, 2011 post-hunt population estimates, and Bureau of Land Management surface acres for data analysis units (DAUs) located within the Bureau of Land Management, Royal Gorge Field Office planning area (acreage values are approximate). Available online: http://cpw.state.co.us/thingstodo/Pages/HerdManagementPlans.aspx.

Table 2.17. Rocky Mountain Bighorn Sheep 2012 Post-Hunt Population Estimates Set by Colorado Parks and Wildlife

DAU	2012 Post-hunt estimate	Acres	BLM surface acres	Percent BLM
RBS-1	150	507,067.14	594.41	0.12
RBS-2	180	801,175.78	1,033.53	0.13
RBS-3	290	271,622.97	1,316.08	0.48
RBS-4	200	413,380.22	234.34	0.06
RBS-5	310	833,822.22	63,475.49	7.61
RBS-6	135	512,010.76	733.06	0.14
RBS-7	50	268,804.26	77.87	0.03
RBS-8	135	333,756.95	44,087.33	13.21
RBS-9	475	1,082,486.60	270,346.65	24.97
RBS-10	330	963,852.99	16,244.01	1.69
RBS-11	70	510,232.46	5,035.13	0.99
RBS-12	435	842,941.43	16,100.16	1.91
RBS-14	80	93,104.80	0.00	0.00
RBS-15	235	856,977.72	44,021.74	5.14
RBS-16	25	854,312.49	2,541.47	0.30
RBS-17	305	1,818,354.71	978.20	0.05
RBS-18	650	1,331,349.71	10,878.22	0.82
RBS-19	80	241,483.83	94,774.99	39.25
RBS-39	50	124,855.81	0.00	0.00

DAU	2012 Post-hunt estimate	Acres	BLM surface acres	Percent BLM
Total		12,661,592.86	572,472.71	4.52

Source: Colorado Parks and Wildlife bighorn sheep 2012 post-hunt population estimates and Bureau of Land Management surface acres for data analysis units (DAUs) located within the Bureau of Land Management, Royal Gorge Field Office planning area (acreage values are approximate). Available online: http://www2.cde.state.co.us/artemis/nrserials/nr681internet/nr6812012internet.pdf.

Although data are lacking, other non-game populations, including fur-bearers, small mammals, and reptiles, are assumed to be stable.

Upland game birds

In shortgrass prairie portions of the planning area, mourning dove shows a stable population trend in Colorado (Partners in Flight Science Committee 2012). In shortgrass prairie, *Colorado Breeding Bird Atlas* (Kingery 1998) states that inadequate cover and food sources are having a negative effect on nesting, brood rearing, foraging and thermal cover for ring-necked pheasant and scaled quail. Population trends for scaled quail show a slight increase, while ring-necked pheasant shows a moderate decline in Colorado (Partners in Flight Science Committee 2012; Kingery 1998). In wild turkey habitats in the planning area, juniper encroachment is ubiquitous. In these situations, this encroachment converts productive, moist sites needed for wild turkey reproduction and foraging to dry, depauperate sites. Wild turkey shows a population increase in Colorado, even though within the planning area, juniper encroachment is widespread throughout its range (Partners in Flight Science Committee 2012; Kingery 1998). White-tailed ptarmigan and dusky grouse show an uncertain or stable population trend in Colorado.

Migratory birds

A number of migratory bird and neotropical passerine populations are declining in Colorado and across the planning area (Partners in Flight Science Committee 2012; Sauer et al. 2014). From the list of migratory birds in Table 2.12 above, the following species are trending toward a small increase in population within the Southern Rocky Mountains in Colorado: Cordilleran flycatcher, green-tailed towhee, Hammond's flycatcher, MacGillivray's warbler, prairie falcon, violet-green swallow, and Williamson's sapsucker (Partners in Flight Science Committee 2012). In the same physiographic area in Colorado, the following species show a stable or uncertain population trend: American dipper, American pipit, band-tailed pigeon, Bell's vireo, black rosy-finch, black swift, boreal owl, brown-caped rosy-finch, Cassin's sparrow, flammulated owl, golden eagle, Grace's warbler, grasshopper sparrow, McCown's longspur, northern goshawk, northern harrier, purple martin, Swainson's hawk, and Virginia's warbler.

The following species show a moderate decrease in population in the Southern Rocky Mountains in Colorado: broad-tailed hummingbird, horned lark, lark bunting, lazuli bunting, Lewis's woodpecker, loggerhead shrike, olive-sided flycatcher, and Wilson's warbler (Partners in Flight Science Committee 2012). Cassin's finch shows a statistically significant large decrease in population in this area.

In the shortgrass prairie physiographic area in Colorado, the population trends for migratory bird species are as follows: golden eagle, loggerhead shrike, McCown's longspur and Swainson's hawk have a small population increase; Bell's vireo, broad-tailed hummingbird, Cassin's finch, Cordilleran flycatcher, green-tailed towhee, lazuli bunting, Lewis's woodpecker, prairie falcon, purple martin, violet-green swallow, Virginia's warbler, and Hammond's flycatcher show a stable or unknown population trend (Partners in Flight Science Committee 2012). Cassin's sparrow and

northern harrier show a moderate decreased population trend. Grasshopper sparrow, horned lark, and lark bunting show a statistically significant large population decrease.

Raptors

In Colorado, flammulated owl and northern saw-whet owl show unknown or stable population trends, great horned owl and northern pygmy owl show a possible small increase in populations, whereas burrowing owl and long-eared owl show a moderate decrease in population (Partners in Flight Science Committee 2012). In the shortgrass prairie in Colorado, burrowing owl shows a stable or uncertain population trend. In Colorado, short-eared owl shows a steep decline in population. It is not known how these statewide results translate to the planning area.

Bald eagle, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, ferruginous hawk, and prairie falcon all show large population increases in Colorado (Partners in Flight Science Committee 2012). Northern goshawk shows unknown or stable population trend in the state, while northern harrier and American kestrel show moderate to possibly large declines in population. American peregrine falcon shows a stable or uncertain population trend in the Southern Rocky Mountains in Colorado (Partners in Flight Science Committee 2012). Surveys for diurnal raptors in the planning area span several years; however, the data were collected intermittently, so the data on their populations or habitats in the planning area are inconclusive.

Big game

Increasing numbers of humans are exerting pressure on mule deer in winter range habitat, as those areas tend to be popular for a variety of recreational uses. Conflicts between managing for mule deer winter range and solitude and managing for recreation use are increasing. In many portions of the State, within black bear range, black bear-human conflicts are on the rise, which often results in lethal management of black bear (Baruch-Mordo, Breck,Wilson, and Theobald 2008).

Trends in habitat quality

Wildlife diversity and abundance typically reflect the diversity, quality, and quantity of habitat. In general, the condition and quality of breeding, foraging, resting, roosting, and hiding cover habitats for many birds and mammals in some portions of the planning area have declined over time. In other portions of the planning area, the quality of various wildlife habitats are in stable or decent condition. Management actions are causing intentional improvements to various wildlife habitats. Examples include livestock exclosures along damaged riparian areas, tree removal in Rocky Mountain bighorn sheep migration corridors and winter range for mule deer, noxious weed treatments, reseeding, prescribed burns, acquisition of lands containing important habitat, flow manipulations to important riparian areas and reservoirs, road closures, changes in motorized use seasons, installation of road and trail markers, trail re-routes, fence construction, pinyon pine and juniper removal and thinning, installation of bat grates, and modifications of timing and numbers of authorized livestock grazing regimes. The quantity of acres of habitat improved by these measures, however, pales in comparison to the need that still exists.

Possible causes of poor wildlife habitat conditions include conversion of native vegetation to agricultural uses, historic overgrazing, noxious weed infestations, pinyon-juniper encroachment, changes in natural disturbance regimes, and increased recreational use, including quantity of use, types of use, and geographic areas used (Kingery 1998). The effects of habitat condition and improvement vary for each wildlife species of interest. Degraded habitats make it difficult

for wildlife species to cope with or resist climate fluctuations, large disturbances, and invasive, non-native, and noxious species.

All current livestock grazing allotments have been assessed using the land health methodology (BLM 1997). Portions of each landscape were found to be meeting, meeting with problems, or failing to meet land health standards. The following is a summary of the most common conditions observed in some portions of the planning area, along with the effect those conditions have on wildlife species:

Low percent canopy cover by perennial cool season and warm season grasses and forbs

Percent canopy cover of desirable native grass and forb species is lower than expected in many portions of the planning area for that particular site's ecological potential. This condition is most evident at drier, low-elevation sites in the planning area. These sites appear to sustain heavier concentrations of grazing wildlife and livestock, which further reduces palatable native grasses and increases cover of non-desirable plants. Among other benefits, healthy stands of native perennial grasses and forbs provide essential hiding and breeding cover and forage for a variety of wildlife species. In some ecological sites however, bare mineral soil or large interspatial gaps between bunchgrasses are important and appropriate features that provide nesting strata for some ground-nesting birds. High forb cover is a very important source of food for a variety of birds, small and large mammals, and pollinators. A site with low forb cover is considered a degraded site for many but not all wildlife species.

Low plant species diversity

Plant species diversity is lower than expected for some portions of the planning area relative to that particular site's ecological potential. This condition is often observed in connection with other symptoms, such as weed occurrences, over grazing, and over browsing, etc. In many ecological sites, high plant species diversity, or heterogeneous habitats, are more resilient to disturbances, more productive, and provide habitat for a greater number of wildlife species and individuals than uniform or homogenous plant communities provide.

In some ecological sites, however, low plant species diversity is appropriate and provides important features to wildlife species adapted to that condition. Vegetation patch size, shape, and juxtaposition across a landscape are important characteristics that affect multiple species. High forb and cool-season bunch grass diversity is a very important characteristic for many wildlife species, providing food and pollination sources, hiding cover, breeding substrate, and biodiversity. High shrub or tree species diversity is important for wildlife residing in those ecotones, but generally at landscape scales, homogeneity of these vegetation strata is also important for wide-ranging wildlife species. In contrast, sites with low plant species diversity are considered degraded for many but not all wildlife species.

Low seral-stage diversity

Seral stage refers to a specific period in linear secondary succession, of the dominant plant, plant assemblage, or patch. Generally, four seral stages are recognized: 1) early seral, 2) mid seral, 3) late seral, and 4) potential natural vegetation community. Seral stage influences the vertical and horizontal structure, species composition, and resiliency of vegetation as well as the diversity of wildlife assemblages present. Thus, the desired condition is to have a variety of seral stages for a given vegetation cover type across the larger landscape.

For some vegetation cover types, it is very appropriate to have large patches all in the same seral stage. In the planning area, many forest stands and shrub patches are in the late seral stage due to altered disturbance regimes. In contrast, many grasslands and meadows are continuously in an early seral stage due to heavy use by native wildlife species and livestock, large landscape fires, and a variety of human induced disturbances. Wildlife species in the planning area may be suffering lower population levels, loss of breeding, foraging, roosting/perching, migration and hiding cover habitats as a consequence.

Low vegetation age-class diversity

Some sites in the planning area are dominated by an even-aged stand of vegetation (such as big mountain sagebrush), with very little recruitment of younger age classes. For some vegetation types, such as lodgepole pine, this condition is very appropriate. Age-class diversity within patches for other vegetation cover types is typically more resilient to environmental disturbances and provides more suitable habitat for a greater number of wildlife species than even-aged stands of vegetation. Age-class diversity also indicates that vegetation reproduction and/or recruitment is occurring, leading to good land health. Many wildlife species are dependent upon certain age classes in vegetation cover, or a variety of vegetation age classes. Low age-class diversity results in a loss of habitat for some wildlife species, and future loss of wildlife habitats if that vegetation condition declines due to lack of recruitment or seed source.

Excessive weeds and/or threat of invasion

Weeds, exotic annuals, and noxious plant species are at moderate to high levels in some portions of the planning area, including undisturbed sites, which is atypical. In some cases, weed cover occurs at a level that poses an invasion risk, should a major disturbance (such as fire or drought) occur. Exotic and noxious weeds often displace native vegetation, typically resulting in degraded or unsuitable habitat for most native wildlife species that are closely associated with native grasses and forbs, such as birds, pollinators, insects and small mammals.

Pinyon-juniper encroachment

Within the planning area, pinyon pine and juniper trees are expanding beyond their known historical range, increasing canopy cover, and filling in gaps. This encroachment renders sites unsuitable for many wildlife species, because it alters the hydrologic cycle, reduces mid-story and understory plant cover, and changes the understory plant species composition. Substantial effects to wildlife species populations are reported across Colorado and the West due to this trend.

Habitat fragmentation, degradation, and loss

Road expansion, recreation, agriculture, and residential development are increasing habitat fragmentation and degrading some habitats by introducing weeds in some portions of the planning area. Human-caused disturbances may negatively impact one wildlife species, such as those that require solitude or avoid humans, and benefit another, such as generalists or those that are perceived as nuisance species.

Over-browsed shrubs and trees

Abnormal growth form, hedging, poor leader growth, high or conspicuous browse-line heights on shrubs and deciduous trees, and similar vegetation conditions are known to occur in the planning area. These vegetation conditions indicate overuse by wildlife and/or livestock. This condition is most evident where big game and livestock use spatially overlap, and where recreation pressures

or severe winters are concentrating big game in confined areas. Wild ungulates in particular have the ability to cause dramatic shifts in vegetation growth forms and species composition, which indirectly can affect birds, small mammals, and other wildlife taxa. This condition may indicate an imbalance between big game numbers, livestock stocking rates, animal distribution, human uses, and the capacity of that particular landscape to support these various competing population levels.

Poor vigor of shrubs

Decadent plants, dead plants, poor leader growth, and marginal seed production in shrubs are observed in some areas within the planning unit. These conditions are often observed in association with heavy browsing and foraging behaviors by grazing animals. The health and persistence of native shrubs is critical to provide essential cover, food, and structural diversity for multiple wildlife species, but especially migratory birds.

Loss and/or degradation of crucial habitats

Impacts from development, weeds, recreation, and other activities are believed to be resulting in short or long-term loss or degradation of crucial habitats such as big game severe winter range and production areas within the planning area.

Landscape and habitat connectivity problems

Roads, fences, trails, rangeland conversions, and other human developments may be impeding or preventing animal movement and migration in the planning area. These effects will be analyzed in detail during project level planning and travel management planning.

Declining wildlife populations

Wildlife populations (such as neotropical migratory birds) may be declining in size in the planning area, or at risk of declining at larger scales.

Overabundance or unwanted growth of wildlife populations

Some native wildlife species may be exceeding habitat carrying capacity or management objectives, contributing to site degradation within the planning area. Overpopulation of native wildlife may be inferred from both habitat condition and utilization indices—such as overbrowsing or hedging of shrubs, scat, and weed proliferation—and big game herd harvest/population data collected by CPW (see Tables 2.14–2.17).

2.2.5.4. Forecast

With focused and collaborative management over time, sites within the planning area that serve as important wildlife habitat that are currently not meeting standards would be expected to improve. However, some degraded areas, such as those dominated by noxious weeds, may continue in their present condition or become worse if a variety of management actions are not implemented in due time.

These vegetation changes would affect habitats for some wildlife species, and could in turn affect the composition and size of wildlife assemblages in the planning area, but probably at localized spatial scales. The magnitude and duration of these effects would vary for each species. The populations and habitat of more common wildlife species would be expected to remain relatively stable, while some generalist species may see an increase in population size. Small populations,

rare wildlife species, or specialists, and their habitats would be at higher risk of decline in the planning area. As demand for resource values increases, these trends would likely continue into the future.

Oil and gas, coal, solar, and other energy-related projects are expected to exert continued pressure on wildlife populations and their habitats in the planning area. Other uses such as livestock grazing, water use, realty actions, and recreation may also have negative impacts. To some extent, trends such as drought and disease are a result of natural factors, which may be beyond the control of management, but cumulative effects from these and other stressors mentioned above may result.

2.2.5.5. Key Features

The BLM-RGFO will continue to focus management and conservation efforts on key wildlife species and their habitats. Colorado Parks and Wildlife has identified several crucial habitats for elk, deer, and other big game species in the planning area, including production areas, movement corridors, summer and severe winter range, and others. Changes in these types of habitats, such as loss or degradation of habitat, fragmentation, or disturbance during crucial seasons, could have a disproportionate effect on populations by reducing carrying capacity during critical periods.

Data on raptor nest locations and status in the planning area are limited, although efforts are being made to improve this knowledge base. Nests and crucial habitat for raptors will continue to be priority areas for conservation. Furthermore, migratory birds and, in particular, species of conservation concern would continue to be monitored across the planning area, and conservation measures would be implemented as necessary for compliance with the Migratory Bird Treaty Act and BLM regulations. Key vegetation cover types that are identified for restoration and/or conservation because of the association with wildlife species of interest include shrublands, pinyon-juniper stands, riparian corridors and other types aquatic environments, aspen stands, and cliff and cave features.

2.2.6. Aquatic Wildlife

2.2.6.1. Indicators

Indicators of good condition aquatic wildlife habitat include the following:

- Conditions are not affected by upland area activities, and wetland habitats are not receiving upland areas chemicals or soil deposition beyond natural rates.
- Vegetation within the riparian/wetland zone is dominated by an appropriate mix of native or introduced species that support situationally appropriate aquatic habitat stability.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density to keep riparian areas functional, supporting flowing water aquatic habitat.
- Stream bank vegetation is present and is composed of species and communities that have root systems capable of withstanding high-flow events. In wetlands, vegetation is present to dampen wind and wave action.

- Streams are in balance with the water and sediment being supplied by the watershed (i.e., no head cutting; no excessive erosion or deposition).
- An active floodplain is present where appropriate and side channels provide a variety of microhabitats.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energy, creating instream habitat stability.
- Stream channels have appropriate size and meander patterns for the stream's position in the landscape, and the stream bed is made up of appropriate materials.
- Woody debris contributes to the character of the stream channel morphology.
- Water quality is improved or maintained as it flows through public land riparian and wetlands, and stable soils store and release water slowly.

2.2.6.2. Current Condition

Aquatic wildlife habitat aligns closely with riparian and wetland resources (see also section 2.2.8, Wetlands and Riparian Resources), in that wetlands are generally present with open water aquatic habitat. However, seasonal puddles, infrequently ponded areas, sheet water from snowmelt, etc., can be valuable temporary habitat for some species where wetland plants or conditions do not develop. Aquatic wildlife of some life stage occupies virtually all the wetland and riparian types discussed in section 2.2.8 that will be listed in the RMP. Some areas are also known fisheries, with some popular for angling, or are occupied by herpetofauna known regionally and likely to be present (Hammerson 1999). Fisheries will also be listed in the RMP because of their importance to Colorado's instream flow program, recreation, etc. Most public land in the RMP planning area is in Fremont, Chaffee, Lake and Park Counties where leopard frogs, choir frogs, Woodhouse's toads, tiger salamanders, and garter snakes are the most likely to occur, but there are also public lands within other counties where a broader range of species can occupy aquatic habitats.

Also occupying aquatic habitats are prolific aquatic macroinvertebrate communities that are important to the food webs of both aquatic and terrestrial animals in their aquatic or emergent life stages. Regionally famous hatches of certain macroinvertebrates draw anglers to public lands in pursuit of fishing opportunities. Much of the aquatic habitat occurring on public lands is also a public water supply (see "Water quality" in section 2.2.4.1). The primary aquatic habitat central to the RGFO is the Arkansas River. Approximately 40 percent of the river is in public ownership for the length between its headwaters and the Pueblo Reservoir. Well-described in previous studies (Smith and Hill 2000), the popular fishery of the Arkansas River has mostly brown trout, but it also has a rebounding rainbow trout fishery that declined after the 1996 RMP due to whirling disease. The Arkansas River fishery recently (2014) achieved status as one of Colorado's "gold medal waters." Gold medal water status is reserved for select waters that have attained a specific density of trout along with a substantial portion of larger fish. Arkansas River tributaries yield the next most aquatic habitat managed under the jurisdictional area to be covered under the RMP.

The South Platte Basin, primarily in South Park, also has substantial aquatic habitat and wetlands managed by the RGFO, including man-made lakes, stream segments, alpine bogs, fens, and infrequently filled playas. Mineral estate (split estate) management obligations extend the footprint area for aquatic wildlife habitat protection to some limited degree. Sensitive or special status species of aquatic wildlife are discussed in section 2.2.9, Special Status Species. A few

popular stream fisheries have declined or died out due to drought since the 1996 RMP, but these would hopefully recolonize if there were an increase in annual precipitation, or they could be restocked. Some eastern plains reservoir fisheries (public land managed by CPW and others) have dried out completely or nearly during extended droughts.

Public lands managed under cooperative agreements and recreation and public purpose (R&PP) leases are discussed in further detail in section 2.3.11, Rights-of-Way and Land Use Authorizations. Changes to water management practices may keep some locations from ever being viable fisheries again. A few smaller streams are benefitting from beaver colonization because of the stability that ponded water can bring to a small stream system.

2.2.6.3. Trends and Forecast

The trends and likely future conditions that are important to consider when discussing future aquatic habitat and wildlife management considerations for Colorado, east of the Continental Divide, are as follows (Hammerson 1999; Smith and Hill 2000):

- Angling in popular fisheries is increasing, and raft fishing on the Arkansas is increasing.
- Instream activity related to gold prospecting is increasing (see also section 2.2.8). Numerous locations along streams throughout the field office have eroded riparian areas with resulting siltation and visual scars.
- Extended drought and related recent changes in water management are affecting some fisheries and likely will in the future. Future water withdrawals could also affect some aquatic habitats.
- Whirling disease has altered certain fisheries and will continue to affect some populations.
- The introduction of aquatic nuisance organisms into waters of the State is an increasing concern, as certain species are found in areas adjacent to or on public land (e.g., Eurasian milfoil, bullfrogs).
- Increasing development within some areas is changing native infiltration rates, resulting in heightened storm peak flows and reduced base flows.
- Beaver colonization is expanding regionally on public lands and is improving some aquatic habitats, but beaver interaction with infrastructure may create issues, for example, by submerging road segments under ponded water.
- Pending water development and future changes or activities in regional water management for specific water projects at locations such as Blue Heron, Hayden Ranch/Box Creek Reservoir, Cucharas Reservoir, Clear Creek Reservoir, Southern Delivery System expansion, Birdeye Gulch development, DeWeese Reservoir, Oil Creek, and Park Center may alter fisheries or aquatic habitat.
- A national weed EIS (BLM 2007c) and an RGFO weed treatment EA (DOI-BLM-CO-2010-0075 EA) have been completed since the last RMP, but funding and staff limitations restrict the ability of the BLM to prevent weeds from spreading into aquatic habitat (see also section 2.2.8).
- Adaptive management triggers that more appropriately consider drought conditions need to be developed for land uses where aquatic habitat is involved.

- BLM aquatic habitat is increasingly discussed by stakeholders in large cooperative regional initiatives such as the Statewide Water Supply Initiative (SWSI), Colorado Water Plan (http://cwcb.state.co.us/water-management/water-supply-planning/pages/swsi2010.aspx) and regional basin roundtables, or source water protection plans. Groups external to the BLM set goals and objectives for important statewide resources. The RMP must identify the overlap between stakeholder efforts and the BLM's objectives for aquatic resource management within the RGFO.

- The BLM has instream flow data for most RGFO fisheries, but the BLM may not have the resources to continue adequately monitoring instream flows (see discussion on water rights in section 2.2.4).

2.2.6.4. Key Features

The BLM-RGFO will continue to focus management and protection efforts on the Arkansas River corridor to sustain aquatic and associated riparian habitat to the benefit of the regionally important trout fishery and obligate riparian wildlife species associated with the river. Additionally, flow protection strategies will continue to be a priority when working with water development interests, so that flow management will account for important aquatic habitat within the Arkansas Basin on tributaries and on the main-stem of the Arkansas River. Where appropriate opportunity exists, watershed health improvement efforts will continue in areas where there are historic scars on the land, poor water cycles, or eroding gullies and draws. Road impairments will be addressed to restore erosion to more natural rates. The Arkansas River has well-known episodes of periodic, turbid runoff that drains cumulatively from numerous areas in the basin. Inventory of smaller, more isolated aquatic habitats will continue to be a priority, and this will determine whether aquatic species habitat is in need of improved management.

2.2.7. Vegetation

2.2.7.1. Indicators

Vegetative communities are complex and interdependent groups of plant species that capture energy, cycle nutrients, fix carbon, and influence the atmosphere, water, and soil. They are a critical component of, and contribute valuable services to, a healthy ecosystem. Healthy communities are self-perpetuating and resilient to change. In addition, they provide for many of the more commonly recognized resource uses and values on public lands, including livestock grazing, wildlife habitat, recreation, and scenic qualities. Healthy, productive plant 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 the population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes.

The following indicators for evaluating the health of vegetative communities were identified in *Standards for Public Land Health and Guidelines for Livestock Grazing Management* (BLM 1997).

- Noxious weeds and undesirable species are minimal in the overall plant community.

- Native plant communities are spatially distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.
- Plants are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations.
- Landscapes exhibit connectivity of habitat or presence of corridors to prevent habitat fragmentation.
- Photosynthetic activity is evident throughout the growing season.
- Diversity and density of plant species are in balance with habitat/landscape potential and exhibit resilience to the effects of human activities.
- Appropriate plant litter accumulates and is evenly distributed across the landscape.
- Landscapes are composed of several plant communities that may be in a variety of successional stages and patterns.

The following indicators relate to riparian and wetland vegetation:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Stream bank vegetation is present and is comprised of species and communities that have root systems capable of withstanding high stream flow events.
- Plant species present indicate maintenance of riparian moisture characteristics.
- Stream is in balance with the water and sediment being supplied by the watershed (i.e., no headcutting, no excessive erosion or deposition)
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point bars with a range of age classes and successional stages.
- An active floodplain is present.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.
- Stream channels have appropriate size, meander pattern appropriate to the stream's position in the landscape, and parent material.
- Woody debris contributes to the character of the stream channel morphology.

2.2.7.2. Current Condition

BLM Colorado standards for land health

As part of implementing the BLM Colorado *Standards for Public Land Health and Guidelines for Livestock Grazing Management* (BLM 1997), BLM employees conducted LHAs across the RGFO between 2002 and 2013, in which they assessed the current condition of vegetation and overall land health.

Healthy plant species and communities

The planning area was assessed for adherence to Land Health Standard 3 (Table 2.18).

Table 2.18. Colorado Public Land Health 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 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 fluctuation and ecological processes.

Indicators:

- Noxious weeds and undesirable species are minimal in the overall plant community.
- Native plant and animal communities are spatially distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.
- Plants and animals are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations.
- Landscapes exhibit connectivity of habitat or presence of corridors to prevent habitat fragmentation.
- Photosynthetic activity is evident throughout the growing season.
- Diversity and density of plant and animal species are in balance with habitat/landscape potential and exhibit resilience to human activities.
- Appropriate plant litter accumulates, and is evenly distributed across the landscape.
- Landscapes composed of several plant communities that may be in a variety of successional stages and patterns.

Riparian vegetation

Riparian vegetation (see also riparian and wetland resources, section 2.2.8) along nearly all of the streams in the planning area was evaluated for adherence to Land Health Standard 2 (Table 2.19).

Table 2.19. Colorado Public Land Health 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 biodiversity. Water quality is improved or maintained. Stable soils store and release water slowly.

Indicators:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Stream bank vegetation is present and is comprised of species and communities that have root systems capable of withstanding high stream-flow events.

- Plant species present indicate maintenance of riparian moisture characteristics.
- Stream is in balance with the water and sediment being supplied by the watershed (i.e., no headcutting, no excessive erosion, or deposition).
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point bars with a range of age classes and successional stages.
- An active floodplain is present.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.
- Stream channels with size and meander pattern appropriate for the stream's parent materials and position in the landscape.
- Woody debris contributes to the character of the stream channel morphology.

Grazing allotments

Table 2.20 summarizes the status of grazing allotments in the RGFO in relation to public land health standards.

Table 2.20. Status of Allotments Meeting Public Land Health Standards

Description	Number of allotments	Acres/miles
Upland soils, healthy plant and animal communities, and T&E species standards		
Total number of allotments assessed	530	600,000
Allotments meeting standards with problems and/or NOT meeting standards, with livestock grazing identified as the cause	6	1,000
Allotments meeting standards with problems and/or NOT meeting standards, with causes other than livestock grazing identified	71	48,545
Riparian and water quality standards		
Total number of allotments assessed	530	600,000
Allotments meeting standards with problems and/or NOT meeting standards, with livestock grazing identified as the cause	6	13.4 5.4 (miles)
Allotments meeting standards with problems and/or NOT meeting standards, with causes other than livestock grazing identified	9	22.35 (miles)

Vegetation ecoregions

A vegetative community is commonly described by the individual plant species of which it is composed. Those that are particularly scarce or rare are discussed in section 2.2.9, Special Status Species.

Additional species of concern are those that are non-native in origin, with invasive and highly competitive characteristics. A number of these exist in the planning area and compete with native vegetation for space, light, and limited nutrients. When an individual species is identified as a substantial economic threat, it is designated by the state of Colorado as a noxious species or by the BLM as a species of concern. Both exotic and noxious weeds are further discussed under “Noxious weeds” below.

Vegetation in the planning area can also be described in terms of assemblages of native species and classified based on ecoregions, which are large geographic areas sharing similar patterns of climate, elevation, and geology. Most of the planning area falls in the Southern Rockies ecoregion, with the remainder in the Southwestern Tablelands and High Plains ecoregions (Chapman et al. 2006). These are further subdivided on the basis of topography and landform. Table 2.21 shows the acreages of ecoregion subdivisions on BLM lands within the planning area. A description of each of the ecoregion subdivisions with their associated vegetation follows the table.

Table 2.21. Ecoregions in the RGFO Planning Area

Ecoregion	Ecoregion subdivision	Total acres
Southern Rockies	Alpine Zone	6,663
	Crystalline Subalpine Forests	15,885
	Crystalline Mid-Elevation Forests	129,106
	Foothill Shrublands	312,322
	Sedimentary Subalpine Forests	17,579
	Sedimentary Mid-Elevation Forests	37,723
	Volcanic Subalpine Forests	13,447.93
	Volcanic Mid-Elevation Forests	5,328
	Sagebrush Parks	6,679
	Grassland Parks	69,627
High Plains	Rolling Sand Plains	1,004
	Moderate Relief Plains	523
	Flat to Rolling Plains	1,598
	Front Range Fans	75
Southwestern Tablelands	Piedmont Plains and Tablelands	32,584
	Mesa de Maya/Black Mesa	472
	Purgatoire Hills and Canyons	418
	Pinyon-Juniper Woodlands and Savannas	11,309
	Sandsheets	7,094

Descriptions of ecoregions and associated vegetation types within the planning area

Southern Rockies

The Southern Rockies are composed of high elevation, steep, rugged mountains. Although coniferous forests cover much of the region, as in most of the mountainous regions in the western United States, vegetation, as well as soil and land use, follows a pattern of elevational banding (Table 2.22). The lowest elevations are generally covered by grass or shrubs and heavily grazed. Low to middle elevations are also grazed and covered by a variety of vegetation types, including Douglas-fir, ponderosa pine, aspen, and juniper oak woodlands. Middle to high elevations are largely covered by coniferous forests and have little grazing activity. The highest elevations have alpine characteristics.

Table 2.22. Southern Rockies Ecoregion Subdivisions and Natural Vegetation

Ecoregion subdivision	Natural vegetation
Alpine Zone	Alpine meadows. Dominated by bistort, alpine timothy, alpine avens, alpine bluegrass, alpine clover, tufted hairgrass, and various sedges. Trees, if present, are krummholz (dwarf and/or prostrate shrubs) and include spruce, fir, and pine. Willow thickets occur in depressions and wet meadows.
Crystalline Subalpine Forests	Subalpine forests dominated by Engelmann spruce and subalpine fir. Often interspersed with aspen groves, lodgepole pine forest, or mountain meadows, and with Douglas-fir at lower elevations. May include limber pine and Rocky Mountain bristlecone pine. Understory is dominated by dwarf huckleberry and grouse whortleberry.
Crystalline Mid-Elevation Forests	Ponderosa pine forest with areas of Douglas-fir forest. Understory may include mountain mahogany, bitterbrush, wax currant, skunkbush, woods rose, mountain muhly, Junegrass, Arizona fescue, king spike-fescue, and various sedges.
Foothill Shrublands	Sagebrush shrubland, pinyon-juniper woodland, and foothill-mountain grasslands. Also includes areas of mountain mahogany shrublands and scattered Gambel's oak woodlands. The woodlands are often interspersed with mountain big sagebrush, skunkbush, serviceberry, fringed sage, rabbitbrush, blue grama, Junegrass, western wheatgrass, Indian ricegrass, Scribner needlegrass, muttongrass, and blue grama.
Sedimentary Subalpine Forests	Subalpine forests dominated by subalpine fir, Engelmann spruce, and lodgepole pine. Areas of Douglas-fir or aspen forests at lower elevations. Understory may include whortleberry, kinnickinnick, snowberry, sedges, mountain brome, and forbs.
Sedimentary Mid-Elevation Forests	Ponderosa pine forest, Gambel's oak woodland, and aspen forest (especially on the Western Slope). Areas of mountain mahogany and two-needle pinyon pine. Shrub vegetation includes antelope bitterbrush, fringed sage, serviceberry, and snowberry. Understory grasses of Arizona fescue, bluegrass, Junegrass, needlegrasses, mountain muhly, pine dropseed, and mountain brome.
Volcanic Subalpine Forests	Subalpine forests dominated by Engelmann spruce, subalpine fir, aspen and, in the north, lodgepole pine. Understory may include whortleberry, kinnikinnick, snowberry, sedges, mountain brome, and forbs.
Volcanic Mid-Elevation Forests	Ponderosa pine, Douglas-fir, and aspen forests, with scattered areas of Gambel's oak woodlands. Understory of dwarf juniper, western wheatgrass, Oregon grape, blue grama, sideoats grama, and needlegrasses.
Sagebrush Parks	Sagebrush shrubland: Wyoming big sagebrush, mountain big sagebrush, black sagebrush, western wheatgrass, bottlebrush squirreltail, and elk sedge. Areas of bunchgrasses include Arizona fescue and mountain muhly.
Grassland Parks	Foothill grasslands with bunchgrasses dominant: Arizona fescue, Idaho fescue, Columbia needlegrass, Canby bluegrass, mountain muhly, bluebunch wheatgrass, needle-and-thread, Junegrass, and slender wheatgrass.

Southwestern Tablelands

Unlike most adjacent Great Plains ecological regions, little of the Southwestern Tablelands is cropland (Table 2.23). Much of this elevated tableland is subhumid grassland and semiarid

grazing land. The potential natural vegetation in this region is grama-buffalo grass with some mesquite-buffalo grass in the southeast and shinnery (midgrass prairie with open low and shrubs) along the Canadian River.

Table 2.23. Southwestern Tablelands Ecoregion Subdivisions and Natural Vegetation

Ecoregion subdivision	Natural vegetation
Piedmont Plains and Tablelands	Shortgrass prairie: blue grama, green needlegrass, buffalograss, needle-and-thread, and red threeawn. Also may include mixed grass species such as western wheatgrass, galleta grass, sand dropseed, and little bluestem. Sand sagebrush, yucca, and cholla cactus can also occur.
Mesa de Maya/Black Mesa	Pinyon-juniper woodland and shortgrass prairie. On top of the mesa: shortgrass prairie dominated by blue grama, hairy grama, sideoats grama, galleta grass, buffalograss, and western wheatgrass. On rocky slopes and in canyons: juniper with pinyon pine–oak woodlands with a few isolated areas of mesquite shrublands.
Purgatoire Hills and Canyons	Juniper woodlands and shortgrass prairie. Rocky Mountain juniper, oneseed juniper, Utah juniper, blue grama, and buffalograss.
Pinyon-Juniper Woodlands and Savannas	Pinyon-juniper woodlands: pinyon pine, Rocky Mountain juniper, eastern red cedar, and one-seed juniper.
Sand Sheets	Sandsage prairie: sand sagebrush, sand bluestem, prairie sandreed, blowout grass, lemon scurfpea, and little bluestem.

High Plains

Higher and drier than the Central Great Plains to the east, and in contrast to the irregular, mostly grassland or grazing land of the Northwestern Great Plains to the north, much of the Western High Plains comprises smooth to slightly irregular plains having a high percentage of cropland (Table 2.24). Grama-buffalo grass is the potential natural vegetation in this region as compared to mostly wheatgrass-needlegrass to the north, Trans-Pecos shrub savanna to the south, and taller grasses to the east. The northern boundary of this ecological region is also the approximate northern limit of winter wheat and sorghum and the southern limit of spring wheat.

Table 2.24. High Plains Ecoregion Subdivisions and Natural Vegetation

Ecoregion subdivision	Natural vegetation
Rolling Sand Plains	Sandsage prairie: sand sagebrush, sand bluestem, prairie sandreed, blowout grass, lemon scurfpea, little bluestem, rabbitbrush, Indian ricegrass, and sand dropseed.
Moderate Relief Plains	Shortgrass prairie: blue grama, buffalograss, with threadleaf sedge, fringed sage, Junegrass, and western wheatgrass. Riparian areas contain cottonwood/shrub/herbaceous species.
Flat to Rolling Plains	Shortgrass prairie: blue grama, buffalograss, with threadleaf sedge, fringed sage, Junegrass, and western wheatgrass. Riparian areas contain cottonwood/shrub/herbaceous species.
Front Range Fans	Shortgrass and mixed-grass prairie: blue grama, needle-and-thread, western wheatgrass, buffalograss, Junegrass, and little bluestem. Big bluestem is scattered in low concentrations throughout the region. Riparian areas contain cottonwood/shrub/herbaceous species.

Vegetation management

Vegetation management is the process of describing and achieving the plant community that would best support a desired resource use and resource condition on a site-specific basis. The variable climate, elevation, and soils of the planning area are conducive to extremely varied vegetation. In this document, the vegetation in the planning area is classified according to three major groups: grassland, woodland/shrubland, and forest.

Grassland

This group includes the grass and meadow types and covers approximately 203,969 acres of BLM-administered land or 30 percent of the planning area. Types within the grassland group are blue grama at 5,000–9,000 feet; mountain muhly at 8,000–10,000 feet; and Arizona fescue at 9,000–11,500 feet. These types intergrade with each other and exist throughout the resource area within specific elevation zones. Each occurs as extensive acreages or as very small parks within shrub or forest types. The grassland type provides forage for big game and is critical for the survival of grassland-adapted species. Typical species are pronghorn antelopes, coyotes, ferruginous hawks, and prairie dogs. See also section 2.2.5, Terrestrial Wildlife. Severely disturbed sites are dominated by annual weeds or shrubs, but these are not extensive and generally occur in creek or canyon bottoms, around water, or in small parks within forest or shrub types. The meadow type includes the sedge-rush and brome meadow subtypes. Sedge-rush meadows are mostly in South Park, and brome meadows are at mid- to high elevations throughout the resource area.

Woodland/shrubland

This group covers approximately 249,558 acres of BLM-administered land or 37 percent of the planning area and includes the pinyon/juniper type at elevations of 5,000–10,000 feet; the mountain shrub type at 6,000–9,500 feet; sagebrush at 7,500–10,000 feet; and saltbush at 5,400–5,500 feet.

Pinyon/juniper is the most significant woodland type because of the large area it covers. It grows in shallow, rocky soils on ridges, in deep soils in valleys, and on benches. Pinyon dominates at higher elevations, juniper at lower. Relative forage production depends mainly on the successional stage of the vegetation. Mature, closed canopy stands support little or no understory vegetation. Young stands and mature stands that have been recently treated support a productive and diverse plant community that includes grasses, forbs, and shrubs, and has a higher percent of the soil surface covered by live plants than do untreated mature stands. In certain areas this type provides winter range for elk and mule deer. Species such as pinyon jays and pinyon mice are dependent on this type. See also Terrestrial Wildlife (section 2.2.5).

The mountain shrub type is dominated by Gambel's oak and mountain mahogany. These occur predominately in the Arkansas Canyon area or on shallow, rocky soils. This type is less extensive than the pinyon/juniper type, but it is important because it contributes a significant amount of forage and cover where it occurs. It is important year-round range for many big game animals, and its variety of plant life makes it critical for many other species; many shrub-nesting bids are dependent on this type. Gambel's oak is often an early successional stage following fire in forest types. See also section 2.3.3, Forestry.

The entire planning area has been assessed using the land health assessment methodology. Portions of each landscape were found to be meeting, meeting with problems, or failing to meet land health standards. Overbrowsed shrubs and trees and poor shrub vigor were common conditions observed (see also section 2.2.5, Terrestrial Wildlife).

Overbrowsed shrubs and trees

Abnormal growth form, hedging, poor leader growth, high or conspicuous browse-line heights, and similar problems indicate overuse by wildlife and/or livestock. This problem is most evident where big game and livestock use overlap. Wild ungulates in particular have the ability to cause dramatic shifts in vegetation, which can affect birds, small mammals, and other wildlife. This may indicate an imbalance between big game numbers, livestock stocking rates, and animal distribution, and the capacity of a habitat to support these population levels.

Poor shrub vigor

Decadent plants, dead plants, poor leader growth, and marginal seed production are observed in some areas. These problems are often observed in association with heavy browsing and foraging damage by grazing animals. The health and persistence of native shrubs is critical to provide essential cover, food, and structural diversity for multiple wildlife species.

The sagebrush and saltbush types are less important since they occupy relatively little area on BLM-administered lands. Elk and mule deer use the sagebrush on winter ranges as winter browse.

Forest group

The conifer and deciduous forest types make up the forest land group. These cover approximately 215,401 acres or 32 percent of the BLM-administered land in the planning area. The major conifers include ponderosa pine at 5,000 to 9,000 feet, lodgepole pine at 9,000 to 11,500 feet, Douglas-fir at 6,000 to 10,000 feet, and Engelmann' spruce at 9,000 to 11,500 feet. Major deciduous types are aspen at 5,000 to 11,500 feet, narrowleaf cottonwood at 5,000 to 8,000 feet, and plains cottonwood at 5,000 to 6,000 feet. These areas provide important summer habitat for elk and mule deer and in some areas also serve as calving and fawning range. Black bear, blue grouse, snowshoe hare, and short-tailed weasels are common in this type.

There are a wide variety of forest types found throughout the RGFO. The tree species found within the area are hardy, drought tolerant trees that are well suited to the landscape. They include; ponderosa pine, Douglas-fir, Engelmann spruce, white fir, lodgepole pine, bristlecone pine, limber pine and quaking aspen.

Aspen usually occur in pure stands or within the conifer types where moisture and light are favorable. Aspen generally has a highly productive grass-forb understory. The two cottonwood types are limited in size and distribution but are important to livestock and wildlife. These types are associated with streams, springs, or high water tables and usually support productive grass or meadow understories. See also Forestry (section 2.3.3).

Noxious weeds

Weed control guidance and programs

In 2007, the BLM completed *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS) (BLM 2007c) , which can be accessed on the BLM's website: www.blm.gov. The RGFO subsequently created a field-office-specific programmatic vegetation treatment EA (DOI-BLM-CO-2010-0075) derived from the PEIS.

The BLM coordinates with counties and other entities in and around the planning area in implementing its integrated weed management program. This cooperative effort supports the integrated weed management program and promotes the success of early detection/rapid response and the treatment and re-treatment of small and large patches of noxious weeds. A coordinated strategy means that there are more people looking for and treating noxious weeds in a strategic manner on public lands. Support for integrated weed management comes from Executive orders, legislation, and strategic documents, including the following:

- Colorado Noxious Weed Act 8 CCR 1203-15 (2003)
- Presidents Executive Order 13112 (1999)
- Federal Noxious Weed Act of 1974, Public Law 93-692
- Colorado Governor's Executive Order D 00699
- RGFO programmatic vegetation treatment EA (DOI-BLM-CO-2010-0075)
- Record of Decision for *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (BLM 2007c).

Weed surveys

From 2003 to 2013, the RGFO surveyed 41 percent (or 277,000 acres) of the planning area. Data for RGFO weed infestations and acreage estimates prior to 2011 are incomplete, so the estimates are conservative. According to available internal BLM data from 1998–2002, 226 noxious weed infestations were identified with an average size of 0.6 acres. In 2012, RGFO staff treated nearly 1,700 acres on nine noxious weed infestations that ranged from 0.5 to 171 acres..

Large patches of weeds will need to be treated for years to come, and linear infestations always pose a threat because of the ease of seed transportation, whether along a trail, road, irrigation ditch, or stream/river. The RGFO will continue to survey for about 32 weed species from all three categories of the Colorado noxious weeds list (available online: https://www.colorado.gov/pacific/sites/default/files/NoxiousWeedList12.10.14.pdf). Table 2.25 lists some of the most troublesome weeds in the RGFO, along with associated data (Asher and Dewey 2005).

Table 2.25. Noxious Weeds in the RGFO Planning Area

Weed species	Listing	Number of infestations	Acres infested	Percent average annual rate of spread
Russian knapweed (*Acroptilon repens*)	State noxious; BLM concern	38	4.9	8–14%
Spotted knapweed (*Centaurea maculosa*)	State noxious; BLM concern	4	2.0	10–24%
Diffuse knapweed (*Centaurea diffusa*)	State noxious; BLM concern	53	37.4	16%
Knapweed (*Centaurea* spp.)	State noxious; BLM concern	8	549.3	8–24%
Yellow toadflax (*Linaria vulgaris*)	State noxious; BLM concern	17	311.7	8–29%

Weed species	Listing	Number of infestations	Acres infested	Percent average annual rate of spread
Dalmation toadflax (*Linaria dalmatica*)	State noxious; BLM concern	4	1.0	8–29%
Hoary cress (whitetop) (*Cadaria draba*)	State noxious; BLM concern	2	22.6	11–18%
Canada thistle (*Cirsium arvense*)	State noxious; BLM concern	96	811.8	10–12%
Musk thistle (*Carduus nutans*)	State noxious; BLM concern	20	12.5	12–22%
Russian olive (*Elaeagnum angustifolia*)	State noxious; BLM concern	5	57.9	n.d.
Tamarisk (*Tamarix* spp.)	State noxious; BLM concern	60	636.3	12%
Hounds tongue (*Hieracium cynoglossoides*)	State noxious; BLM concern	7	181.0	n.d.
Leafy spurge (*Euphorbia esula*)	State noxious; BLM concern	27	24	12–16%
Scotch thistle (*Onopordum acanthium*)	State noxious; BLM concern	3	465	12–22%
Elongated mustard (*Brassica elongata*)	State noxious	2	214	n.d.

Treating problem weeds

Approximately 50 RGFO weed treatments per year have been conducted on about 1,200 to 1,700 acres of BLM lands in recent years,. The majority of the most troublesome weeds in the planning area are perennial, and the most effective option for long-term success and eradication is continued implementation of early detection and rapid response, as well as the application of herbicides on small infestations.

Herbicides

The appropriate use of approved herbicides in moderation does the following:

- Reduces the cost of treatment
- Insures a reduction in infestation size
- Potentially eradicates weeds in a location
- Reduces herbicide use in native systems (compared with having to treat large patches over several years)
- Promotes land health

Biological controls

There are several biological controls (using living organisms) in development that may help with some of the more troublesome weed species. As biological controls become more available, they could be used in conjunction with chemical and mechanical treatments. Some biological agents currently approved for release are effective against certain weed species in the planning area,

including Canada, musk, bull and scotch thistles, field bindweed, Dalmatian toadflax, spotted knapweed, puncturevine, leafy spurge, and tamarisk.

The size of infestation and type of noxious weed drive whether or not to use a biological control agent. Noxious weed patches need to be large enough to support the biological agent; the noxious weed can't be on a State directive that forbids allowing the plant to flower and reproduce; and there must be State and Federal consensus that there will always be a small/medium amount of the weed present in the ecosystem. *Diorhabda elongata* (known as the tamarisk leaf beetle) is a prime example of a biological control agent being used in riparian areas, and it enables a small amount of tamarisk to remain, but not enough to compromise the ecosystem.

Other common exotic species

Other common weedy exotic species in the planning area that are not considered noxious include annual wheatgrass *(Eremopyrum triticeum)*, clasping pepperweed *(Lepidium perfoliatum)*, Russian thistle *(Salsola tragus)*, filaree *(Erodium cicutarium)*, burr buttercup *(Ceratocephala testiculata)*, spreading wallflower *(Erysimum repandum)*, blue mustard *(Chorispora tenella)*, and European madwort *(Alyssum simplex)*.

Noxious weeds and exotic species

Spread of new and existing weed species

Noxious weeds continue to increase at alarming rates across the western United States. The RGFO is no exception, with creeping perennials like hoary cress, oxeye daisy, Russian knapweed, and spotted knapweed spreading at rates of 8–24 percent per year (Asher and Dewey 2005). Evidence of this spread includes the recent appearance of noxious weed species that were previously absent from this area:

- Yellow star thistle near Beulah in Pueblo County
- Elongated mustard near Wellsville in Chaffee and Fremont Counties

BLM land health assessment data for 2000–2014 indicate that noxious weeds have not yet become a dominant feature of vegetation within the planning area. Weed surveys support the idea that weeds spread at alarming rates if not controlled. This spread will continue to threaten native systems, slowly compromising native vegetation and altering these systems until they can no longer support native plant, aquatic, or wildlife populations.

Competition with native vegetation

Other exotic species are increasing within native vegetation. There is concern that some winter annuals like cheatgrass have the potential to overtake native vegetation, alter fuel and fire regimes, and ultimately displace entire native communities as has happened in other ecoregions. There is little evidence that this is happening on a large scale yet, as the BLM has not experienced dramatic increases in fire frequency or fires fueled by invasive annuals. Some cheatgrass-fueled burns have occurred, indicating that it is happening in localized areas.

Landscape disturbances

Many weed invasions are tied to disturbances in the landscape. Based on anecdotal evidence, most travel routes in the planning area have noxious weed infestations within 15 feet, and most riparian areas have noxious weeds associated with them. Past vegetation treatments have

included seeding of non-native species, which contributed to high levels of undesirable plants such as crested wheatgrass. Based on observation, the scale of disturbances infested with exotic annuals is probably even greater.

It is likely that noxious weeds and exotic plants will continue to stay at high levels and increase in some locations in the planning area. Development trends on private lands, increasing recreational use, increasing mineral and oil and gas development, irrigation ditches, livestock grazing, and wildlife corridors are all factors that will promote weeds and exotic species to the detriment of native plant communities.

Health of native plant communities

Spatial distribution, diversity, and density

Soil and climate largely determine whether a plant community can grow on a particular site (known as site potential). Data from recent LHAs indicate that appropriate plant communities occur on appropriate sites in the planning area. However, the amount of land supporting native plant communities in the region has declined, resulting in the reduced spatial distribution and frequency of native vegetation within the planning area. The majority of this decline is due to changes in land use and the development of private lands.

Within plant communities, there is some indication that diversity, composition, and frequency are degraded, and this may pose a threat to sustainability of native species in some areas. These affected communities may not be as resistant to changing conditions, disturbances, or weed invasions. Over time, this lack of resiliency means decreased sustainability.

Impacts from land use activities

Many land use activities have the potential to degrade native communities. Excessive grazing by livestock, big game, and even rabbits can reduce palatable plants and trample others. Physical disturbances associated with off-road travel and concentrated activities like cutting wood or collecting rocks can damage plants. In addition, the alteration of normal drainage patterns associated with road development, and range or watershed improvement projects can degrade native plant communities. Invasive plant dominance arising from certain types of land use can also drive out native plant species.

2.2.7.3. Trends and Forecast

The trend for native plant communities in the greater region is for continued decline in spite of some improvements on BLM lands in the last 30 years. The decline, largely due to the loss of native plant communities on private land, is expected to continue and increase over time. Much of the loss in and around the planning area stems from rapid land development in response to a growing human population. Some of the factors associated with land developments that contribute to the decline of native plant communities include loss of topsoil, soil compaction, and the spread of invasive species. This rapid growth increases the important role of public lands in preserving native plant communities.

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 BLM has primary authority to manage livestock grazing and where grazing is the primary activity that is potentially diminishing vegetation health, 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.

Climate change is likely to worsen these losses, mainly at the lower elevation range of each community type. The greatest loss of native plant communities on public lands is expected to occur in the lowest elevation areas, around WUI zones, and in areas of intensive energy development.

Riparian and wetland vegetation

Maintaining riparian health

While region-wide trends are not readily available, the indicators for riparian plants generally have been stable to improving. Native wetland plants tend to be desirable species, and indicate the presence of a high water table. See also Wetlands and Riparian Resources (section 2.2.8).

Weeds, particularly tamarisk, are a significant problem in riparian areas, and in a few cases dominate the vegetation. While tamarisk control with herbicides has been conducted on a number of planning area streams, the tamarisk beetle (populations are increasing in the planning area) shows the greatest promise for providing long-term control. Control of this exotic should result in improved riparian vegetation vigor and composition, although the presence or establishment of other weeds would diminish this gain.

2.2.7.4. Key Features

The factors below should be considered when making allocation and management decisions related to vegetation.

Regional and global biodiversity

Areas of vegetation that contribute to biodiversity on a regional or global scale should be managed to maintain and/or enhance those high quality conditions. Riparian areas are widely recognized for their important contributions to biodiversity in the arid West, and should be included in this group.

Pristine vegetative communities

Areas that support pristine or intact vegetation should be managed to maintain these qualities. Some of these have been identified by the Colorado Natural Heritage Program as being high quality examples of common vegetation communities. Data collected through LHAs will be helpful in identifying additional areas.

Species migration corridors

Corridors that allow for upward, downward, or transregional migration of species should be maintained or re-established where possible, and managed for high levels of vegetation health.

This will be particularly important as part of a strategy to ensure that plant communities and species are able to survive the predicted effects of climate change.

General management for land health

All BLM lands should be managed to meet minimal levels of vegetation health as specified in the Colorado land health standards (BLM 1997). Areas not meeting standards should be specially managed to improve conditions. When determining uses of BLM lands, the BLM should employ BMPs in order to avoid unnecessary damage.

Critical weed containment areas

Public lands should be managed to contain infestations of those weed species identified under the Colorado Noxious Weed Act. These would probably be dynamic and depend on the species and location of the infestation and on the mechanics of weed seed spread for that species.

2.2.8. Wetlands and Riparian Resources

2.2.8.1. Indicators

Indicators of good condition and function for wetland and riparian resources include the following:

- Vegetation within riparian/wetland zone is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure and adequate composition, cover, and density.
- Stream bank vegetation is present and composed of species and communities that have root systems capable of withstanding high-flow events. In wetlands, vegetation is present to dampen wind and wave action.
- Plant species present indicate maintenance of riparian moisture characteristics.
- Stream is in balance with the water and sediment being supplied by the watershed (i.e., no head cutting, no excessive erosion or deposition).
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point pars with a range of age classes and successional stages.
- An active floodplain is present in appropriate channels.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energy.
- Stream channels have appropriate size and meander patterns for the stream's position in the landscape, and the stream bed is made up of the appropriate materials.

- Woody debris contributes to the character of the stream channel morphology.
- Riparian systems associated with both running and standing water function properly, having the ability to recover from major disturbance such as fire, an infrequent severe grazing incident, or 100-year floods.
- Water quality is improved or maintained as it flows through public land riparian and wetlands, and stable soils store and release water slowly.
- Wetlands are not receiving upland area chemicals or soil deposition that harm the vegetation.

2.2.8.2. Current Condition

Wetland resources are separated from upland vegetation communities and habitat types in this RMP/AMS due to their relative scarcity, overlapping complex issues, and the inherent need for intensified management due to impacts from recreation, livestock movement, and other activities. Wetland regulation requires a heightened management emphasis because of the significant value wetland has for wildlife, agriculture, recreation, floodplain function, water supply, and other societal needs. Accordingly, riparian and wetland management within BLM and the RGFO is a separate program with unique funding, workload, and required accomplishments.

Resources will be partitioned out in the RMP as lentic, or more typical standing water wetlands, and lotic, which are riparian wetlands where the flowing water of creeks, streams, and rivers define wetland vegetation characteristics. In order to manage these sensitive areas, RGFO has undergone an inventory to locate, characterize, and assess riparian and wetland resource conditions. Inventory and assessment is needed to compare a wetland system's current condition to its potential condition. Knowledge of existing conditions is necessary for evaluating the implications of various land use management on a given area. Evaluating riparian areas excludes assessment of ephemeral stream flow channels that are not saturated for a duration long enough to develop wetland obligate plant species. Knowledge about the condition and characteristics of ephemeral channels is important for understanding sediment delivery, runoff rates, and other watershed variables, but true ephemeral drainages are not included in the discussion of resources in the RMP. Occasionally, ephemeral channels are severely degraded riparian areas, either from being buried due to severe upland erosion, from down-cut, or for other reasons, and are so degraded that riparian function has been lost. Additional discussion of ephemeral channels and upland erosion is in Soil Resources (section 2.2.3).

Resource inventory in riparian and wetland areas has generally been conducted by field reconnaissance aided by infrared aerial photography interpretation to locate wetland areas. Geographic information system (GIS) geo-databases are used to store information. Next generation National Wetlands Inventory (NWI) protocol will be used in the near future and will further refine spatial accuracy. NWI mapping and inventory will assist in locating other smaller off-channel wetlands, seeps, springs, and isolated wetlands not presently accounted for. The affected environment section of the RMP revision will probably use NWI mapping to update RGFO's current resource quantification.

Existing inventory information shows wide diversity among wetland types and plant communities within the planning area primarily due to RGFO managing lands across vast areas of Colorado's rugged mountains, large mountain parks, foothills, and to a lesser extent the Great Plains. Elevation, precipitation, gradient, land use, historic disturbance, plant species introduction, geology, and other variables are influential in setting the wetland community and condition of a

particular location. RGFO not only manages many typical riparian areas and wetlands, but also manages *fen* resources (those created through groundwater inputs, with accumulated organic soils, and sometimes with unique water chemistry) and *playas* (infrequently flooded shallow depressions filled during periods of heavy precipitation). Additionally, the office manages numerous artificial wetlands incidentally created through the construction of stock ponds, erosion control settling basins, railroad or roadway impoundments, and both native and developed springs.

There are also some wetland areas created through seepage from irrigation ditches. The Colorado Natural Heritage Program (Carsey et al. 2003), Johnson (1998, 2000), and others have conducted work characterizing riparian and wetland types and plant associations within Colorado. Outside information is beneficial to aid the RGFO in resource management, especially because of the large private land influence on wetlands under the jurisdiction of this office. Numerous plant communities occur statewide. Because the RGFO has jurisdiction over a large proportion of the total Colorado land area, the variation among plant communities in the RGFO is high. However, the spectrum of resources RGFO manages generally transitions from typical high elevation, willow-dominated, small stream riparian communities, often adjacent to sedge-dominated, herbaceous wet meadows, to other communities, with descending elevation and increasing gradient. Lower elevation herbaceous communities of mixed grasses, rushes, and sedges create understory among taller species like aspen, alder, birch, cottonwoods, and willows.

In lower elevations, other species begin to influence the community makeup typical of the Eastern Plains. The number of plant associations reported by location would be extensive, and because plant communities change over a continuum rather than at fixed points, no detailed community information will be presented in the RMP, but GIS data contain community information. Additionally, wetland communities are always changing, frequently influenced by floods, droughts, and species introduction, etc. The RGFO uses wetland plant identification guides such as Culver and Lemly (2013) along with an internal agency protocol (BLM 1998a, 1998b) to understand existing condition through a standardized assessment process. Assessments evaluate the plant community condition, wetland function, and stability relative to the capability of that resource on public land. Standard 3 of the BLM Colorado *Standards for Public Land Health and Guidelines for Livestock Grazing Management* (BLM 1997) dictates that wetland and riparian resources attain a rating of Properly Functioning Condition through assessment, or if in a lower condition status, demonstrate an upward trend. Specialized management for riparian areas is guided by legislation and BLM policy (see BLM 1998a, 1998b).

The RGFO also attempts to recognize and manage for the importance of wetlands identified by the Colorado Natural Heritage Program as suitable *potential conservation areas* and those within *critical habitat* for threatened or endangered species. A wetland area occupied by a BLM special status species also heightens management attention (see section 2.2.9). However, RGFO has made it a priority to heighten management on all wetlands to the extent possible given staffing and workload. By proximity to the densely populated Colorado Front Range, public lands within the field office are fragmented due to homesteading and tend to be smaller blocks of land relative to national public lands, so stream segment lengths can be short. An appendix in the RMP will list riparian areas and give their condition and other information.

Another table will list RGFO's larger known lentic wetland areas. Sometimes these lands are reservoir shoreline areas or distinct, large areas adjacent to riparian areas. Small wetland areas that are not named are those commonly associated with seeps. These are being inventoried and will also be quantified in the RMP. The BLM is typically not the managing agency of public lands where a fractional portion of the total lands are at larger irrigation reservoirs. Often these lands

are managed under cooperative management agreements with Colorado Parks and Wildlife as State wildlife areas. Water level fluctuation can be substantial at those locations, and BLM lands are often inundated and included within State wildlife areas.

The reasons for stream riparian areas or wetlands being in good or poor condition vary, but resources in remote or rugged places, tight canyons, or within heavily forested settings are generally those in optimal condition. Resources nearer to communities, adjacent to well-used routes, or on public lands within private land holdings have the tendency to be more modified by human actions, including historic water withdrawal, stream-side forest harvest, intensive grazing, mining, and channelization. The length of the riparian area can also factor into its condition. In recent times, larger areas received heightened management emphasis, and smaller blocks of public land, which can be influenced by the management of adjoining lands, had management attention postponed. Invasive species are problematic in the RGFO, with salt cedar, Russian olive, knapweeds, leafy spurge, and thistles being some of the most difficult plants.

Additionally, the seral stage of a riparian or wetland area plant community can factor into its functionality. Recovering streams in an early vegetation successional stage that are still meeting hydrological function (resistant to flood damage) may be years from becoming a mature plant community offering heightened wildlife benefits. Although the RGFO jurisdictional area for public resources is large, the relative percentage of riparian areas and wetlands in Federal versus State ownership is small, because homesteading converted the most productive land to private holdings. Retaining riparian and wetland resources on public land is therefore valuable, and these areas are central to many land uses. The larger riparian areas and wetlands of Colorado's eastern plains and intermountain parks have the least amount of public land managed by the BLM. Similarly, USFS public land riparian and wetland resources are generally associated with headwaters and small-order streams, so statewide, the larger wetland complexes are not in public ownership.

2.2.8.3. Trends and Forecast

The trends below are important to consider when discussing the future function and management of Colorado's public riparian and wetland areas.

- Long term stream stability is related to watershed upland vegetation seral stage. Upland fires and increasingly catastrophic fires through time and the subsequent runoff will repeatedly overwhelm stream systems with eroded sediments, altering stream balance. Historical fire patterns (see section 2.2.10, Wildland Fire Ecology and Management) show historical natural fires to be smaller.

- Public land riparian and wetland vegetation community succession is generally advancing with intensified management, but weed introduction and expansion is also ongoing and is costly to control.

- Throughout the RGFO, intensified grazing management has improved functional condition, but much of the infrastructure used to accomplish this (fences, water-developments, etc., is old and deteriorating, and unplanned livestock use of resources is likely to increase.

- Exchanges and acquisitions, which were a prevalent tool to manage riparian resources after the 1996 RMP, have been reduced. Through time, the relative ease of land tenure adjustments will decline because of land subdivision and increasing numbers and density of private land

owners. In the future, combining or blocking up[4] public lands through sensible land exchange will be difficult. Currently, many public land riparian issues occur in areas with irregular or mixed land ownership.

- Increased recreational use (section 2.3.1) for activities like camping, water-based recreation, and recreational gold prospecting will cause disturbance to riparian resources through trampled vegetation, modified stream banks, and wildlife disturbance (see also section 2.2.5).

- There has been an increase in stream-based placering for gold within RGFO waters for both recreational (see above) and commercial purposes (see also "Management of locatable minerals" in section 2.3.5.2). Monitoring this rate of growth will be necessary and planned for. The General Mining Act of 1872 placed limitations upon riparian avoidance and protection but allowed for disturbance to be repaired through follow-up restoration. However, restoration can be difficult in areas with complex hydrology. The management of gold prospecting will necessitate high numbers of mineral extraction operation plans, increasing the BLM's workload. Equally, the workload to withdraw riparian areas from mineral extraction is high.

- Flow protection monitoring will also necessitate an increasing workload as the RGFO monitors water exchanges and development projects on rivers, creeks, small seeps, springs, and fens. The BLM can propose that public lands be included in the water development plans of outside interests. The management of flow and water rights needs to be incorporated into the planning process to protect water-dependent resources in the RGFO.

- Beaver expansion is occurring and benefits the functionality of some riparian and wetland systems, but beaver expansion can also negatively impact existing infrastructure projects such as road crossing and irrigation projects.

- Workload in response to drought has been increasing, because some areas that were traditionally wet have dried (e.g., springs and smaller-stream riparian areas). As livestock and wildlife use patterns change, adaptive management becomes necessary. Adaptive management trigger points will need to be developed to better adjust for drought conditions.

- Waste water from oil and gas operations has become a regional concern when there is interaction with surface water or with groundwater and eventually surface water through springs. The RMP needs to address waste water consistently within the water quality and oil and gas sections of the RMP because of the potential interaction of waste water with public water resources.

- Vegetation utilization criteria under the range program needs to better address special circumstances within wetland areas in the RMP.

2.2.8.4. Key Features

The BLM-RGFO will continue to focus management and protection efforts on the Arkansas River corridor to sustain associated riparian habitat to the benefit of the regionally important trout fishery and the river's obligate riparian wildlife species. Tributaries to the Arkansas River will also receive heightened management attention to maintain habitat connectivity. Watershed health improvement efforts to reduce erosion to more natural rates will continue in areas with historic scars on the land, poor water cycles, eroding gullies and draws, and road impairments. The Arkansas River has well-known episodes of cumulative, periodic, turbid runoff from

[4]"Blocking up" means acquiring or disposing of property to create a more manageable, contiguous, parcel of public land.

numerous areas in the basin. Inventory of smaller, more isolated wetland habitats will continue to be a priority, and the BLM's inventory will determine those areas in need of management improvement that are important aquatic habitat or especially important to weed management in riparian and wetland areas. Additionally, isolated fens, playas, and small stream segments on public land within the South Park area will be protected through intensified management. Many of these features are on lands identified for disposal under the 1996 RMP prior to the amendment retaining such parcels. The BLM has intensified management activities on those lands since the amendment, and this will need to continue.

2.2.9. Special Status Species

2.2.9.1. Indicators

Special status species are those animals and plants that have the following characteristics:

- They have been proposed for listing under provisions of the Endangered Species Act (ESA) or are officially listed as threatened or endangered (16 U.S.C. 1531–1534).
- They are candidates for listing as threatened or endangered under the provisions of the ESA and are managed as BLM sensitive species.
- They have been de-listed for a 5-year period and are managed as BLM sensitive species.
- They have been designated by the BLM State Director as sensitive.

Habitat loss, competition, predation, disease, and other factors are to blame for species decline and imperilment. Habitat loss and modification due to human activity are the greatest threats to ecosystems, particularly for those species adapted to specific ecological niches. BLM practices are intended to sustain and promote species that are legally protected, and prevent those species that are not yet legally protected from needing such protection.

In addition to the indicators for all plant and wildlife species described earlier in section 2.2.5.1, indicators that special status plants and animal species and their habitats are being properly managed, maintained, or enhanced include the following:

- Populations of endemic and protected species are stable or increasing within suitable habitat.
- Suitable recovery habitat for endemic or protected species is available in the planning area.

Special status species indicators include population levels and density, breeding status, distribution and range, age class structure, and genetic diversity. Population and biological data for several special status species are tracked by the BLM, the FWS, as well as cooperating agencies such as CPW, Rocky Mountain Bird Observatory, and the CNHP, and the quantity and quality of preferred and suitable habitat, prey numbers, and threats to species are evaluated. The BLM also tracks conditions, and manages and may restrict certain activities or implement timing restrictions in critical breeding, foraging, and wintering areas and migration habitats for special status species, but presently there are few management standards or guidelines in the existing RMP directing such action.

Public Land Health Standard 4

Although each of the public land health standards ultimately benefits wildlife, plants, and habitats, Standard 4 specifically addresses special status wildlife and plant species and their habitats. This standard requires stabilizing and increasing the population of endemic and protected species in suitable habitats and protecting suitable habitat for recovery. Other indicators include all those listed for healthy plant and animal communities under Standard 3, addressed in section 2.2.5 of this document, and for riparian systems under Standard 2, which is addressed in section 2.2.8. Land health assessments use both quantitative and qualitative methods for evaluating the standards for wildlife and habitats.

2.2.9.2. Current Condition

Federally listed threatened, endangered, and proposed (T&E) species and designated critical habitat are managed by the BLM and regulated by the FWS, with the ultimate goal of species recovery and maintaining or improving species population viability. In accordance with the ESA, consultation with the FWS is required on any action proposed by the BLM that may affect a threatened, endangered, or proposed species or critical habitat to make sure that any action authorized, funded, or carried out by the BLM is "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species" (16 U.S.C. 1531–1534). Candidate species are managed by the BLM to maintain viable populations so that they do not become listed as threatened or endangered. BLM sensitive species are treated similarly. The BLM, the FWS, the USFS, and the State of Colorado develop formal and informal agreements locally to provide guidance on species management. Examples of agreements already in place include those for Mexican spotted owl and *Eutrema penlandii*.

2.2.9.2.1. Federal Endangered, Threatened, Proposed, and Candidate Species

On the basis of an official list of threatened, endangered, proposed, and candidate species, and designated critical habitat in the RGFO planning area (06E24000-2015-SLI-0570, April 8, 2015), 19 federally protected, threatened, endangered, or proposed species are being considered in this analysis because of known or suspected occurrence (Table 2.26). Two species, Gunnison sage-grouse and North Park phacelia, are not being considered in this analysis, because their existing occurrence and populations are outside the RGFO planning area (Spackman et al. 1997; FWS 2014d).

Federally listed species

In accordance with BLM Manual 6840, *Special Status Species Management*, Federal candidate species are managed as BLM sensitive species in order to prevent the need for future listing (BLM 2008a). These species are addressed in section 2.2.9.2.2, BLM Sensitive Species, below.

Table 2.26. Threatened, Endangered, and Proposed Species within the RGFO Planning Area Boundary

Species name	Listing status	Critical habitat designations
Birds		
Gunnison sage-grouse (*Centrocercus minimus*)[a]	Threatened	Designated in Montrose, San Miguel, Dolores, Mesa, Ouray, Gunnison, Delta, Hinsdale, and Saguache Counties.
Interior least tern (*Sternula antillarum*)[b]	Endangered	Not designated

Species name	Listing status	Critical habitat designations
Lesser prairie-chicken (*Tympanuchus pallidicinctus*)	Threatened	Not designated
Mexican spotted owl (*Strix occidentalis lucida*)	Threatened	Yes; designated in Jefferson, Douglas, Teller, El Paso, Fremont, Custer, Huerfano and Pueblo Counties.
Piping plover (*Charadrius melodus*)[b]	Threatened	Not in Colorado
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Endangered	Yes; designated in La Plata, Alamosa, Conejos, and Costilla Counties.
Whooping crane (*Grus americana*)[b]	Endangered, experimental population, non-essential	Proposed, but not in Colorado.
Yellow-billed cuckoo (*Coccyzus americanu*)	Threatened	Proposed in Routt, Mesa, Delta, Montrose, Gunnison, Ouray, Rio Grande, Alamosa, Conejos and Costiall Counties.
Insects		
Pawnee montane skipper (*Hesperia leonardus montana*)	Threatened	Proposed in Douglas and Jefferson Counties
Uncompahgre fritillary butterfly (*Boloria acrocnema*)	Endangered	Not designated
Mammals		
Black-footed ferret (*Mustela nigripes*)	Endangered, experimental population, non-essential	Not designated
Canada lynx (*Lynx canadensis*)	Threatened	No; designated, but not in Colorado.
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	Endangered	Proposed in La Plata, Archuleta, and Las Animas Counties.
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	Threatened	Yes; designated in Boulder, El Paso, Jefferson, and Larimer Counties.
Flowering plants		
Colorado butterfly plant (*Guara neomexicana ssp. coloradensis*)	Threatened	No; designated, but not in Colorado.
North Park phacelia (*Phacelia formosula*)[a]	Endangered	Not designated
Penland alpine fen mustard (*Eutrema penlandii*)	Threatened	Not designated
Ute ladies' tresses orchid (*Spiranthes diluvialis*)	Threatened	Not designated
Western prairie -fringed orchid (*Platanthera praeclara*)[a]	Threatened	Not designated
Fish		
Greenback cutthroat trout (*Oncorhynchus clarki stomias*)	Threatened	Not designated
Pallid sturgeon (*Scaphirhynchuys albus*)[b]	Endangered	Not designated
Candidate species		
Greater sage-grouse (*Centrocercus urophasianus*)[a]	Proposed as threatened or candidate	N/A
Arkansas darter (*Etheostoma cragini*)[a]	Candidate	N/A
Arapahoe snowfly (*Capnia arapahoe*)[a]	Candidate	N/A

[a] Habitat for this species is not known to occur in the RGFO administrative boundary or lands affected by BLM authorized actions, so this species is not considered in this AMS.

[b]Water depletions in the North Platte, South Platte, and Laramie River Basins may affect the species and/or critical habitat associated with the Platte River in Nebraska.

Plants

Ute ladies'-tresses

This facultative wetland species is known from a wide range of seasonally moist and wet meadows of drainages common to riparian-related plant assemblages; however, it is less common in shrub- or tree-dominated areas (Culver and Lemly 2013; Spackman et al. 1997). This species requires occasional fluvial disturbance, such as flooding. It is known to occur at elevations between 4,500 and 6,800 feet. It flowers from July to September (Spackman et al. 1997).

Ute ladies'-tresses is suspected to occur on BLM administrative and affected lands in the RGFO in Boulder and Jefferson Counties, but may also be present in El Paso, Larimer, and Weld Counties (Spackman et al. 1997). Prior to 1992, extant populations of Ute ladies'-tresses were known only from Jefferson and Boulder Counties along Clear, Boulder, and South Boulder Creeks within the Clear and St. Vrain watersheds. Historical (and presumably extirpated) occurrences were also known from Weld and El Paso Counties in the Middle South Platte-Cherry Creek and Fountain watersheds, but plants have not been observed since 1896. Since 1992, additional populations have been recorded from St. Vrain and Left Hand Creeks in Boulder County (St. Vrain watershed), Claymore Lake near Fort Collins in Larimer County, and the Cache La Poudre watershed. Threats to this species include urbanization, grazing, mowing, flood control, pesticides, competition from introduced weeds, natural herbivory, loss of pollinators, recreation, and over-collection.

Colorado butterfly plant

Colorado butterfly plant is a facultative wetland endemic species confined to moist soils in mesic or wet meadows of floodplain areas in north central Colorado, extreme western Nebraska, and southeastern Wyoming at elevations between 5,800 to 6,200 feet (Culver and Lemly 2013; Spackman et al. 1997). This subspecies occurs primarily in habitats created and maintained by streams active within their floodplains, with vegetation that is relatively open and not overly dense or overgrown. Colonies are often found in low depressions or along bends in wide, active, meandering stream channels a short distance upslope of the actual channel including sub-irrigated, alluvial soils. Historically, flooding was probably the main cause of disturbances in the plant's habitat, although wildfire and grazing by native herbivores may also have been important. Although flowering and fruiting stems may undergo increased mortality because of these events, vegetative rosettes appear to be little affected. It flowers from June to September and is pollinated by moths (Culver and Lemly 2013).

All currently known populations are within a small area (17,000 acres) in southeastern Wyoming, western Nebraska, and north-central Colorado, including Boulder, Broomfield, Douglas, Jefferson, Larimer and Weld Counties (Culver and Lemly 2013; Spackman et al. 1997). In Colorado, one population occurs on the Meadow Springs Ranch, northern Colorado (owned by the City of Fort Collins).

The reasons for range-wide decline are generally related to habitat degradation and destruction (spraying of herbicides, pesticides, mowing, grazing, etc.) No populations are known to occur on RGFO-managed lands, and surveys may not have been completed within the planning area. BLM authorized actions may have effects on downstream populations.

Penland alpine fen mustard

This small obligate wetland species occurs in the alpine tundra of Colorado, where endemic small populations of the plant are distributed in a 25-mile stretch of the Continental Divide on Hoosier Pass and in the Mosquito Range above an elevation of 11,800 feet in Lake, Park, and

Summit Counties (Culver and Lemly 2013; Spackman et al. 1997). The alpine fen mustard is found on deep organic soils in moist areas that are usually adjacent to clear running water from snow melt, eastern aspects with gentle slopes. It flowers from June to August and sets fruit in late July to September.

Direct impacts to plants and habitats occur from mining and from OHV use and other forms of recreation. In addition, there are only a few populations of the species on small areas of specialized habitat, which make it particularly vulnerable to human disturbances as well as to random environmental occurrences. The FWS *Eutrema* recovery team generated a potential habitat map based on the geology, elevation, soils, and hydrology required to maintain populations. This model documented potential habitat on RGFO-managed lands in the Mosquito Range of Colorado.

Western prairie fringed orchid

This facultative wetland to obligate wetland species is found in full sun on moist to wet unplowed calcareous soils of tallgrass prairie, sedge meadows, undisturbed environments, and roadside ditches that get flooded 1-2 weeks annually. It flowers mid-June to late July,

NatureServe and the FWS do not indicate this species present in Colorado (NatureServe 2014; FWS 2015b). However, upstream water depletions of North Platte, South Platte and Laramie River Basins carried out on BLM administrative lands are described as a possible threat to downstream populations (FWS 2015b).

Fish

Greenback cutthroat trout

Greenback cutthroat trout is the native salmonid of the South Platte Basin and is Colorado's state fish. Presumed to be extinct by 1937, numerous wild cutthroat populations identified as greenbacks were discovered in the South Platte and Arkansas Basins starting in the late 1950s. Based on genetic analysis, researchers have concluded that the only currently surviving population of true greenback cutthroat trout is in Bear Creek, a small tributary of the Arkansas River near Colorado Springs, Colorado. Further research suggests that the greenbacks that were the native cutthroat of the South Platte were likely stocked in Bear Creek in the early 1880s. The greenback cutthroat trout is one of three subspecies of cutthroat that currently reside in Colorado, inhabiting cold-water streams and lakes.

Pallid sturgeon

This species has a unique mouth that it uses to suck fish and invertebrates from river bottoms. Suitable habitat for this species is large free flowing rivers with silt and a variety of depths and velocities, so that sand bars, sand flats, gravel bars, and braided sections form and provide adequate prey (FWS 2015b). This eastern fish species is not known to occur in the RGFO planning area or in Colorado; however, BLM authorized actions upstream that cause water depletions in the South Platte River Basin are described as a threat to downstream pallid sturgeon populations.

Terrestrial vertebrates

Piping plover

Piping plover is a small North American ground nesting shorebird that migrates to Colorado in late April to early May. Generally, piping plover favors open sand, gravel, or cobble beaches for breeding. Breeding sites are generally found on islands, lake shores, coastal shorelines, and river margins where insect prey are abundant. Currently, the only known piping plover habitat within the administrative boundaries of BLM-RGFO is near Las Animas, Colorado, along playas and man-made reservoirs. Documented nesting has occurred at Adobe Creek, John Martin, Neenoshe, Neegronda, and Upper Queens Reservoirs. Threats to piping plover include high water levels that flood nesting habitat, insecticide application, and predation of eggs and chicks. Predation is especially an issue, as this species produces a small clutch size (Slater 1994).

Interior least tern

Least tern (*Sternula antillarum*), the smallest member of the tern family, is represented by three distinct subspecies. The occurrence of breeding least terns is localized and is highly dependent on the presence of shallow water bodies during summer, dry, exposed sandbars and favorable river flows that support a forage fish supply and isolate the sandbars from the riverbanks. Characteristic riverine nesting sites are dry, flat, sparsely vegetated sandbars and gravel bars within a wide, unobstructed, water-filled river channel. This species is migratory in Colorado from mid to lay May until fall. Currently, the only known piping plover habitat within the administrative boundaries of BLM-RGFO is near Las Animas, Colorado, along playas and man-made reservoirs. Least terns nest primarily at Adobe Creek and Neenoshe Reservoirs, with one nesting record from Upper Queens Reservoir.

Threats to interior least tern include small populations of fish, including minnow; drought; water depletions and poor water quality that reduce fish populations; high water levels that flood nesting habitat; timing changes to water flows; pesticide and insecticide application; and predation of eggs and chicks. Similarly to piping plover, predation is especially an issue, as this species has a low reproductive rate (Slater 1994). Water depletions in lands affected by BLM authorized actions are a concern for downstream populations.

Mexican spotted owl

In accordance with the 2012 FWS recovery plan, the planning area for this species lies within the Southern Rocky Mountain–Colorado ecological management unit, a specific geographic area, identified mainly from physiographic provinces, used to evaluate the status of Mexican spotted owl and within which to develop specific management guidelines. The habitat within the RGFO is primarily narrow, steep-walled canyons that offer a cool microclimate with mixed coniferous forest canopy having a complex structure, a high canopy closure, and abundant small mammal populations (FWS 2001, 2004).

Nests and roosts are primarily found in closed-canopy forests or rocky canyons. In the northern portion of the range, most nests are in caves or on cliff ledges in steep-walled canyons. Elsewhere, the majority of nests appear to be in trees. Forests used for roosting and nesting often contain mature or late-seral coniferous stands that are structurally complex. These forests are typically of uneven age and multi-storied, with high canopy closure. Although a variety of tree species are used for nesting and roosting, Douglas-fir appears to be the most commonly used species for both of these activities. In 2013, three adults and one fledgling were located during annual BLM-RGFO Mexican spotted owl surveys. Mexican spotted owls nest, roost, forage, and disperse in a diverse array of biotic communities.

Primary threats to the subspecies are those that aggressively alter its nesting, roosting, and foraging habitat. This may include some silviculture practices such as clear cutting or overstory removal; lack of surface and mixed fire; and severe, stand-replacing wildfire. Additional threats vary by recovery unit, and they include such factors as indiscriminate fuelwood cutting, overgrazing, recreation, and fragmentation of habitat.

Preble's meadow jumping mouse

Preble's meadow jumping mouse is found along the foothills in southeastern Wyoming and southward along the eastern edge of the Front Range of Colorado to Colorado Springs, in Boulder, Weld, Jefferson, and El Paso Counties at elevations up to 7,600 feet. Preble's meadow jumping mouse is primarily associated with riparian corridors of small intermittent and perennial streams, where riparian herbaceous and shrub (primarily willow) vegetation dominate. Typical habitat for the Preble's meadow jumping mouse comprises well-developed plains riparian vegetation with adjacent relatively undisturbed grassland communities, within 300 feet of the 100-year floodplain and a nearby water source. Well-developed plains riparian vegetation typically includes a dense multistoried, horizontal cover dominated by willows with a understory of grasses and forbs. Other shrub species that may be present include snowberry, chokecherry, hawthorn, Gambel's oak, gray alder, river birch, skunkbrush, wild plum, lead plant, red-osier dogwood, and others (FWS 2015b).

The RGFO manages several small parcels of land that are located within Preble's meadow jumping mouse overall range. Currently, there is no designated critical habitat and no known occurrences of Preble's within the RGFO. Threats to Preble's meadow jumping mouse include those actions causing habitat loss or conversion such as urban and residential development, roads, agricultural production, shrub removal, stream flow changes and water control, native plant removal, and mowing.

New Mexico meadow jumping mouse

The New Mexico meadow jumping mouse is restricted to riparian corridors with flowing water and dense herbaceous vegetation. It nests in dry upland soils that are within 300 feet of the active stream channel, but primarily uses moist, streamside, dense riparian/wetland vegetation up to an elevation of about 8,000 feet for foraging and movement (FWS 2014a). It appears to only use two riparian community types: 1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canary grass alliances) and 2) scrub-shrub wetlands (riparian areas along perennial streams that are composed of willow and alder shrub sites with moist to saturated soils). It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edges of permanent water. The only known location of New Mexico meadow jumping mouse in Colorado is within Lake Dorothey State Wildlife Area, located in Las Animas County; however, few surveys have been conducted elsewhere or within RGFO lands in that vicinity.

The primary threats to New Mexico meadow jumping mouse include excessive grazing pressure, water use and management, highway reconstruction, development, and recreation. Moreover, the highly fragmented nature of its distribution is a major contributor to the vulnerability of this species and increases the likelihood of very small, isolated populations being extirpated.

Lesser prairie chicken

Nesting, brooding, or winter habitat for lesser prairie chicken (LEPC) is found where high forb cover occurs in sand sagebrush, sand shinnery oak, and mixed grass and waste grain fields in the eastern shortgrass prairie of southeastern Colorado (Van Pelt et al. 2013). This species has high

site fidelity to lek sites, which are located on knolls and ridges, with grama-grass species less than 4 inches in height. Lek sites also occur in disturbed areas, including abandoned oil and gas pads, roads, livestock concentration areas, herbicide-treated areas, and prairie dog towns (Van Pelt et al. 2013).

Lesser prairie chicken was a likely resident in six counties in Colorado prior to European settlement. At present, LEPC is known to occupy portions of Baca, Cheyenne, Prowers, and Kiowa Counties, but is not known to persist in Bent and Kit Carson Counties. Currently, populations in Kiowa and Cheyenne Counties number less than 100 individuals and appear to be isolated from other populations in Colorado and adjacent states. The estimated size of the LEPC population in Colorado, as of 2000, is less than 1,500 breeding individuals. CPW and the USFS have conducted LEPC lek surveys for many years. Total LEPC detected in 2011 was 161 birds, up from 148 birds detected in 2010 and 75 detected in 2009. The total number of active leks detected was 17, identical to the 17 in 2010 and up from the 13 in 2009. In 2011, six leks were detected from Baca County, two in Cheyenne County, and nine in Prowers County. No active leks were counted in Kiowa County during standard survey efforts. Active leks may have been present but undetected because of prohibitions to accessing leks on private land.

The Lesser Prairie-Chicken Range-wide Conservation Plan was created in 2013 to preclude the need to list LEPC under the Endangered Species Act of 1973, as amended (VanPelt et al. 2013). The plan created LEPC focal, connectivity, and expansion areas to direct conservation efforts for the species. These areas are where lesser prairie-chicken individuals are known to have occurred, displayed, and bred in the past 10 years. Focal or corridor areas are based upon lek site and habitat information provided by representatives of State and Federal wildlife management agencies within the range of LEPC (Van Pelt et al. 2013). The determination of an area to be focal versus corridor was based upon habitat, proximity to leks, land use, and recent use by the species.

The RGFO manages very little surface lands but many acres of Federal subsurface rights within the range of LEPC in Colorado (Table 2.27).The BLM currently has oil and gas development leases on 2,132.79 acres within the connectivity stratum, 1,588.39 acres within the expansion stratum, and 7,332.77 acres within the focal area stratum (acreages are approximate).

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Table 2.27. Lesser Prairie Chicken Focal Areas and Federal Subsurface Rights Overlap within the RGFO Planning Area

Stratum	Federal subsurface rights	Total acres[a]
Connectivity	All minerals	6,112
	Oil and gas only	266
	Other	964
Expansion	All minerals	6,279
	Oil and gas only	171
	Other	1,928
Focal area	All minerals	37,810
	Oil and gas only	280
	Other	8,814

[a]Acreages are approximate

Threats to lesser prairie chicken include those actions that convert habitat from suitable to unsuitable, such as livestock grazing, energy development, petroleum production, shrub eradication and control, woody plant invasion, noxious weed invasion, herbicide application, and

road development (Van Pelt et al. 2013). Threats that cause mortality to individuals include collisions with power lines and motorized vehicles, predation, hunting, insecticide application, and competition with other upland ground nesting birds.

Southwestern willow flycatcher

This species occurs in the southernmost portions of Colorado only in deciduous willow carrs and cottonwood riparian corridors. Other native shrubs and trees may be present. Native vegetation must be greater than 13 feet in height with high canopy cover and dense hiding cover greater than 1.24 acres in size (FWS 1995b). This species breeds in sites at elevations up to 8,500 feet. It is migratory in Colorado, arriving by mid-May. Abundant insect populations must be present in breeding habitat for reproductive success (FWS 1995b).

Suitable habitat for southwestern willow flycatcher may be present in the RGFO planning area, and that habitat may be occupied according to USGS GAP GIS distribution models (USGS Gap Analysis Program 2011). Few to no surveys have been done to date in the planning area for this species, which has always been considered rare throughout its range.

Threats to this species include those actions that affect riparian corridors and convert suitable breeding and foraging habitat to unsuitable or non-habitat, such as native tree and shrub removal, water impoundments, changes to water flows or timing, noxious weed invasion, drought, and urban development. Other threats include cowbird nest parasitism, insecticide application, and predation.

Whooping crane

This species uses large seasonal or permanently flooded palustrine wetland complexes with potholes, including croplands, salt marshes, or tidal flats (FWS 2015b). Breeding sites need to have an abundance of insects, crayfish, frogs, small fish to satisfy foraging demands. Open terrain is needed near wetlands for roosting. In Colorado, this is an incidental migratory species. Past attempts to foster and establish whooping crane in Colorado were relatively unsuccessful, and the last individuals died in 2002.

Upstream water depletions affecting the South Platte River Basin are a threat to downstream populations of whooping crane.

Yellow-billed cuckoo

This species occupies low gradient, perennial, free-flowing, and dynamic riparian corridors with wide floodplain attributes at elevations up to 7,000 feet. Suitable breeding habitat must have native stands of willow, cottonwood, and other deciduous shrub and tree species greater than 37 acres in size, with dense canopy closure, high number of trees per acre, and dense hiding cover, little to no Tamarisk present, and abundant large-sized insect and tree frog populations.

Yellow-billed cuckoo is migratory in Colorado for the purpose of breeding (FWS 2014c). It is known to occupy parts of western Colorado, and eBird (2012) reports occurrences throughout eastern Colorado. It is not documented within the RGFO. Suitable habitat may exist in the planning area for yellow-billed cuckoo in limited sites according to USGS GAP GIS distribution models; however, those sites have not been evaluated and may be too small in size to meet habitat requirements for this species (USGS Gap Analysis Program 2011; FWS 2014c).

Threats to yellow-billed cuckoo include insecticide application and those actions that affect riparian corridors and convert suitable breeding and foraging habitat to unsuitable or non-habitat, such as native tree and shrub removal, water impoundments, changes to water flows or timing, noxious weed invasion, drought, and urban development.

Black-footed ferret

Black-footed ferret is an obligate associate of prairie dog colonies and specifically burrows for hunting prey and shelter spending the vast majority of its time underground. While this species may consume other small mammals (e.g., mice, rabbits, as well as carrion), its primary prey is the prairie dog.

Gunnison's and black-tailed prairie dog colonies occur in the RGFO planning area, according to inventory data; however, none of them currently meet the habitat requirements needed to support black-footed ferret, as suitable black-footed ferret habitat occurs only in prairie dog colonies that are greater than 200 acres in size with a density of greater than eight burrows per acre (FWS 2015a).

Currently, there are no known populations of black-footed ferret within the planning area, even though potential habitat does exist. However, all black-tailed prairie dog colonies within the RGFO planning area have been block-cleared with the FWS. This means that wild and free-ranging black-footed ferret individuals are no longer present, that Section 7 consultation is no longer required for activities that remove black-tailed prairie dog individuals or their habitat, and that survey requirements for black-footed ferret are no longer in effect.

Threats to black-footed ferret are related to loss of habitat and prey, including conversion of suitable habitat to unsuitable (such as conversion to agricultural fields), lethal prairie dog management, and disease.

Canada lynx

Much of the following species description and information on habitat requirements was compiled from the Southern Rocky Mountains Geographic Area section of *Canada Lynx Conservation Assessment and Strategy* (Interagency Lynx Biology Team 2013). Snowshoe hare and red squirrel are the primary prey of lynx in this region. Preferred habitat for Canada lynx includes Englemann spruce, and mesic mixed conifer forests with dense horizontal cover, coarse woody debris, and adequate browse for snowshoe hare during winter.

In this planning area, habitat for Canada lynx occurs at higher elevations or in mesic microsites (north aspects, drainages, and cirques). Suitable habitat for Canada lynx is limited in the planning area in comparison to surrounding National Forest System lands. Although not considered primary lynx habitat, upper montane mixed forests likely provide important connective areas, facilitating lynx dispersal, movement, and foraging opportunities between blocks of suitable lynx habitat. Suitable habitat for Canada lynx is present within some portions of the RGFO but in limited areas and quantities, as this is the eastern edge of suitable habitat for this species in Colorado. In fact, the entire population of lynx in Colorado is believed to have an uncertain future, because it is marginal, disjunct, and isolated from northern core habitats and persistent populations (FWS 2014b).

Lynx were documented by CPW in the vicinity of BLM-managed lands, but these appeared to result solely from movement and dispersal, because the recorded intensity of use by lynx was low

(Ivan and Shenk 2009). CPW closely tracks and monitors lynx movements, and several research projects are underway to evaluate re-introduction efforts and better understand the species.

Threats to Canada lynx are those that affect snowshoe hare habitat, connectivity, dispersal, movement, and reproduction; e.g., timber harvests, stand-replacing fire, recreation, high traffic volume, and collisions with vehicles.

Terrestrial invertebrates

Uncompahgre fritillary butterfly

The Uncompahgre fritillary butterfly has the smallest total range of any North American butterfly species (FWS 2009b). Its habitat is limited to two verified areas (inhabited by three colonies), and possibly an additional two small colonies in the San Juan Mountains and southern Sawatch Range in Gunnison, Hinsdale, and Chaffee Counties in southwestern Colorado. All colonies known to the FWS are associated with patches of snow willow (*Salix nivalis*), which provides larval food and cover, and are restricted to elevations between 12,100 and 13,500 feet (FWS 2009a). The species has been found only on northeast-facing slopes, which are the coolest and wettest microhabitat available in the San Juan Mountains. This species is not known to occur within the RGFO planning area. Furthermore, it is not known if snow willow is present in the planning area to provide suitable habitat for this species. Over-collection is considered the greatest human-caused threat to the Uncompahgre fritillary butterfly, whose sedentary nature, weak flying ability, and tendency to fly low to the ground make it easy to collect. Other actual or potential effects to the species include negative climatic changes, small population size, and low genetic variability. There is also a minor potential threat from the trampling of larvae by livestock and humans.

Pawnee Montane skipper

Pawnee montane skipper is endemic to Colorado Front Range grasslands and open ponderosa pine woodlands with low canopy cover (less than 30 percent) and a sparse understory that provides an abundance of its primary nectar source, prairie gayfeather (*Liatris punctate*), which flowers in late summer to early fall (FWS 1987). It's secondary nectar source is milk thistle (*Cardus nutans*). Blue grama (*Bouteloua gracilis*) is required in abundance as a larval food source (FWS 2015b). Its habitat appears to be confined to an elevation range between 6,000 to 7,500 feet. Adults emerge in July and fulfill a complete life cycle by fall.

Pawnee montane skipper occurs only on the Pikes Peak Granite Formation in the South Platte River drainage system in Colorado, involving portions of Jefferson, Douglas, Teller, and Park Counties. An intensive distribution survey was conducted within the South Platte drainage during August and September 1985. The survey found the range of the skipper to be centered at Deckers, Colorado, and to extend northwestward just beyond Pine, Colorado, and southward to the point where the county lines of Teller, Park, Jefferson, and Douglas Counties nearly converge. This total area is roughly 23 miles long and 5 miles wide. The total known habitat within this range is estimated to be 37.9 square miles. The area occupied by Pawnee montane skipper is managed by the USFS (Pike National Forest), Jefferson County, Colorado State Land Board, and the BLM. The Denver Water Department and private individuals own the rest of the known occupied habitat. The RGFO manages approximately 80 acres of known Pawnee montane skipper habitat, four miles north of Pine, Colorado, within its described range.

This species requires singular disturbance events that promote germination and flowering of prairie gayfeather, such as surface or mixed fire (FWS 2015b). Periodic and repetitive disturbance

events are a threat to this species. Other threats include those actions that remove or aggressively alter habitat, such as stand-replacing fire, land conversion, road development, and noxious weed invasion.

2.2.9.2.2. BLM Sensitive Species

According to BLM Manual 6840.2A, BLM sensitive species are those native species 1) that are found on BLM-administered lands where the agency has the capability to affect its conservation and status through management actions, 2) that have documented downward trends that suggest risk through part or all of its range, 3) for which BLM-administered lands provide refugia or unique habitats, and threats would affect the viability of the species, and 4) that, under the ESA, are proposed for listing, are candidates for listing, or are de-listed during a 5-year period (BLM 2008a).

The Colorado BLM Sensitive Species list, published in 2009, includes six mammals, nine birds, two fish, three reptiles, three amphibians, and 11 plant species (Table 2.28). This list is currently under review by the BLM Colorado State Office and is subject to change.

Table 2.28. Sensitive Species Known to Occur or Potentially Occurring in the RGFO Planning Area

Common name	Scientific name	Other agency designations[a]
Mammals		
Townsend's big-eared bat	*Corynorhinus townsendii*	G4T4/S2, FS, SC
Gunnison's prairie dog	*Cynomys gunnisoni*	G5/S5, FS, Federal candidate in Montane populations
Black-tailed prairie dog	*Cynomys ludovicianus*	G4/S3, FS, SC
Fringed myotis	*Myotis thysanodes*	G4G5/S3, FS
Big free-tailed bat	*Nyctinomops macrotis*	G5/S1
Swift fox	*Vulpes velox*	G3S3, FS, SC
Birds		
Northern goshawk	*Accipter gentilis*	G5/S3B, FS
Ferruginous hawk	*Buteo regalis*	G4/S2BS4N, FS, SC
Western snowy plover	*Charadrius alexandrinus nivosus*	G4T3/S1B, SC
Mountain plover	*Charadrius montanus*	G2/S2B, FS, SC
Bald Eagle	*Haliaeetus leucocephalus*	G5/S1B/S3N, FS, ST
Long-billed curlew	*Numenius americanus*	G5/S2B, FS, SC
White-faced ibis	*Plegadis chihi*	G5/S2B, FS
American white pelican	*Pelecanus erythrorhynchos*	G3/S1B
Brewer's sparrow	*Spizella berweri*	G5/S4B
Lesser prairie chicken	*Tympanuchus pallidicinctus*	Federal candidate
Fish		
Arkansas darter	*Etheostoma cragini*	Federal candidate
Rio Grande cutthroat trout	*Oncorhynchus clarki virginalis*	G4T3/S3, FS, SC
Reptiles		
Common king snake	*Lampropeltis getula*	G5/S1, SC
Milk snake	*Lampropeltis triangulum taylori*	G5T4Q/S2?, FS, SC
Massasauga	*Sistrurus catenatus*	G4/S3, FS, SC
Amphibians		
Northern cricket frog	*Acris crepitans*	G5/SH, SC
Plain's leopard frog	*Rana blairi*	G5/S3, FS, SC
Northern leopard frog	*Rana pipiens*	G5/S3, FS, SC

Common name	Scientific name	Other agency designations[a]
Boreal toad	*Anaxyrus boreas boreas*	FS, SE, G4T1Q/S1
Plants		
Rydberg's golden columbine	*Aquilegia chrysantha* var. *rydbergii*	G4T1/S1, FS
Crandall's rockcress	*Arabis cranadallii (Boechera crandallii)*	G4/S2
Dwarf milkweed	*Asclepias uncialis*	G2G4/T2T3/S2, FS
Brandegee's buckwheat	*Eriogonum brandegeei*	G1G2/S1S2, FS
Colorado buckwheat	*Eriogonum coloradense*	G3/S2
Golden blazing star	*Mentzelia chrysantha (Nuttallia chrysantha)*	G2/S2
Royal Gorge blazing star/Royal Gorge stickleaf	*Mentzelia densa (Nuttallia densa)*	G2/S2
Few-flower ragwort	*Packera pauciflora*	G4G5/S1S2
Degener's beardtounge	*Penstemon degeneri*	GS/S2
Pale blue-eyed grass	*Sisyrinchium pallidum*	G2G3/S2
Rolland's bulrush	*Trichophorum pumilum (Scirpus rollandii)*	G5/S2

[a](G_/S_) = CNHP Global and State Ranking; (FS) = Forest Service; (S_) = Colorado Parks and Wildlife

Mammals

Townsend's big-eared bat

Townsend's big-eared bat occurs throughout the west and in Colorado, from elevations of 6,100–9,500 feet. Habitat associations include dry to mesic coniferous forests, deserts, native prairies, riparian communities, and agricultural areas. Its distribution is strongly correlated with the availability of caves and cave-like roosting habitat. Suitable Townsend's big-eared bat roosting sites have narrowly defined characteristics and are selected based on internal characteristics rather than surrounding vegetation types (Gruver and Keinath 2006).

Townsend's big-eared bat has high site fidelity to maternal roosts, which are critical habitat features (Gruver and Keinath 2006). Internal temperatures of maternal roost sites are drivers of bat energy regulation, especially during pregnancy. Males generally do not roost with females in maternal roosts, and thus congregate in bachelor roosts outside of the breeding season. Hibernacula sites in the western Rocky Mountains, holding from 20 to 30 bats, include caves and mines with adequate airflow to regulate bat body temperature. Suitable hibernacula, also used for mating, may be limiting factors, hence the reason for large numbers of individuals at one site.

Forage habitat is selected based on available structures rather than vegetation type, even though insects are captured near or gleaned from vegetation rather than aerial pursuit (Fitzgerald, , Meaney, and Armstrong 1994). Townsend's big-eared bat's long slow flight patterns make edge habitats, such as riparian-forest edges and beaver dams ideal for foraging. Foraging is usually close to roosts. Preferred prey include caddis flies, moths, beetles, lacewings, flies, and wasps (Adams 2003).

Population centers are believed to occur in the planning area in sites dominated by exposed, cavity-forming rock and/or historic mining districts, which are plentiful in the western portion of the RGFO. Townsend's big-eared bat's habit of roosting on open surfaces makes it readily detectable, and it is often the species most frequently observed (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to use buildings,

bridges, rock crevices, and tree cavities as roost sites. This species has a documented maternity roost within the RGFO along the Arkansas River.

Causes for population decline of this species may be its narrow roosting requirements and loss or disturbance of roosting habitat (Gruver and Keinath 2006). Threats to Townsend's big-eared bat include destruction of roost sites; disturbance at bachelor roosting, maternity roosting, or hibernacula sites; change in cave or mine temperature and humidity; permanent, impermeable sealing of abandoned mines and caves; decline in water quality; mercury contamination of water; lack of access to water; pesticide and herbicide use; disease; and trapping and killing of bats. White-nose syndrome could also affect Townsend's big-eared bat.

Gunnison's prairie dog

Gunnison's prairie dog (GPD) is an ESA candidate species. GPD is limited to the high mountain valleys and plateaus in the southern Rocky Mountains. It occupies shortgrass and mid-grass prairie, grass-shrub in low valleys, mountain meadows in intermountain parks, and valleys with well drained deep soils and flat ground. Its range extends over elevations of 5,000–12,000 feet. On RGFO-managed lands, populations of the species can be found in Chaffee, Lake, Park, and Teller Counties.

Most of the impacts to GPD can be attributed to predators, disease, and disturbance by humans. Human-caused impacts include fragmentation and loss of habitat from development, shooting, and poisoning. Predators include such animals as badgers, coyotes, weasels, and several species of raptors. An occasional pup may be predated by the rattlesnakes that often inhabit the prairie dog's burrow.

Black-tailed prairie dog

The black-tailed prairie dog is a colonial ground squirrel and one of five species in the genus *Cynomys*, all of which occur in western North America. Black-tailed prairie dogs live in colonies or "towns" in short and mixed grass prairies where the landscape is characterized by dry, flat, open grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle. By colonizing areas with low vegetative stature, prairie dogs often select areas with past human (as well as animal) disturbance. In 2002 and 2003, an inventory of black-tailed prairie dogs within the planning area was completed by CNHP (Assal and Sovell 2003). In general, the report indicates that there are few black-tailed prairie dog colonies found on RGFO-managed lands, probably because there are few BLM-managed surface acres on the eastern plains that are suitable habitat for this species.

Threats to this species include habitat conversion from suitable to unsuitable, such as conversion to agricultural fields, lethal management efforts such as poisoning, and disease.

Fringed myotis

Fringed myotis is a species of bat inhabiting coniferous forest and woodland at moderate elevations from 3,900 to 9,400 feet in Colorado. Typical vegetation present in suitable habitat includes ponderosa pine, Douglas-fir, aspen, mixed conifer, lodgepole pine, pinyon, juniper, greasewood, saltbush and Gambel's oak (Keinath 2004). Fringed myotis forages in a variety of vegetation types, including coniferous forests and low-elevation shrub patches. The wing and body morphology of fringed myotis indicates that it is a slow but agile short distance flyer, meaning that foraging habitat and water sources must be proximal to roosting habitat.

Fringed myotis roosts in rock crevices, caves, mines, buildings, and trees. Microclimatic factors that affect roost site selection are believed to be primarily daytime temperature, wind, proximity to water and forage, and predators, especially in areas offering contiguous forested cover (Keinath 2004). A large abundance of snags present and low canopy cover proximate to water are characteristic of high quality roost habitat for fringed myotis. Fringed myotis is believed to use several different roost sites within a short period of time, perhaps for predator avoidance. Permanent roost structures, such as abandoned mines, caves, and cliffs result in high roost site fidelity (Keinath 2004). Ephemeral roost sites, such as snags, result in high site fidelity to the area but low site fidelity to the actual roost location (Keinath 2004).

Suitable roost sites are important determining factors affecting the population size and distribution of fringed myotis (Keinath 2004). Warm maternal roosts are chosen to minimize the energy needed during pregnancy and lactation of pups (Keinath 2004). Lactating females generally have very high site fidelity, even if maternity roosts are located in ephemeral roost sites such as snags. Females usually occupy maternity roosts from mid-April to September; mating occurs in the fall.

Females may occupy maternal roost sites after lactation is complete due to depleted fat reserves. Large females may feed pups from other females to afford smaller females the ability to forage (Keinath 2004). The health and survival of reproductive females is the key dynamic life-population factor in maintaining viable populations in fringed myotis. This may be difficult to manage, as maternal colonies tend to hide out of site in small maternal groups within the maternity roost location and therefore cannot be easily detected during surveys (Keinath 2004).

This species is known to hibernate in caves and buildings. Suitable hibernacula are believed to have stable, cool, damp environments between 60° F and 71° F. Most hibernating fringed myotis bats are found in small group sizes.

Fringed myotis may have a statewide geographic range due to the variety of vegetation types and features available in the state for roosting and hibernacula. This species is considered to be uncommon to rare in Colorado but may be locally abundant; records of occurrence in its range appear to be few. Where this species has been well studied, migration doesn't seem to be extensive.

The primary threats to fringed myotis are disturbance, modification, or loss of maternity, bachelor, or hibernacula roost sites, habitat alteration such as loss of large snags or tree cavities, alteration of water flows, loss of water, changes in vegetation composition and structure, changes in insect prey abundance and diversity or emergence, and pesticide and toxic chemical use (Keinath 2004). White-nosed syndrome could also affect fringed myotis.

Big free-tailed bat

The big free-tailed bat was long thought to be an accidental wanderer in Colorado. However, recent data show the presence of breeding colonies in Colorado (Navo and Gore 2001). Indeed, audible echolocation calls and recordings provide evidence of widespread occurrence across Colorado. This bat frequents rocky or canyon country where it roosts in crevices. In Arizona and New Mexico it uses pinyon-juniper and ponderosa pine woodlands. This migratory species is a swift, powerful flier, and occasionally, individuals wander as far north as Canada. Little is known about its mortality and longevity.

Suitable habitat for big free-tailed bat exists within RGFO-managed lands, but it is not known whether habitat is occupied or what the abundance of this species is within the planning area.

Threats to this species include disease, insecticide application, and contamination of drinking water sources.

Swift fox

Swift fox prefers open and flat prairies and arid plains with flat to rolling terrain and sparse vegetation of the Colorado eastern plains. It sometimes inhabits plains and prairie areas that are intermixed with winter wheat fields. Swift fox has also been documented in areas that are considered to be non-typical habitat, such as pinyon-juniper habitat in Colorado and cultivated areas adjacent to shortgrass prairies. The swift fox likely chooses areas with long sight-lines for predator avoidance and prey advantage, thereby avoiding vegetation and topographic features like canyons, steep hills, dense shrub, and forests.

The preferred habitat types and conditions appear to provide the best opportunities to avoid predators. Burrows provide denning habitat, so its relationship with burrowing animals is linked to its reproductive success. Prey include small to medium-sized mammals, prairie dog, birds, invertebrates, grass, and berries. Suitable habitat for swift fox exists within the RGFO planning area. The abundance and occupancy of that habitat is unknown. Habitat for this species is distributed in many eastern Colorado counties according to CPW GIS distribution models (CPW 2012).

Threats to this species include conversion of suitable habitat to unsuitable, such as to agricultural use, mineral extraction, lethal rodent control methods, collisions with motorized vehicles, predation, intraspecific competition with other medium-sized carnivores, trapping, shooting, and predator control methods.

Birds

Northern goshawk

In the western United States, northern goshawk habitats include interior mid- to late-seral-stage coniferous forest and mature aspen woodlands, often on north-facing slopes. The most consistent vegetative characteristic of goshawk nest sites is a high percent of canopy closure. Northern goshawk typically nests in large blocks of forested habitats at elevations between 7,000 and 11,500 feet. Two to four alternate nest sites are used in the nest area, totaling 100 acres in size. Post-fledging areas, used for training fledglings to become independent, span 300 to 600 acres in size (Reynolds et al. 1992). Post-fledging areas are characterized by forests with well-developed understories, canopy cover greater than 50 percent, snags, nest trees, coarse woody debris, and other structures that support prey populations.

Foraging areas span 5,000–6,000 acres in size to support a wider variety of large and small vertebrate prey populations. Goshawk prefers to hunt in forests with high canopy cover, high basal area, and a high number of large trees, and open understory, but it is often observed hunting along edges, in clear cuts, in openings, and crossing openings between woodlands in Colorado. Prey species, which are usually large-bodied vertebrates, include rabbits, hares, squirrels, upland game birds, perching birds, woodpeckers, and their relatives (Skorkowsky 2009).

Suitable habitat for northern goshawk is present within the planning area. Nesting has been confirmed on BLM-managed and adjoining Forest Service lands.

Threats to northern goshawk include loss or degradation of nesting or foraging habitat from changes in stand structure; fragmentation of habitat; lowered prey diversity or availability; genetic isolation; introduction of non-native species; depredation of adults, eggs, and chicks; inter- and intraspecific competition for nest sites; tree harvesting; human disturbance at nest sites; climate change; disease; illegal shooting and trapping; falconry; and pesticides and contaminants (Squires and Reynolds 1997).

Ferruginous hawk

Suitable habitat for ferruginous hawk includes open landscapes in grassland, shrubland, and pinyon-juniper woodland types. In Colorado, ferruginous hawk is most abundantly found year-round in the eastern plains and northwest corner of the state. It uncommonly winters in the mountainous and western slope portions of the state, probably in the wider valleys south of the Colorado River Valley (Collins and Reynolds 2005). It occupies elevations between 3,000 and 9,500 feet. It avoids developed, disturbed, urbanized, and closed environments, such as canyons and forests (Colorado Division of Wildlife 2003; Collins and Reynolds 2005).

In western Colorado, high abundance of primary prey followed by large, unaltered patches of native grasslands appear to be driving factors in ferruginous hawk's selection of breeding and wintering sites (Collins and Reynolds 2005). This species is often observed near prairie dog colonies and other rodent populations, which are their primary prey base. It is considered a mammalian specialist.

Based on the limited data available, the species is entirely migratory in the planning area, with birds overwintering and generally moving north in the early spring.

Ferruginous hawk breeds monogamously from February to July. It generally selects nesting structures that are elevated, preferring, in order, juniper, pine, willow, or cottonwood trees; sagebrush; cliffs; utility poles; dirt outcrops; haystacks; and buildings (Collins and Reynolds 2005). On occasion, ferruginous hawk nests on the ground but avoids cultivated sites for nesting. Like other raptors, ferruginous hawk uses and defends up to eight alternate nests in their nesting territory, which ranges from 0.01 to 10.00 square kilometers.

Breeding and nesting by this species in the RGFO planning area have not been reported; however, suitable habitat is abundant in the planning area, particularly along the foothills and eastern plains. Active nests may be identified during future surveys.

Risk factors limiting ferruginous hawk populations are availability of secure nest sites, nest disturbance, insufficient prey base, and unsuitable habitat around nest sites (Collins and Reynolds 2005). Mortality causes include predation by great horned owl, corvids (such as American crow), golden eagle, and mammals. Competition with buteos, such as red-tailed hawk, for prey and nest sites occurs, but this may be offset by hunting times, nest heights, or reproductive phenology. Other threats to ferruginous hawk are conversion of habitat to agriculture, urbanization, habitat degradation from improper grazing, human disturbance during breeding, prey population control with poison, trapping, shooting, prey population declines from habitat conversion, disease outbreaks (sylvatic plague), mine and energy development, changed fire regimes, and exotic and invasive species expansion.

Western snowy plover

Snowy plover nests on sandy beaches or alkaline flats with little or no vegetation. Nests are located within 500 feet of water. Snowy plovers arrive in Colorado in mid-April. They initiate nests as early as mid-April and as late as early July. The later dates are probably re-nesting attempts after failed nests rather than second clutches after successful nests. Most birds have left the State by the end of September.

Within the central shortgrass prairie in Colorado, they breed on the shores of reservoirs near the Arkansas River between La Junta and Lamar. Suitable habitat may exist within the RGFO planning area (USGS Gap Analysis Program 2011).

Threats to this ground nesting bird include predation, habitat modification due to urban development, road development, vegetation removal, and changes to water levels.

Mountain plover

Although the species is relatively rare, mountain plover can generally be found in open, flat tablelands that show some disturbance from drought, grazing, fire, etc. Typical nesting habitat contains vegetation less than 3 inches in height, is at least 30 percent bare ground, has a conspicuous object nearby, has less than 5 percent slope, is usually heavily grazed by livestock and/or prairie dogs, and has some taller vegetation, possibly used for shade and escape cover.

Surveys for mountain plover have been conducted within the RGFO. Mountain plover is found throughout the RGFO planning area in suitable habitats in both mountain meadows and shortgrass prairie.

Threats to this species includes those that cause a loss in quantity or degraded quality of breeding habitats, similar to those causing declines in prairie dog populations, such as grazing practices, land conversion to crop production, and energy and mineral development.

Bald eagle

In Colorado, bald eagle can be found year-round, though most individual eagles migrate in summer to northern breeding grounds but return to lower latitudes during the winter. Local migration of individual bald eagles may occur. Bald eagle occurs primarily in aquatic ecosystems, frequenting estuaries, large lakes, reservoirs, major rivers, and seacoasts (Buehler 2000). It is rarely associated with smaller streams or ponds. Large deciduous or conifer trees are needed for roosting, foraging, and breeding. Such trees are often proximal to water bodies, provide shelter from wind, and afford some distance from human disturbance. Quality foraging habitat is more important than proximity to water bodies (Buehler 2000). Bald eagle nesting occurs near open water, including rivers, streams and lakes, where they use large ponderosa pine, Douglas-fir, or cottonwood trees.

Winter habitat for bald eagle occurs throughout the country but is most abundant in the West and Midwest. Abundant and readily available food, close to one or more suitable night roosts, is the primary habitat requirement in winter. The majority of wintering bald eagle individuals are found near open water, where they feed on fish and waterfowl, often taking those that are dead or injured. When suitable conditions exist, particularly a lack of human disturbance, wintering bald eagles will forage in terrestrial habitats where they prey on small- to medium-sized mammals (e.g., prairie dogs and jackrabbits). They also scavenge road kills and winter mortalities of big game and livestock.

Within the RGFO, bald eagle is commonly seen along the Arkansas River during winter months. BLM survey records indicate that bald eagle historically nested within the RGFO. Raptor surveys are underway in the RGFO, and bald eagle nesting data is being updated.

Threats to bald eagle include contaminants; prey poisoning, including by mercury, lead, and PCBs; habitat loss; human disturbance at nest and roost sites; illegal shooting; decreasing food supply; electrocution from power lines; collisions with wind turbines; vehicle collisions while scavenging on roads; and habitat degradation from ex-urban and urban development (Travsky and Beauvais 2004).

Long-billed curlew

Long-billed curlew feeds in open prairies, usually in grassy hollows, or edges of prairie sloughs and ponds. Although it does not nest in agricultural areas, it often forages in them throughout the breeding season. Little information is known on microhabitat use during the breeding season, but curlews need open water for nesting and appear to have high site fidelity (Fellows and Jones 2009).

In southeastern Colorado, 55 percent of foraging observations occurred in short grass and 40 percent in crop fields. In this portion of the State, long-billed curlew was documented as breeding by Breeding Bird Atlas II surveyors. This species has been documented as a migrant in the planning area, but it is not known to nest in the planning area. Suitable nesting habitat may be present within the planning area for this species, but surveys have not been conducted specifically on BLM-managed lands.

Threats to this species include pesticide application, disease, energy development, predation, vehicle collisions and disturbance, and actions that alter breeding habitat such as noxious weed invasion, lack of natural fire, encroachment of trees, grazing, and conversion of suitable habitat to crop production (Fellows and Jones 2009).

White-faced ibis

White-faced ibis occurs in shallow ponds, lake margins, irrigated hay, freshwater wetlands, and wet meadows where moist soil, sedges, and cattails are present. Migrating to Colorado in April to breed, this species nests in colonies. Wetlands and agricultural fields provide foraging opportunities.

White-faced ibis is known to occur along the Arkansas River and among scattered reservoirs within the planning area, and breeding is possible, according to breeding bird survey data and Breeding Bird Atlas II data (USGS 2001). According to distribution data (eBird 2012) and USGS GAP GIS data (USGS 2011), suitable breeding habitat for this species appears to be concentrated in three areas in Colorado: the San Luis Valley, north-central, and the northeastern Colorado plains.

Threats to white-faced ibis include actions that alter breeding habitat, such as conversion from suitable habitat to unsuitable or non-habitat, including conversion to agricultural fields, water diversion projects, wetland dewatering, pesticide application, human disturbance at nest colonies during breeding season, urban development, and invasive species (Smiley and Keinath 2003). Other threats include drought, flooding, and predation.

American white pelican

In Colorado, this bird's habitat includes rivers, lakes, reservoirs, and marshes. Pelicans rest or roost on islands and peninsulas within these systems. Pelicans are known to use reservoirs within the planning area throughout South Park and the eastern plains. These areas serve as important foraging and nesting locations.

This species is migratory throughout most of Colorado, but within the Colorado Front Range, there is one known resident breeding population, and it is not located on BLM- managed lands.

Threats to this species includes changes to water levels and flows, where breeding and foraging habitat occur; disease; pesticide ingestion; contaminated water; motorized boats; and low flying aircraft.

Brewer's sparrow

Brewer's sparrow is considered a big sagebrush (*Artemisia tridentata*) obligate species, which migrates to sagebrush shrublands of central and western Colorado. Breeding pairs are generally uncommon or rare on Colorado's eastern plains and foothills, diminishing in abundance with decreasing latitude. This species requires contiguous large patches of healthy, evenly spaced, live sagebrush, 3--7 feet in height, and bunchgrass and forb understory. It avoids edges and newly disturbed areas, and is sensitive to patch size (Boyle and Reeder 2005). In Colorado, Brewer's sparrow has been found to occur in eight vegetation classes (listed in decreasing importance): mountain big sagebrush, lowland sagebrush, tall desert shrub, shortgrass-sandsage, montane grassland, mountain shrub, and pinyon-juniper woodlands.

Sagebrush cover in Colorado is found to occur at elevations of 3,200–11,000 feet (Mutel and Emerick 1992; Boyle and Reeder 2005). Brewer's sparrow has high breeding site fidelity, and juveniles generally return to nesting areas in subsequent years. Suitable foraging habitat for Brewer's sparrow has shrubs with large, vigorous forms. Brewer's sparrow primarily gleans small insects, such as butterfly and moth larvae, spiders, true bugs, and leaf hoppers, from sagebrush, rabbitbrush (*Chrysothamnus spp.*), and dwarf trees. Because Brewer's sparrow is omnivorous, it also consumes seeds from a variety of plant families, such as purslane (*Portulacaceae*), amaranth (*Amaranthaceae*), and goosefoot (*Chenopodiaceae*) (Boyle and Reeder 2005). Suitable foraging habitats during the breeding season are usually within 164 feet from nest sites (Boyle and Reeder 2005).

Suitable habitat for Brewer's sparrow probably exists in the RGFO planning area. Surveys for this species have not been carried out in the planning area by the RGFO. Breeding Bird Atlas II surveyors have documented possible, probable, and confirmed nesting observations of Brewer's sparrow in the vicinity of BLM-managed lands (eBird 2012).

Threats identified as affecting Brewer's sparrow include factors degrading or resulting in a loss of suitable breeding and foraging sagebrush habitat, such as pinyon pine–juniper encroachment, invasive plant encroachment, land use changes including development, fragmentation of habitat, motorized and non-motorized travel corridors and use, grazing practices, fire regime changes, and factors increasing edges or proximity to agricultural or developed areas (Holmes and Johnson 2005). Nest parasitism and predation, competition with sage sparrow, sage thrasher, and song sparrow are other factors affecting reproductive success.

Fish

Arkansas darter

Arkansas darter is a small, 2.5-inch fish in the perch family, native to portions of the Arkansas River Basin. It is listed as threatened in Colorado and is a candidate for protection under the ESA. The species is most often found in small spring-fed streams with a sand substrate and aquatic vegetation. The population appears stable at most sites where spring flows persist, and it has declined in areas where spring flows have decreased or have been eliminated. Estimates state that there are approximately 145 locality occurrences of the Arkansas darter distributed across the five states (FWS 2010a). Currently, the RGFO does not manage any lands that directly affect Arkansas darter habitat.

In Colorado, the species is found in the Upper Arkansas River, Adobe Creek, Fountain Creek, Horse Creek, Upper Arkansas at John Martin, Big Sandy Creek, Rush Creek, Black Squirrel Creek, and Chico Creek drainages. Comparisons with data collected since 1979 show that the species distribution has not changed significantly. Darter populations in Colorado persist in large, deep pools during late summer low-water periods when streams may become intermittent. Major threats to the species include stream dewatering resulting from groundwater pumping in the western portion of its range, and development pressures in portions of its eastern range. Spills and runoff from confined animal feeding operations also threaten the species locally throughout its range.

Reptiles

Common king snake

The common king snake is associated with lowland river valleys in southeastern Colorado and has been found near irrigated fields on the floodplain of the Arkansas River, rural residential areas in plains grassland, near stream courses, and in other areas dominated by shortgrass prairie. Most activity occurs on the ground or in rodent burrows. Periods of inactivity are spent in burrows and logs, in or under old buildings, in other underground spaces, or beneath various types of cover. This snake has been observed in a few locations in southeastern Colorado and north to the vicinity of the Arkansas River at elevations below about 5,200 feet. This species is difficult to find but may be locally common in the very restricted range in Colorado.

Milk snake

Milk snake occupies a variety of habitats in Colorado, including shortgrass prairie, sandhills, shrubby hillsides, canyons, open stands of ponderosa pine with Gambel's oak in the foothills, pinyon-juniper woodlands, arid river valleys, and abandoned mines. It generally stays hidden, except at night, and can commonly be found under discarded railroad ties in sand-hill regions. Hibernation sites include rock crevices that may be shared with other snake species. This species is found throughout most of Colorado at elevations primarily below 8,000 feet. Generally, milk snakes are scarce or at least hard to find, but fairly common locally.

Massasauga

Habitat for Massasauga in Colorado consists of dry plains grassland and sandhill areas. Massasaugas may be attracted to sandy soils supporting abundant rodent populations. The massasauga occurs in southeastern Colorado at elevations below about 5,500 feet and is locally very common within the planning area.

Amphibians

Northern cricket frog

In Colorado, the northern cricket frog has been located along the Republican River system in the northeast part of the State. The last known specimen in Colorado was observed in 1979 along the North Fork of the Republican River. In Colorado, its habitat occurs along sunny, muddy, or marshy, gently sloping edges of permanent or semi-permanent ponds, reservoirs, and streams; along irrigation ditches; in pastures; and in sandhill country.

Plains leopard frog

The plains leopard frog occurs on the southeastern plains of Colorado. They inhabit the margins of streams, natural and artificial ponds, reservoirs, creek pools, irrigation ditches, and other bodies of water in plains grassland, sandhills, stream valleys, or canyon bottoms. Although the plains leopard frog remains widely distributed within southeastern Colorado, lack of adequate data makes it difficult to assess trends in abundance in the State. It has become rare or absent where bullfrogs have been introduced in Colorado.

Northern leopard frog

The formerly abundant northern leopard frog has become scarce in many areas of Colorado. Typical habitats include wet meadows and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches. Some populations have disappeared due at least in part to changes in habitat. The suitability of breeding sites changes in response to climatic variation and flooding; though some sites may become unsuitable, others may be created by these events. It is suspected that local extirpation and colonization are normal ecological features of the northern leopard frog in the drought-prone climate of Colorado. It has become rare or absent where bullfrogs have been introduced in Colorado. Flood-control measures and diversion of water for irrigation have probably reduced the availability of breeding habitat along floodplains in lowland segments of some streams.

Boreal toad

Boreal toads use wet habitats in foothills, montane, and subalpine areas and are seldom far from water. They can potentially be found in all riparian habitat types, including marshes, wet meadows, streams, beaver ponds, glacial kettle ponds, and lakes that are interspersed in subalpine forest of lodgepole pine, Engelmann spruce, subalpine fir, and aspen. Once very common, the boreal toad has undergone severe declines beginning in the 1970s. Factors that may have contributed to the decline include increased ultraviolet light on embryos, acidification and heavy-metal contamination of water, habitat destruction and degradation, impacts of introduced trout, introduced fungal disease infection, and predation.

Plants

Rydberg's golden columbine

Rydberg's golden columbine occurs in mountainous terrain, especially along streams or in rocky ravines at an elevation of 5,500–6,000 feet on the eastern slope of the Rockies in Colorado. The species is endemic to Colorado in El Paso, Jefferson, Las Animas, and Fremont Counties. Suitable habitat appears to include granite based soils where streams are located in canyons and rocky ravines, may be in seep-fed rocky ledges, and in shady moist areas (Spackman et al. 1997). It flowers in June. Known occurrences are documented in the RGFO planning area.

Crandall's rockcress

This plant grows in limestone chip-rock, shale slopes, sandstone ridges, and stony areas, often among sagebrush, ridges, and steep hill slopes. It is regionally endemic to central Colorado and is located within Park and Chaffee Counties within the planning area. Associated vegetation includes grasses, sagebrush, pinyon pine, juniper, and ponderosa pine at elevations of 8,100–10,600 feet (Spackman et al. 1997). The primary threat at this time is considered to be roads. It is not known whether or not all of the occurrences are threatened by these activities. Habitat loss is another substantial threat. Extrinsic factors such as resource extraction and activities associated with recreation, road development, and grazing are the primary range-wide threats.

Dwarf milkweed

Dwarf milkweed habitat consists of shortgrass prairie, often on sandstone-derived soils and gravelly or rocky slopes at an elevation of 4,000–6,500 feet. It grows on the lower side slopes of canyon walls, on the base of mesas and escarpments, in gentle terrain, and in open sites (Spackman et al. 1997). Associated plant species include juniper, mountain mahogany, blue grama, yucca and prickly pear cactus. It flowers in late April until the end of May and fruits in late May to early June. Other associated species include juniper, mountain mahogany, blue grama, yucca and prickly pear cactus. Dwarf milkweed is very rare and occurs in small populations. It is only known from isolated occurrences in Colorado, New Mexico, Wyoming and Arizona. Surveys by CNHP in 1996 documented one population of this species with 24 individual plants in Oil Well Flats. Previous surveys have documented a small population in the Dinosaur Flats area.

Brandegee wild buckwheat

Brandegee wild buckwheat is listed as a BLM sensitive species and is locally common within the planning area but endemic to the upper Arkansas River in Chaffee and Fremont Counties, Colorado. It occurs on barren clay-loam soil in the Morrison formation. The plant grows where there are high levels of bentonite clay soil, on barren sites in open sagebrush or pinyon pine and juniper woodlands, and on steep slopes at elevations of 5,700– 8,700 feet (Spackman et al. 1997). It flowers from July to August and sets fruit between August and September. The CNHP, in cooperation with The Nature Conservancy, designated a site in Chaffee County as the Droney Gulch State Natural Area. The Droney Gulch site represents the best known occurrence in the world for this species. An equally important site is the Cleora site, located southeast of Salida. This species also occurs in the Garden Park area north of Cañon City in several sites along Fourmile Creek. The area has been designated as the Garden Park Natural Area by the state of Colorado and as a BLM research natural area and an ACEC.

Colorado buckwheat

Colorado buckwheat occurs in gravelly or sandy soil, often on subalpine and alpine slopes, and sometimes on montane grasslands at elevations of 8,500–12,000 feet. This species is endemic to Colorado and has been observed in Park County within the planning area. It flowers July to August.

Golden blazing star

Golden blazing star is a tall plant with yellow flowers. Habitat occurs on barren slopes of limestone, shale or clay at elevations of 5,120–5,700 feet. It appears to be confined to chalk, gypsum, and limestone rocky outcrops on barren and eroding soils of Biobrara shale (Spackman

et al. 1997). Site conditions appear to be hot and dry with low levels of competition with other plant species. It flowers from mid-July through September and sets fruit from late August through early September. This species is known from less than 20 locations in the Arkansas Valley from Pueblo Reservoir to Cañon City and is not found anywhere else in the world. BLM lands support two excellent populations of blazing star, one in the Fourmile Creek drainage north of Cañon City and the other in the dry uplands at Blue Heron ponds. Both populations of this species that occur on public lands provide an important potential haven for the golden blazing star.

Royal Gorge blazing star/Royal Gorge stickleaf

Royal Gorge stickleaf is a BLM sensitive species that is found in the lower rocky drainages of the project area. It is endemic to drainages and the main canyon of the Arkansas River in Fremont and Chaffee Counties at elevations between 5,400–7,700 feet (Spackman et al. 1997). It is found in washes, naturally disturbed sites, and steep rocky slopes, roadsides, gravel, scree, granodiorite and gneiss cliffs, often with pinyon-juniper or montane shrubs. Stickleaf habitat is confined to areas that are not good areas for fuel treatment projects because of the potential for soil erosion on the steep slopes where the plant is found. Good stickleaf habitat contains rocky drainages, and the vegetation (pinyon-juniper) is usually widely spaced with an open canopy and a depauperate understory. It flowers from July to August and sets fruit in September. Although this is a rare endemic species, this plant is locally common within the planning area.

Few-flowered ragwort

Few-flowered ragwort is an uncommon facultative wetland species found in meadows and wet places such as peatlands or fens, and areas with high pH (Culver and Lemly 2013). Suitable habitat is fed by water that has been in contact with the bedrock and enriched with dissolved minerals.

This species is only known to occur in Park County in Colorado; however, no specimens have been located on BLM-managed surface lands. This species may be misidentified and may instead be *Packera debilis* according to a recent CNHP publication (Culver and Lemly 2013).

Few-flowered ragwort is threatened by peat mining, alterations to hydrology, and residential development. The effects of cattle grazing are unknown. Its small range and area of occupancy make it vulnerable to random events.

Degener's beardtongue

Degener's beardtongue is endemic to central Colorado in Fremont and Custer Counties. It is known to occur in pinyon-juniper woodlands, ponderosa pine woodlands with Gambel's oak and bunchgrass that have coarse gravelly or rocky reddish soil with igneous bedrock (Spackman et al. 1997). It has also been observed to occur in the cracks of large rock slabs. Degener's beardtongue is also found in needle duff and trail edges (Spackman et al. 1997). Populations are generally found at elevations of 6,000–9,500 feet. It flowers in June to July and sets fruit in late July.

This species has been documented in the planning area in the Arkansas River area from Cotoapaxi to Cañon City, mainly Royal Gorge, Phantom Canyon to the Wet Mountains, and south central Colorado in Fremont, Custer, and Chaffee Counties at 5,900–9,500 feet (Culver and Lemly 2013).

Pale blue-eyed grass

This iris grows in seasonally wet open meadows or meadow-like environments and riparian corridors, among grasses, sedges, and other plants where fine textured soils exist, at elevations of

7,900–9,500 feet (Moore and Friedley 2004). Although it is confined to moist or wet soils, this species has not been assigned a wetland indicator status by the U.S. Army Corp of Engineers or the FWS to date. It flowers late June to July and sets fruit in July and August.

Pale blue-eyed grass occurs in Park County within the planning area, but is also documented in Chaffee, Jackson, Larimer, and Saguache counties in Colorado and Wyoming.

It faces a long list of threats including development, agriculture, plant succession, livestock grazing, off-road vehicle use, logging, invasive plants, small population size, and hybridization with another iris.

Roland's bulrush

This species occurs on moss hummocks in very rich fens and moss margins in willow-dominated wetlands at elevations of 9,300–11,000 feet, and it occurs within Park County within the planning area.

2.2.9.3. Trends

The populations, and often habitats, of all special status wildlife and plant species have historically suffered downward trends. In general, there is a deficit of baseline population data for most of the special status species listed for this planning area. Because of management-driven habitat improvements and protection and recovery efforts, some populations, such as American peregrine falcon, ferruginous hawk ,and bald eagle, are stabilizing range-wide, while others, such as Brewer's sparrow and lesser prairie chicken, are still in decline (Partners in Flight Science Committee 2012). Although management efforts by the FWS, CPW, BLM, and others have reversed the downward trend for some special status species populations and improved habitat in some locations in the planning area, none of the populations are thought to be near their historic levels. Populations of most special status species are believed to remain biologically insecure, regardless of habitat improvement efforts.

Current and future threats are habitat loss and fragmentation, especially of breeding habitats; poaching; predation; disease; invasive species; and others. Habitat fragmentation leading to degradation and loss are caused or exacerbated by historic overgrazing, energy development, mining, water diversions, recreation, agriculture, residential development, motorized vehicle collisions, and other human activities. Natural processes such as fire, drought, and vegetation cover type conversions—especially pinyon-juniper encroachment and increased density—as well as climate change may also contribute to landscape changes over time, thereby affecting special status species and their habitats. It is not known which species will be able to adapt to these changes and persist.

Land health assessment observations

Healthy plant conditions typically translate into healthy breeding, foraging, resting migration, winter, and roosting habitats for fish and wildlife species, so most sites in the planning area that met Standard 3 for healthy native plant and animal communities were also found to meet Standard 4 for special status species; however, because special status species are typically restricted in their range and have narrower habitat requirements, achieving Standard 3 alone does not necessarily guarantee that Standard 4 will meet the habitat requirements to maintain viable populations of special status species.

Conversely, an area may have failed to meet Standard 3 but met Standard 4 simply because no special status species or suitable habitat occurs in that area. Where a site failed to meet or fell short of land health standards, the reasons entailed one or more of those indicators identified for common fish and wildlife. Refer to the terrestrial wildlife trends in section 2.2.5.3 and aquatic wildlife trends in 2.2.6.3 for a list of the most common land health problems observed across the planning area and a description of causal factors.

Overall, there are adequate data describing general vegetation conditions within the planning area, but little inventory data on the quality, quantity, location, and suitability of habitats for special status species. Focused inventories are needed within the RGFO to determine whether habitats for special status species are located within the planning area and to determine the suitability of those sites to meet the life history needs of those species.

2.2.9.4. Forecast

The future of most special status species and their habitats within the planning area depends on the degree to which threats can be eliminated or mitigated and populations and their habitats restored, improved and protected. With time and adaptive management practices, areas currently not meeting land health standards would be expected to improve. However, some degraded areas, such as those dominated by weeds, may continue in their present condition, or possibly become worse. As demand for resources increases, these trends would likely to continue into the future.

The development of oil, gas, coal, and solar resources, and other energy-related projects have the potential to adversely impact habitats and populations. Other uses such as livestock grazing, water use, realty actions, and recreation may also have negative impacts. Streams could potentially be affected by development, resulting in increased sedimentation and adverse changes in water quality and aquatic habitat.

To a degree, some trends are a result of natural factors, such as drought and disease, and may be beyond the BLM's control. Conservation efforts can be facilitated by obtaining baseline information on the biology and distribution of special status wildlife species and the condition of their habitats within the planning area, as well as by monitoring these populations, applying adaptive management strategies, and continuing habitat improvement projects at small and landscape-level scales.

2.2.9.5. Key Features

The RGFO will continue to focus management, habitat improvement, inventory, monitoring and protection efforts on special status species and their habitats. Key features and areas include core populations, historic habitats, occupied and suitable habitats (particularly those near known populations), federally designated critical habitats, and important landscape connectivity features such as movement corridors. Key habitats include plant ACECs (discussed in section 2.4.1), perennial streams, riparian and wetland vegetation, pinyon-juniper, cliff and cave features, and other rare, unique, or diverse habitats. The RGFO will continue to improve its knowledge of the distribution and status of these species across the planning area and will develop and apply standardized protection measures to enhance the conservation and recovery of these species.

2.2.10. Wildland Fire Ecology and Management

Background

The Federal Wildland Fire Management Policy (FWFMP) was developed by the Secretaries of the Departments of Interior and Agriculture in 1995 in response to the dramatic increases in the frequency, size, and catastrophic nature of wildfires in the United States. The 2001 review and update of the 1995 FWFMP (DOI et al. 2001) consists of findings, guiding principles, policy statements, and implementation actions, and replaces the 1995 FWFMP. The 2001 FWFMP update directs Federal agencies to achieve a balance between fire suppression to protect life, property, and resources and fire management to regulate fuels and maintain healthy ecosystems. The FWFMP provides the fundamental principles necessary to the success of the Federal wildland fire management program and the implementation of review recommendations. These umbrella principles compel each agency to review its policies to ensure compatibility. Since the development of this policy, several changes and revisions have been made to consolidate and clarify changes that have occurred since the strategy document was first issued.

The current FWFMP directs Federal agencies to achieve a balance between suppression and managed fire to protect life, property, and natural resources. It also serves as a tool for land managers to manage fires for resource benefit, to regulate fuels, and to maintain healthy ecosystems. The policy provides the following guiding principles:

- Safety—firefighter and public safety are the top priorities
- Fire management and ecosystem sustainability—the full range of fire management activities will be used to help achieve ecosystem sustainability, including interrelated ecological, economic, and social components.
- Response to wildland fire—fire, as a critical natural process, will be integrated into land and resource management plans and activities on a landscape scale and across agency boundaries. Response to wildland fire is based on the ecological, social, and legal consequences of the fire. The circumstances under which a fire occurs, the likely consequences on firefighter and public safety, the welfare of natural and cultural resources, ecosystem sustainability, and the values to be protected dictate the appropriate management response to the wildland fire.
- Management of wildland fire—wildland fire can be managed to protect, maintain, and enhance resources. Managed fire can be allowed to function in its natural ecological role. Use of fire will be based on an approved fire management plan (FMP) and will follow specific prescriptions contained in operational plans.
- Rehabilitation and restoration—rehabilitation and restoration efforts will be used to protect public health and safety, to sustain ecosystems, and to help communities protect infrastructure.
- Protection priorities—the protection of human life is the single overriding priority. Setting priorities among protecting human communities and community infrastructure, protecting other properties and improvements, and protecting natural and cultural resources will be based on the values to be protected, human health and safety, and the cost of protection. Once people have been committed to an incident, these human resources become the highest value to be protected.
- Wildland-urban interface—the operational roles of the Federal agencies as partners in the WUI are wildland firefighting, hazardous fuels reduction, cooperative prevention and

education, and technical assistance. Structural fire suppression is the responsibility of the tribal, State, or local governments. Federal agencies may assist with exterior structural protection activities—including funding—under formal fire protection agreements that specify the mutual responsibilities of the partners. Some Federal agencies have structural protection authority for their facilities on Federal lands they administer, and they may also enter into formal agreements to assist State and local governments with full structural protection.

- Planning—every area with burnable vegetation must have an approved FMP. FMPs are strategic plans that define a program to manage wildland and prescribed fires based on the area's approved land management plan. FMPs must provide for firefighter and public safety; include fire management strategies, tactics, and alternatives; address values to be protected and public health issues; and be consistent with resource management objectives, activities of the area, and environmental laws and regulations.

- Science—FMPs and programs will be based on a foundation of sound science. Research will support ongoing efforts to increase the BLM's scientific knowledge of biological, physical, and sociological factors. Information needed to support fire management will be developed through an integrated interagency fire science program. Scientific results must be made available to managers in a timely manner and must be used in the development of land management plans, FMPs, and implementation plans.

- Preparedness—agencies will ensure their capabilities to provide safe, cost effective, fire management programs in support of land and resource management plans through appropriate planning, staffing, training, equipment, and management oversight.

- Suppression—wildland fires are suppressed at minimum cost while considering firefighter and public safety, benefits, and values to be protected, and are consistent with resource objectives.

- Prevention—agencies will work together with local partners and other affected groups and individuals to prevent unauthorized ignition of wildland fires.

- Standardization—agencies will use compatible planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management activities.

- Interagency cooperation and coordination—fire management planning, preparedness, prevention, fire use, restoration and rehabilitation, monitoring, research, and education will be conducted on an interagency basis with the involvement of cooperators and partners.

- Communication and education—agencies will enhance knowledge and understanding of wildland fire management policies and practices through internal and external communication and education programs. These programs will be continuously improved through the timely and effective exchange of information among all affected agencies and organizations.

- Agency administrator and employee roles—agency administrators will ensure that their employees are trained, certified, and made available to participate in the wildland fire program locally, regionally, and nationally as the situation demands. Employees with operational, administrative, or other skills will support the wildland fire program as necessary. Agency administrators are responsible and will be held accountable for making employees available.

- Evaluation—agencies will develop and implement a systematic method of evaluation to determine effectiveness of projects through implementation of the 2001 Federal fire policy

(DOI et al. 2001). The evaluations will assure accountability, facilitate resolution of areas of conflict, and identify resource shortages and agency priorities.

The national fire plan

The Secretaries of the Interior and Agriculture initiated a national fire plan (NFP) in 2000 (DOI and USDA 2000), which consisted of a collection of documents that addressed the principles outlined in the FWFMP. Originally, the NFP was a single document (DOI and USDA 2000), but eventually the NFP came to represent something larger than a single document. The NFP is not a single, cohesive document; rather it is composed of various documents, including 1) a September 8, 2000 report from the Secretaries of the Interior and Agriculture to the President of the United States in response to the wildland fires in 2000; 2) congressional direction accompanying substantial new appropriations for wildland fire management for fiscal year 2001; and 3) several approved and draft strategies to implement all or parts of the plan. The national fire plan is a nationally coordinated effort to protect communities and natural resources from the harmful effects of increasing wildland fire occurrence and severity in the United States. The national fire plan established the overarching purpose and goals that are articulated and carried forward through the 10-year comprehensive strategy (USDA and DOI 2002), the cohesive strategy(USFS 2000b), and other supporting documents.

2.2.10.1. Indicators

Fire regime condition class

Fire regime condition class (FRCC) is an interagency, standardized index for determining the degree of departure from the historic range of variability in vegetation, fuels, and disturbance regimes. Assessing FRCC can help guide management objectives and set priorities for treatments mandated by Federal agencies. FRCC is incorporated into the Healthy Forests Restoration Act as a monitoring measure. Fire regime condition classes measure the degree of departure from reference conditions, possibly resulting in changes to key ecosystem components, such as vegetation characteristics (species composition, structural stage, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances, such as insect and disease mortality, grazing, and drought. Possible causes of this departure include (but are not limited to) fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, and introduced insects and disease (Schmidt et al. 2002; NIFTT 2010). A FRCC rating of 1 (low), 2 (moderate), or 3 (high) is assigned depending on the degree of departure from the natural range of variability for a particular area.

Condition Class 1

Fire regimes are within historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range.

Condition Class 2

Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). These result in moderate changes

to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.

Condition Class 3

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. These result in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention but including the influence of aboriginal burning (Agee 1993; Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy, Schmidt, Menakis, and Samson (2001) and Schmidt et al. (2002) and interpreted for fire and fuel management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation.

I. Frequency of 0–35 years and low (surface fires most common) to mixed severity (less than 75 percent of the dominant overstory vegetation replaced).

II. Frequency of 0–35 years and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced).

III. Frequency of 35–200 years and mixed severity (less than 75 percent of the dominant overstory vegetation replaced).

IV. Frequency of 35–200 years and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced).

V. Frequency of 200+ years and high (stand replacement) severity.

A comprehensive FRCC data layer that is consistent across the whole RGFO planning area does not exist. LANDFIRE vegetation condition class (VCC) data are available for the planning area (LANDFIRE: LANDFIRE 1.3.0; available online: http://landfire.cr.usgs.gov/viewer/). The VCC layer quantifies the amount that current vegetation has departed from simulated historical vegetation reference conditions. Three condition classes describe low departure (VCC 1), moderate departure (VCC 2), and high departure (VCC 3). VCC is a close approximation for FRCC, as it reflects the changes in vegetation structure and composition resulting from changes in fire regime. VCC does not include the fire regime departure that is a component of FRCC.

VCC is calculated based on changes to species composition, structure state, and canopy closure using methods described in *Interagency Fire Regime Condition Class (FRCC) Guidebook* (NIFTT 2010). VCC is based on the departure of current vegetation conditions from reference vegetation conditions only. LANDFIRE simulates historical vegetation reference conditions using the vegetation and disturbance dynamics model vegetation dynamics development tool (VDDT) (LANDSUM for LF_1.0.0 only). Current vegetation conditions are derived from a classification of existing vegetation type, cover, and height. The use of VCC data provides a tool for the measurement of departure from normal conditions on a broad scale, and it allows land

managers to measure the number of acres within each condition class for planning efforts to focus on moving the landscape to an improved vegetation condition class.

Figure 2.14 below shows the relative amounts of BLM lands falling into the various vegetation condition classes in the RGFO planning area.

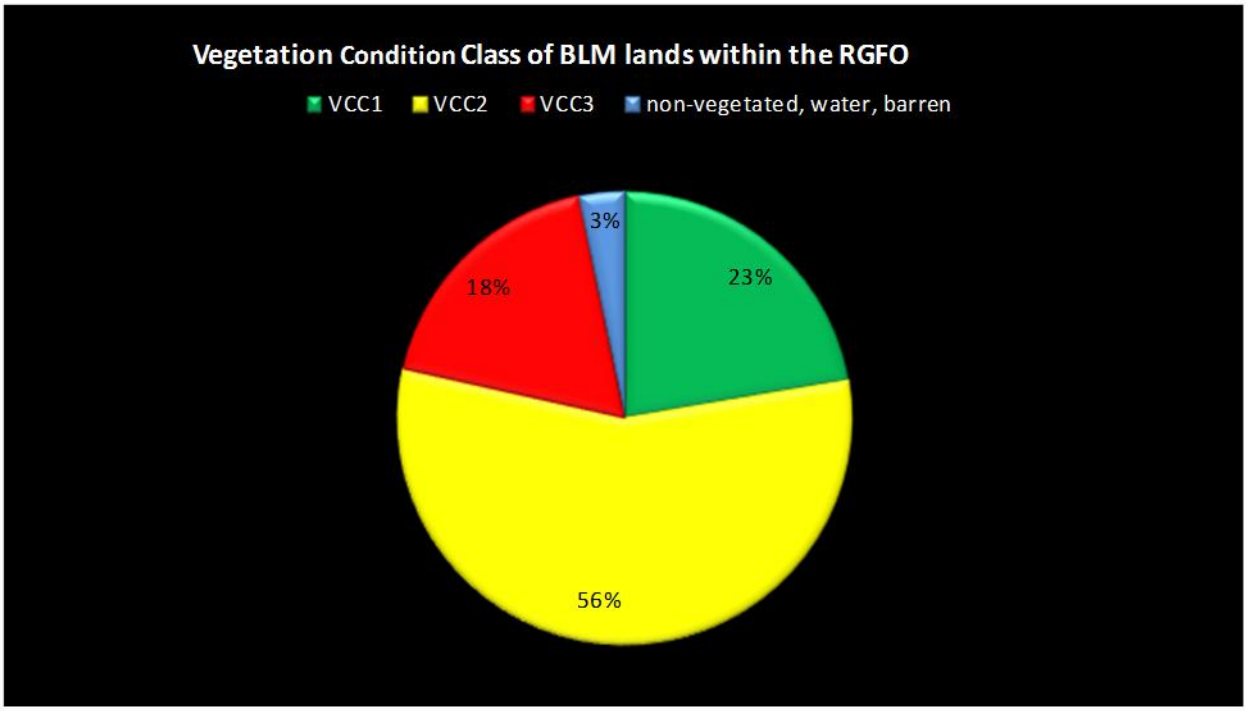

Figure 2.14. Vegetation Condition Class of BLM Lands in the Royal Gorge Field Office

Fire regime group

A majority of the field office is within Fire Regime Group (FRG) III (Figure 2.15). Within this group, the fire return interval can range from 35 to 200 years plus in frequency. Fires in this group tend to be mixed severity fires with less than 75 percent of the dominant overstory vegetation being replaced. The next most dominant group is FRG I. FRG I has a 0- to 35-year fire return interval. Fires in this group tend to be surface fires that are of low to mixed severity. Less than 75 percent of the dominant overstory vegetation is replaced when fire occurs. FRG II and FRG IV both comprise 7 percent of the planning area. The fire return interval in the FRG II fire regime is 0-35 years. FRG IV has a 35- to 200-year plus fire return interval. Fires tend to be high severity, stand-replacing fires with greater than 75 percent of the dominant overstory being replaced in both of these groups. FRG V comprises only 2 percent of the planning area. FRG V has a fire return interval of 200 years or more. Fires in this group tend to be high severity, stand-replacing fires.

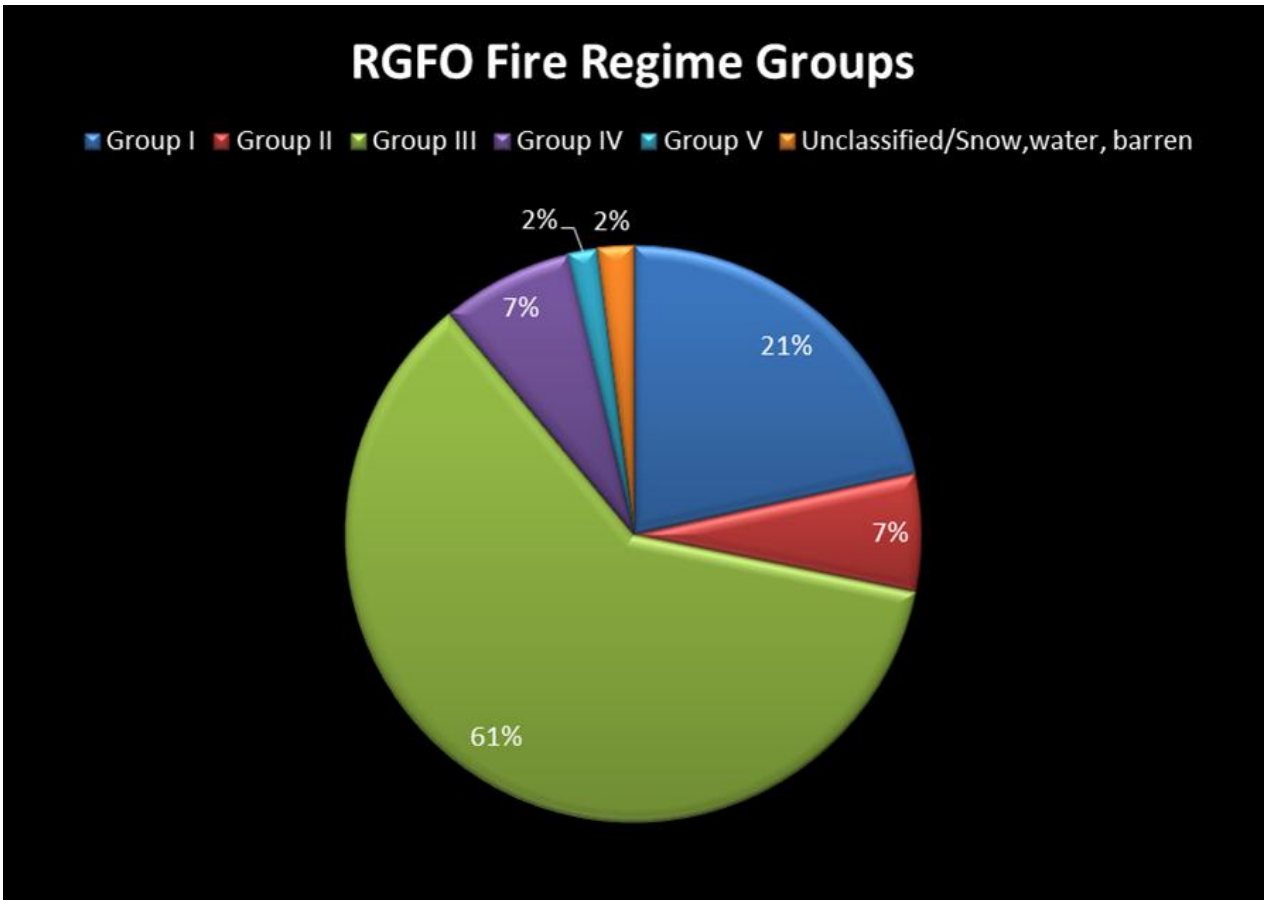

Figure 2.15. Fire Regime Groups

2.2.10.2. Current Condition

The Front Range Interagency Fire Management Unit (FRIFMU) is an interagency unit. The FRIFMU consists of a BLM Fire Management Officer, and a USFS Assistant Fire Management Officer. There is also one Type 4 BLM engine and two Type 6 engines, one BLM and one USFS. Response and suppression activities are not agency specific. The hazardous fuels program is agency specific; however, cooperative agreements are in place to allow staff from the BLM and USFS to collaboratively work together to accomplish projects. Mitigation, education, and prevention are also agency-specific, with one BLM and one USFS representative.

Front Range Interagency Fire Management Unit (FRIFMU) fire management plan

The 2001 Federal wildland fire management policy (DOI et al. 2001; USDA and DOI 2009) required land managers to have an approved FMP for BLM lands with burnable vegetation. The FMP provides a foundation for integrating fire management with all other resource management programs administered by the Royal Gorge Field Office. The FMP is the overarching activity plan for the fire program, and it serves as a tool for planning and achieving resource management objectives on BLM-administered land as defined in the Royal Gorge Resource Area RMP (BLM 1996). The FMP provides guidance for current and ongoing decision-making processes that are

needed for evaluating and responding to wildland fires. The FMP helps with managing fires, and prioritizing, planning, and implementing mechanical hazardous fuel treatments and prescribed fire activities on BLM-administered lands to meet resource management objectives and to improve the protection of human life and property.

The first FMP was developed in 2002 for the FRIFMU. Since then, several revisions, changes, and updates have been made to the FMP to make it current and consistent with new guidance and policies. Some of the more recent changes to the FMP are a result of the FRIFMU's development of an integrated approach that emphasizes interagency cooperation and coordination in the overall development of fire management strategies to manage all wildland fires on Federal lands within the Pueblo Interagency Dispatch Zone.

Fire season and suppression activities

Fire has occurred in all months of the year within the planning area; however, most fire activity occurs during the months of April through October, with fire activity reaching its peak in July. The RGFO has seen an increase in the number of fires and acres burned annually over the last 10 years (Table 2.29). From 1980 to 2013, the unit averaged 38 wildland fires, and an average of 218 acres have burned on BLM-administered lands annually. The fires that occur are relatively small, with 89 percent of the wildland fires burning 10 acres or less. Conditions exist within the planning area for large, catastrophic wildfires that can result in loss of life, property, and resources. The complexity along the Front Range of Colorado, Larimer County to Las Animas County, is increasing every year due to urban sprawl infrastructure development. The result is the number of large fires within the WUI. In the last 10 years, within the planning area, there have been over 21 large fires, resulting in the loss of over 1,000 structures.

Table 2.29. BLM Fire Occurrence Summary 1980−2013

Year	Number of fires	BLM acres	Control acres[a]
1980	30	92	95
1981	32	616	624
1982	8	3	3
1983	9	9	31
1984	20	4	1,060
1985	14	8	103
1986	14	37	96
1987	17	1	3
1988	25	1,259	4,801
1989	21	2	130
1990	29	244	291
1991	23	6	44
1992	30	18	150
1993	33	156	415
1994	41	45	61
1995	39	158	872
1996	70	127	303
1997	39	10	23
1998	41	9	357
1999	24	17	18
2000	87	749	13,620
2001	67	47	97
2002	157	382	15,275

Year	Number of fires	BLM acres	Control acres[a]
2003	68	32	46
2004	26	35	56
2005	37	24	93
2006	54	158	4,965
2007	35	14	14
2008	40	213	12,312
2009	35	3	200
2010	28	1,609	7,024
2011	37	36	94
2012	25	440	89,698
2013	36	848	16,900
Grand total[b]	1,291	7,406	169,873
Source: National Interagency Fire Center			

[a]Control acres are total acres burned regardless of ownership.
[b]Grand total of all fire types and protection types (all action and support fires).

Fire weather patterns

The Royal Gorge Field Office is characterized by rugged mountainous and high valley terrain in the west and relatively flat high plains in the east. The climate is a typical continental climate with dry air, sunny days, clear nights, variable precipitation, moderate evaporation, and large daily temperature changes. Weather systems usually enter the region from the west and southwest; because of the western mountains, occasional low pressure systems on the plains circulate gulf moisture from the east (upslope). The complex topography of the region causes considerable variation in site-specific temperature, precipitation, and surface winds.

Temperatures vary mostly with elevation, and to a lesser extent, local microclimate. Fahrenheit summer temperatures usually range from the upper 40s to the high 80s (mountains), and from lower 60s to 110s (foothills and plains). Annual precipitation is highly variable, primarily because of the orographic effect of the Rocky Mountains. Annual precipitation over most of the area averages 10-20 inches. Except for areas with high snow pack, most precipitation comes from late spring and summer thunderstorms. The monsoonal flow begins mid-May to mid-July and produces isolated thunderstorms. The true monsoon starts around the first of July with numerous daily thunderstorms. The typical period for lightning to occur is June through August.

Upper level winds prevail from the southwest, but varying ground cover, diverse terrain, and upslope conditions cause complex surface wind patterns. Persistent winds with little directional modification occur on the plains, but winds in the valleys are influenced by topographical features.

Fuels

Grasslands

These communities are predominately at elevations of 5,300–9,500 feet. Grass species can include a variety of cool and warm season grasses, such as blue grama, mountain muhly, Arizona fescue, sand dropseed, and Indian ricegrass. Fires are typically fast moving and of low to moderate intensity. Fire duration is usually a single day, unless the fire moves into a fuel type that contains large, woody fuels where it can continue overnight and extend into additional burning periods.

Shrublands

At lower elevations (5,300–5,500 feet), salt brush communities dominate. Mountain shrub communities consist of Gambel's oak, mountain mahogany, snowberry, and occupy mid-elevation sites (5,500 to 9,500 feet), occurring on shallow rocky soils. Sagebrush communities are found at higher elevations (7,500–10,000 feet). Fires are fast moving and of moderate to high intensity.

Pinyon-juniper

Pinyon-juniper is usually found at elevations of 5,400–10,000 feet. Mature stands of pinyon-juniper support little or no understory vegetation. Currently the pinyon-juniper communities are being affected by outbreaks of Ips beetle (*Ips* spp.). Although mature pinyon-juniper is difficult to burn under most conditions, under conditions of temperatures near 100 degrees, single digit relative humidity, and winds above 10 mph, fires are fast-moving, high-intensity, and stand-replacing.

Ponderosa pine

Ponderosa pine occurs in open stands with a productive understory of grasses, forbs, and shrubs. In drier areas, ponderosa pine has a pinyon/juniper component in the understory; in higher elevation, wetter, cooler sites, it has been successfully and severely invaded by Douglas-fir. The result is a continuous bed of vegetation from grasses and litter on the ground up through the ponderosa pine canopy. Once fire is ignited in such a fuel bed, control is very difficult, and the result may be a running crown fire. This condition is very different from the low intensity fire that historically would have burned through the litter, grasses, and shrubs]. This situation is aggravated by outbreaks of mountain pine beetle, *Ips* beetle, spruce budworm, and other insect and disease outbreaks.

Mixed conifer

The mixed-conifer forest type includes a diverse range of species. The distribution and structure of mixed-conifer forests are strongly influenced by temperature and moisture gradients, in addition to soil types and fire. White fir often dominates as the climax species on moist sites, and ponderosa pine, Douglas-fir or Rocky Mountain juniper tend to be the climax species on warmer and drier sites. Engelmann spruce, blue spruce, subalpine fir, bristlecone pine, and limber pine may also be present in the mix. As a result of fire suppression, many mixed-conifer forests are currently denser and contain more dead fuel than they did historically. These heavy accumulations greatly increase the chances for high-intensity, stand-replacing crown fires.

Aspen

Aspen is widely distributed in the planning unit. Aspen communities generally have a highly productive grass-forb understory and typically occur in moist environments. Fire behavior in aspen communities can be expected to be less intense than in most surrounding fuels, but under dry conditions, fire can run through the aspen stands.

Wildland-urban interface

The wildland-urban interface is defined as those areas where undeveloped lands meet or intermix with human development. These developments can include communities and subdivisions as well as isolated structures and infrastructure. Some additional examples of WUI infrastructure include summer homes, power lines, pipelines, communication sites, recreation facilities, renewable energy infrastructure, and military training sites. WUI areas have drastically increased over the last two decades, and they have become a major consideration in the planning efforts for fire and

fuel programs. There has been an increase in the number of WUI fires occurring throughout the planning area and a consequent increase in the number of homes lost or damaged by wildland fires. The most costly fires are those that occur within the WUI.

Fuel management objectives

Prescribed fire program

Fire is recognized as a natural and indispensable process in fire-adapted ecosystems and can also be used to achieve objectives for other resources. It is the ultimate goal of wildland fire managers to re-introduce fire to the landscape in order to return an area to natural historical conditions (FRCC 1). Wherever possible, mechanical treatments would be followed by prescribed broadcast burning. Prescribed broadcast burns would be used to reduce fuel loadings, to create small openings and maintain existing openings, and to maintain thinned stands that increase horizontal diversity and reduce the spread of catastrophic wildfire. The removal of activity slash piles is accomplished through pile burning. All burning operations have appropriate burn plans and accompanying smoke permits in place to meet State and Federal regulations. Prescribed fire projects are initiated by the fire program and by BLM resource programs, including range, wildlife, and forestry. From 2005 to 2013, an annual average of 250 acres was treated with prescribed fire methods.

Non-fire fuel program

Mechanical treatments are a major component of the hazardous fuel reduction program. Treatment methods include the use of large machines such as masticators, roller choppers, and other machines used for commercial harvest. These methods are used in areas where fuel conditions and topography would allow for treatment with minimal ground disturbance and resource damage. Mastication was the most frequently used treatment method in past projects. It has been effective in vegetation types including pinyon juniper, ponderosa pine, mixed conifer, and shrub species (e.g., oak and mountain mahogany). Mastication allows for trees to be selectively removed with little to no damage to the reserve trees. With this type of treatment, specific project objectives such as desired tree spacing, size classes, and forest structure can be achieved, and the large rubber tires on the machine create minimal surface/ground disturbance.

Hand thinning is another method that is commonly used for treatments. Hand thinning is most effective in areas where the terrain is difficult (rocky, steep, etc.) and slope is greater than 30 percent. Hand thinning treatments have been accomplished with in-house crews as well as contract crews.

Mechanical treatment methods allow for the creation of a mosaic of vegetation patterns and types in different successional stages throughout the landscape. These treatments reduce fuels or alter the arrangement of fuels to facilitate the management of wild fires to protect life and property. Additionally, mechanical treatments improve forest health and improve habitat and forage conditions for cattle and wildlife. From 2005 to 2013, an annual average of 1,000 acres has been treated with mechanical methods in the RGFO (Table 2.30).

Table 2.30. Royal Gorge Field Office BLM Fuel-Treatment Summary

Year	BLM RX acres[a]	BLM MX acres	BLM wildfire acres	Total BLM acres
2005	167	2,085	24	2,276
2006	129	1,782	158	2,069
2007	789	2,034	14	2,837
2008	316	1,470	213	1,999
2009	87	1,378	3	1,468
2010	355	933	1,609	2,897
2011	70	823	36	929
2012	220	1,063	440	1,723
2013	120	1,185	848	2,153

[a]RX acres include pile burning and broadcast burning

2.2.10.3. Forecast

Challenges for the fire program

Table 2.31 below shows the number of acres of BLM lands within the RGFO planning area in each fire regime group. The number of acres that need to be treated annually was calculated by dividing the number of acres of BLM within each fire regime group by the midpoint for the number of years of the average fire return interval within each fire regime group. The combined acreage of all of the fire regime groups that need to be treated annually to maintain the historical range of variability is approximately 17,367 acres. Currently, with prescribed fire, mechanical treatment, and acres burned in a wildland fire, the 9-year average of acres treated on BLM is 2,039 acres. The rate at which historic fire occurred was greater than the rate of the current treatments and wildland fires occurring within each of the fire regime groups on BLM lands. This, coupled with the fact that 74 percent of BLM lands within the planning area are in VCC 2 (moderately departed) or VCC 3 (highly departed), poses a significant challenge to returning the landscape to a more sustainable and resilient condition. If treatments are not accelerated, more fires of undesirable intensity will continue, increasing the probability of losing key ecological components and jeopardizing at-risk values.

Table 2.31. FRCC Groups within the RGFO and Acres Needing Treatment

Fire regime group	Acres of BLM in each group	Acres needing treatment[a]
Group I	142,619	8,150
Group II	43,686	2,496
Group III	401,227	5,944
Group IV	48,731	722
Group V	10,991	55
Other[b]	13,277	N/A
Total	660,531	17,367

[a]Number of acres needing treatment within each FRG if fire is within its historic range of variability.
[b]Includes barren, snow, ice, sparsely vegetated, and water.

Wildland-urban interface

WUIs have drastically increased over the last two decades, and they have become a major consideration in the planning efforts for fire and fuel programs. There has been an increase in the number of WUI fires occurring throughout the planning area. Consequently, there has been

an increase in the number of homes and amount of infrastructure lost or damaged by wildland fires. The most costly fires are those that occur within the WUI.

Smoke impacts/air quality

Smoke management, primarily from prescribed burning, is always an issue. With increasing population and the changing demographics of communities, the aesthetic impacts of smoke cannot be ignored. Although no known violations of National Ambient Air Quality Standards from prescribed burning have occurred within the planning area, fire managers and burn bosses typically manage smoke on the basis of aesthetic issues and public perception, which can be more restrictive than air quality standards. There is some concern that smoke affects tourism and visual resource management (VRM). Most of the tourism in the planning area occurs during the summer months. Air quality is generally excellent during this time. The impacts that typically occur during the summer months are from wildfires outside the area (e.g., from Rodeo, Missionary Ridge, and West Fork). The fire program continues to work with the State's Air Pollution Control Division to find ways to increase the BLM's ability to burn more acres each year. These relationships are critical for maintaining and improving the BLM's ability to use fire as a management tool.

Emergency stabilization and burned-area rehabilitation

Post-fire emergency stabilization and burned-area rehabilitation planning (ES&R) follow the larger wildfires on public lands within the planning area. When a severe fire occurs, an initial ES&R plan must be developed within 7 days and a final plan developed within 21 days of the fire being declared contained. Historically, few ES&R projects have been done on BLM lands in the planning area. Prior to 2010, the only ES&R project that was done was in response to the 1988 Dinosaur Fire south of Cañon City. Starting with the Fourmile Canyon Fire in 2010, there has been at least one fire requiring ES&R treatment per year. This trend of more ES&R activity is expected to continue, as fires are becoming larger and more human values (infrastructure, landscapes, etc.) are being affected by wildfire.

Insect and disease outbreaks

See Forestry (section 2.3.3).

Funding/fire budget

Because future budgets cannot be forecast, it is important to maintain flexibility within the fire and fuel program so that resources can be shifted to emphasize areas that are being funded while maintaining the long-term capability to perform all aspects of the fire management job.

The trend in the hazardous fuels budget has been a decrease in funding for both prescribed fire and mechanical treatments (Table 2.32). With the decrease in funding, fewer acres can be treated. In the last few years, to make up for this decreased funding, cooperator funding has become a critical aspect of continuing to implement planned treatments within the RGFO. One of the biggest cooperators for fuel projects has been the Habitat Partnership Program (HPP). This includes the local chapters of HPP as well as the State chapter. Other cooperators include the Rocky Mountain Elk Foundation, the Mule Deer Federation, the National Wild Turkey Federation, and the Front Range Grazing Advisory Board, to name a few.

Table 2.32. RGFO Fuel Treatment Summary Including Contributed Funds

Year	RX acres[a]	MX acres	Total BLM acres	Acres—contributed funds[b]	Acres—contributed+BLM
2005	167	1,918	2,085	0	2,085
2006	129	1,653	1,782	0	1,782
2007	789	1,245	2,034	0	2,034
2008	316	1,154	1,470	0	1,,470
2009	87	1,291	1,378	0	1,378
2010	355	578	933	0	933
2011	70	519	589	234	823
2012	220	443	663	400	1,063
2013	120	250	370	815	1,185
Total	2,253	9,051	11,304	1,449	12,753

[a]Includes pile burning and broadcast burning.
[b]Acres—contributed funds are all mechanical treatments.

As the WUI expands, beetle and other insect and disease outbreaks continue to progress, the public perception of air quality changes, and budgets remain static or shrink, the complexity of managing wildfire and fuels within the planning area will continue to increase. It will be essential to educate the public, hire and retain high-quality employees with progressive ideas, and use adaptive management. Fire suppression will continue to be the most acceptable task performed by the fire program, with mechanical fuel treatments. These treatments should be increased wherever possible, with areas being prioritized for treatment on the basis of ecological function, values at risk, and the potential for creating cohesive treatments. The most difficult tasks will continue to be the implementation of landscape-scale prescribed burns for fuel reduction; prescribed burns near subdivisions, private property, or developed infrastructure; vegetation management; and the management of fire for resource benefit.

2.2.10.4. Key Features

The RGFO will continue to experience wildland fires of all sizes throughout the planning area. Some key features will be firefighter and public safety, protecting watershed health and ecological values, urban interface and infrastructure, and maintaining forest health. Key processes that will be used to sustain or improve these features would be mechanical fuel treatments, prescribed fire, chemical or biological treatments, and management of fires for resource benefit. The land pattern within the planning area lends itself to a variety of different management options to implement these different treatment methods. Larger areas or parcels of BLM lands would be the priority areas for management of wildfires for resource benefits. Within the planning area, there are some small—and in some cases, isolated—parcels of BLM land. The main focus in these areas would be on mechanical, chemical, or biological vegetation treatments. Due to the small acreage of land within these BLM parcels, priority would be given to project areas that could be implemented in a cooperative effort with adjacent land owners. These vegetation treatments would be more effective at reducing the risk and spread of catastrophic wildfire if they conducted over larger and more continuous areas. The RGFO will continue to develop the fire and fuel management program to enhance and maintain the health of landscapes and provide the opportunity for vital ecological process to occur, while protecting at-risk values.

2.2.11. Cultural Resources and Tribal Concerns

2.2.11.1. Indicators

Cultural resources include objects, sites, structures, or places that are 50 years of age or older, with potential scientific value, including locations of traditional cultural, ethnic, or religious significance to a specific social or cultural group. BLM is tasked with identifying and managing such phenomena on public land (National Historic Preservation Act, or NHPA, Section 110), as well as determining whether proposed Federal undertakings will adversely impact the characteristics that make them significant (NHPA, Section 106).

Regulations in 36 CFR 800, *Protection of Historic and Cultural Properties*, direct the management of prehistoric or historic cultural resource sites, structures, or objects listed in, or eligible for listing in the National Register of Historic Places (NRHP; listed or eligible sites are called "historic properties"). In order to be eligible for the NRHP, potential historic properties must meet one of the following criteria and must possess integrity of location, design, setting, materials, workmanship, feeling, and association:

> A. Associated with events that have made a significant contribution to the broad patterns of our history.
>
> B. Associated with the lives of persons significant in our past.
>
> C. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or 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.

2.2.11.2. Current Condition

The BLM identifies cultural resources by performing inventory activities, including fieldwork, archival research, and remote sensing, using GIS resources. After a cultural resource is identified, the BLM evaluates its integrity and its suitability for listing on the NRHP, and whether it might be important to Native American or other traditional communities.

Cultural resource integrity might be affected by physical destruction, damage, neglect, alteration, isolation, transfer, sale, or lease of a resource, or alteration of the resource setting. Specific indicators include the extent or intensity of natural weathering, erosion, wildfire, ground disturbance, grazing, recreation use, and unauthorized collection, intrusion, and vandalism. This loss affects the completeness and accuracy of the scientific information that can be derived from a resource, the aesthetic, historic, or interpretive value of a resource, and the importance of a resource in maintaining social and cultural traditions.

Over the past five decades, the BLM has conducted thousands of large and small Federal undertakings in the planning area. Range improvement projects, wildland fire rehabilitation, recreation projects, realty actions, oil and gas development, and minerals extraction continue to expand the number of inventories completed and cultural resources identified.

The RGFO manages cultural resources that range from 50 to 12,000 years in age. Populations of both aboriginal and European ancestry occupied the eastern part of Colorado at different times in history, and they left a diverse array of sites on BLM land that possess rich cultural information and have the potential to greatly enhance understanding of the past.

The earliest sites in the RGFO date to the Paleoindian period (~11000–5800 BC) and are very sparsely represented. Through time, the number of sites increased, a result of both population growth and preservation factors. The Archaic period (5800 BC–AD 150) is well represented in both the plains and the mountains, with the largest number of sites dating to the Late Prehistoric (AD 100–1725).

Because Native Americans became more mobile with the introduction of the horse during the Protohistoric (AD 1540–1860), they were less likely to establish permanent occupations, resulting in a paucity of archaeological sites that date to that period. The horse also carried a wide variety of tribal groups from many parts of the Plains through eastern Colorado during the Protohistoric and Historic periods. As a result, the RGFO maintains ongoing consultation relationships with 17 modern tribes that have historic ties to eastern Colorado, with reservations as far north as Montana and as far south as Oklahoma.

Site types include open lithic locales, open camps, sheltered camps, pit structure sites, stone structure sites, quarries, and isolated features and artifacts. Most of the phenomena are culturally Plains-oriented, although some researchers believe that a unique "Mountain Tradition" might be identifiable.

During the early 1700s, Spanish explorers passed through the area, and fur trapping was at its height from 1812 through the 1840s. Very few material remains can be accurately assigned to that period, but sites associated with the 1859 Colorado Gold Rush and later are plentiful. Construction of towns, roads, and railroads followed, and comprise a dense and detailed historic record, with many sites and copious archival information.

Historic-era sites include mines and mining-related phenomena; town sites; railroad grades and associated station sites; homesteads; ranches; dinosaur quarries; shanty towns; and entire historic mining landscapes. Industrialization and commercial production, as well as the increasing ease of trade with the arrival of the railroads, resulted in standardization of artifacts, and to some degree, architecture. However, vernacular construction is typical during this period, and it exhibits cultural variability.

Based on current data, approximately 233,800 acres of BLM-administered land have been inventoried for cultural resources, which comprises about one-third of the total acreage managed by the RGFO. Archaeologists have recorded 2,721 sites, of which 1,627 are prehistoric (Paleoindian, Archaic, or Late Prehistoric), 7 date to the Protohistoric, and 1,087 date to the Historic period. Approximately 16 percent (n = 432) of the sites are potentially eligible, officially eligible, or are listed on the National Register of Historic Places. A total of 5 national historic districts, 3 of which are national historic landmarks, are present on BLM-administered land, or contain BLM-administered land within their boundaries.

Two branches of a national historic trail (the Santa Fe Trail), pass through southeastern Colorado, and segments are present on BLM-administered land. BLM manages the segments as historic properties, with special emphasis on locating physical remains of the trail, thus refining the known corridor.

Tribal Issues

Because no Native American groups currently reside within the jurisdiction of the RGFO, the BLM maintains a long-distance consultative relationship with 17 tribes that have historic ties to the area. The tribes include the Apache Tribe of Oklahoma; Cheyenne and Arapaho Tribes of Oklahoma; Cheyenne River Lakota Tribe; Comanche Tribe of Oklahoma; Crow Creek Sioux; Jicarilla Apache Nation; Kiowa Tribe of Oklahoma; Northern Arapaho Tribe; Northern Cheyenne Tribe; Oglala Sioux Tribe; Pawnee Nation of Oklahoma; Rosebud Sioux Tribe; Eastern Shoshone Tribe; Southern Ute Tribe; Standing Rock Sioux Tribe; Ute Tribe; and the Ute Mountain Ute Tribe.

As part of both its Section 106 and Section 110 responsibilities under the NHPA, the BLM manages sacred sites, possible traditional use areas and potential traditional cultural properties with the same high level of care that it affords other historic properties. In addition, BLM evaluates every site for its possible importance to Native Americans, and if a need is identified through consultation, employs additional measures that emphasize security, protection, and access for interested tribes.

In addition to NHPA requirements, the BLM also has responsibilities under the Native American Graves and Repatriation Act (NAGPRA). RGFO works closely with the tribes when inadvertent discoveries are made, and when this rare event occurs, follows the model of close cooperation established in the recent past.

2.2.11.3. Trends and Forecast

Factors influencing cultural resource trends include the presence and condition of cultural resources, landscapes, or places of traditional use. The current condition of cultural resources in the planning area is highly variable due to the diversity of terrain, geomorphology, access, visibility, and past and current land use patterns. Compliance with Section 106 of the NHPA, along with the BLM policy of avoiding impacts to cultural resources, allows for the continued identification and management of cultural resource sites.

The overwhelming Section 106 workload leaves little time for the RGFO's Section 110 program, so relatively few research-based inventories have been conducted. As a result, much of the information used to identify the characteristics of the planning area derives from inventories that involve land disturbance, as opposed to an intentional cultural resource research design.

Despite the resulting skewed data, the RGFO has begun evaluating cultural resources in a broader landscape context, when possible. In addition, technological advances in remote sensing improve the identification process, GPS technology greatly improves the quality of the locational data, and GIS allows for much easier analysis of spatial and temporal patterns.

In general, cultural resource conditions are declining, mainly due to natural erosional processes, increased casual use of public lands, and limited site monitoring and protection.

Exposed sites and associated artifacts, features, and structures are easily disturbed by natural elements such as wind and water erosion, deterioration, decay, animal and human intrusion, and development and maintenance activities. Vandalism of cultural resources (such as unauthorized digging and looting) has been documented, and is illegal under the Archaeological Resources Protection Act (ARPA). Collectively, these agents have adversely affected many known cultural resources, and they are certainly affecting those not yet identified and recorded.

Conditions are relatively more stable for cultural resources identified during Section 106 compliance activities. Although some undertakings in proximity to historic properties are allowed to proceed, potential impacts are resolved pursuant to NHPA and under current NEPA guidelines. In such cases, the trend is toward a desired condition of conservation and protection, at least until the information latent in the phenomena can be extracted.

In general, the trend in condition for recorded and unrecorded cultural resources is downward. Illegal removal of artifacts, natural erosional processes, ground disturbance associated with recreational activity, limited law enforcement, livestock operations, increasing energy activities, and an inclination toward more intensive use of public lands all contribute to this trend.

Based on current management practices, the potential for illegal removal of or damage to cultural resources will increase because of projected increases in recreational and commercial usage, coupled with a limited law enforcement presence. Cultural resources are known to be deteriorating from a variety of causes. Collectively, these agents have adversely affected many known cultural resources and have probably affected many undiscovered cultural resources. This trend will likely continue, due to the ongoing development of private lands adjacent to BLM-administered acreage, increased use by recreationists, and development associated with energy, mining, communication, and other associated activities that require the use of Federal lands. Identifying management actions that will improve the BLM's ability to locate and carefully manage sensitive areas and traditional cultural properties will help to alleviate damage to cultural resources and places of Native American concern.

2.2.12. Paleontological Resources

2.2.12.1. Indicators

Paleontological resources constitute a fragile and non-renewable scientific record of the history of life on earth. Once damaged, destroyed, or improperly collected, their scientific and educational value may be greatly reduced or lost forever. It is the policy of the BLM to manage paleontological resources for these values, using scientific principles, and to mitigate adverse impacts to them. To accomplish this goal, paleontological resources must be professionally identified and evaluated, and paleontological data must be considered as early as possible in the decision-making process.

Paleontological resources are managed in accordance with BLM Manual 8270, *Paleontological Resource Management* (BLM 1998c), and BLM Handbook H-8270-1, *General Procedural Guidance for Paleontological Resource Management* (BLM 1998d).

Resource condition is assessed through field observations, paleontological reports, commercial site reports, and project reviews. The primary resource indicator is whether the characteristics that make a fossil locality or feature important for scientific use have been lost or diminished. Natural weathering, decay, erosion, improper collection, and vandalism can remove or damage those characteristics that make a paleontological resource scientifically important.

2.2.12.2. Current Condition

Paleontological resources are integrally associated with the geologic rock units (such as formations, members, or beds) in which they are located. If extensive paleontological resources are found in a certain formation in one geographic area, it is likely that paleontological resources

will be found in that formation or its equivalent in other geographical areas. Although numerous fossil localities are known within the planning area, not all of them have been formally documented, and fewer have been extensively studied. Efforts to fully inventory fossil resources have been successful only in the Garden Park Fossil Area, where BLM has designated these public lands as an ACEC due to the significant fossil resources that are located there. The BLM manages the paleontological resources in this area using educational programs such as the Hands on the Land, and partnerships with local volunteer groups.

Potential Fossil Yield Classification

The potential for paleontological resources is currently identified using two indicators: the BLM Potential Fossil Yield Classification (PFYC) system (Figure 2.16) and the RGFO fossil locality database that is a record of fossil localities within the RGFO, developed by the RGFO. Due to the large size of the RGFO, the BLM maintains relationships with paleontological data repositories such as the U.S. Geological Survey, the Denver Museum of Nature and History, and the University Of Colorado Museum of Natural History for assistance with paleontological resource locality information.

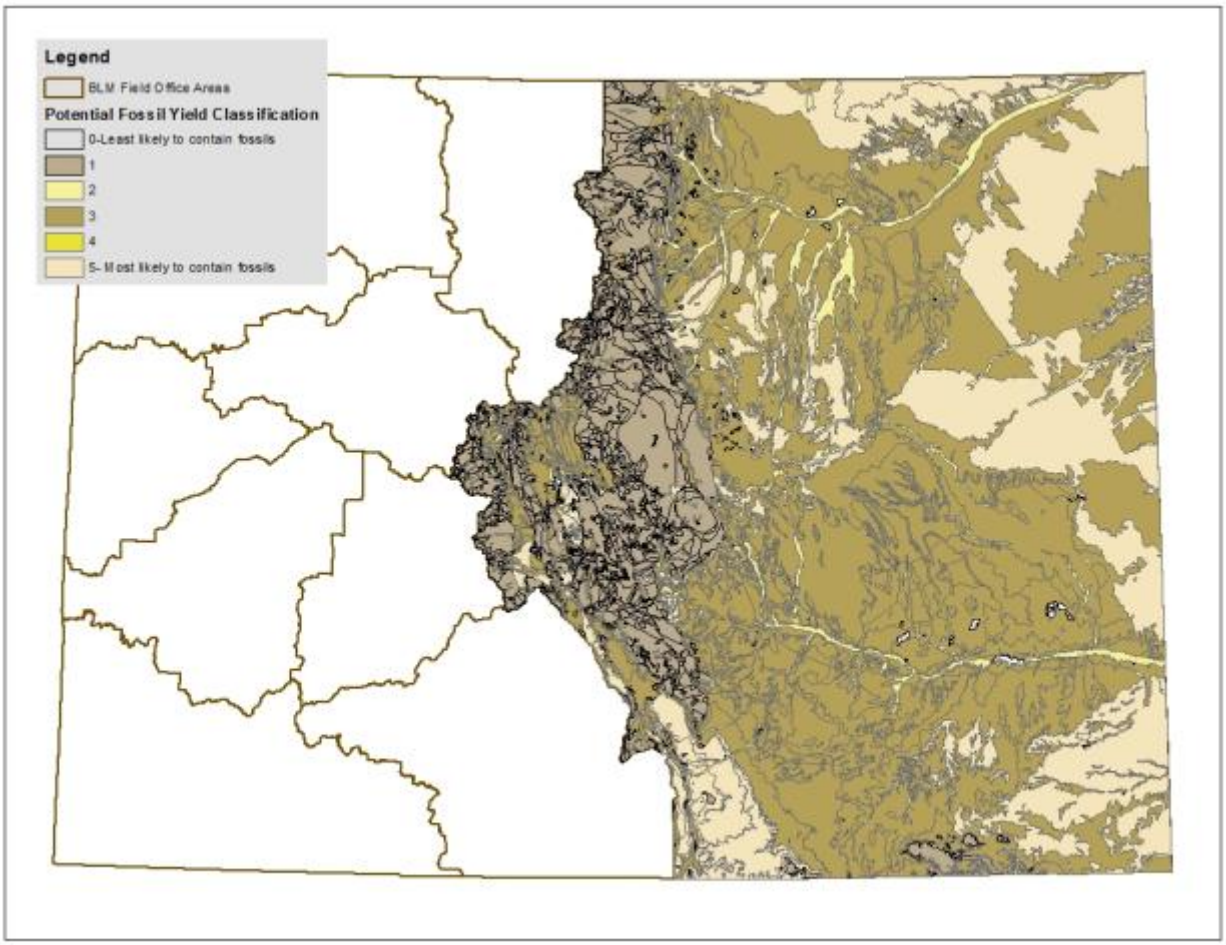

Figure 2.16. Potential Fossil Yield Classification for the Royal Gorge Field Office

The probability of finding paleontological resources can be broadly predicted by the geologic units present at or near the surface; therefore, geological mapping is useful for assessing a location's potential for paleontological resources (Figure 2.16 above).

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or significant invertebrate or plant fossils and their sensitivity to adverse impacts, with higher-numbered classes indicating 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 applicable to specific paleontological localities or small areas within units. While widely scattered fossils or localities may occur within a geologic unit, the relative abundance of significant localities determines the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an early point in the analysis, and it should be used to assist in determining where and whether there is a need for a paleontological resource survey, or for further mitigation assessment or actions. Descriptions of the PFYC can be found in BLM IM No. 2008-009 (BLM 2007a).

Classifications within the planning area

Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected on about 37 percent of BLM surface estate within the RGFO (Table 2.33, PFYC 3, 4, and 5). In these areas, pre-work surveys or on-site monitoring may be required during construction. Class 5 geologic formations are the most likely to produce scientifically significant paleontological resources and therefore have the highest management concern.

Table 2.33. Percentage of BLM RGFO Surface Estate within Each Potential Fossil Yield Classification

Potential Fossil Yield Classification (PFYC)	Acres of BLM surface	Percent of BLM surface
0	453	<1%
1	447,020	67%
2	1,463	<1%
3	141,962	21%
4	0	0
5	76,590	11%

2.2.12.3. Trends and Forecast

Qualitative observation indicates that the condition has remained stable for paleontological resources protected or mitigated through the permitting process and other standard operating procedures (such as pre-disturbance clearance) associated with Federal management actions. In these cases, the trend has been toward conservation.

For resources not associated with direct management actions, the trend has been slightly downward. The primary contributors to this trend include unauthorized collection of fossils, limited law enforcement resources, ground disturbance associated with recreational activities, and natural processes such as erosion.

2.2.12.4. Key Features

Key areas for paleontological resource management are the Garden Park Fossil Area that is managed by the BLM as an ACEC due to the significant paleontological resources that are located there. The Garden Park Fossil Area is also designated as a national natural landmark by the National Park Service and a Colorado natural area by Colorado Parks and Wildlife.

2.2.13. Visual Resources

2.2.13.1. Indicators

For large portions of the planning area, scenic quality is of national significance and an important part of the local and State economy as well as people's daily lives. Many people live, work and play in the planning area because of the natural setting and related visual qualities that the public lands offer. Scenic values are an important part of the local communities that the planning area serves, and it contributes to factors ranging from quality of life to the economic value associated with tourism, recreation, and associated businesses. Visitors to Colorado and the Rocky Mountains expect to see high-quality scenic values and are contributors to the State's economy. Two special recreation management areas (SRMAs) and 14 scenic byways are located within the planning area, and they attract approximately 1.8 million visitors annually.

The BLM Visual Resource Management (VRM) system is a way to identify, evaluate, and classify scenic values in order to determine appropriate levels of management based on demands from other resources. This system also provides land managers with the tools to plan projects so that they reduce impacts to visual resources and protect an area's scenic values in line with the values that the public prescribes to public land resources.

Visual resource inventory

The first essential part of the VRM process is conducting a visual resource inventory (VRI) based on three components: 1) Scenic Quality Evaluation, 2) Sensitivity Level Analysis, and 3) Delineation of Distance Zones (BLM 1986a). These three components are overlaid to generate a 1–4 inventory value for the entire planning area. These classes provide the basis for considering visual values in the RMP and planning processes, but they do not establish management direction nor are they used as a basis for constraining or limiting surface-disturbing activities. A VRI has been completed for the planning area.

Visual resource classes

Following an inventory, the next step in the VRM process is to assign management classes to the landscape through the RMP development process. The assignment of visual management classes is ultimately based on the management decisions made in the RMP. However, visual values must be considered throughout the RMP development process and can often be the driving force for some management decisions. The objectives of these management classes are as follows:

Class I

To preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II

To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but they should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III

To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV

To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These 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 elements.

Table 2.34 shows the acreage of each management class as assigned in the existing RMP.

Table 2.34. Visual Resource Classes

Visual resource class	Acres[a]	Percentage[a]
I	0	0%
II	230,152	34%
III	327,624	49%
IV	110,964	17%
Total	668,740	100%

[a]Because of changes in land ownership patterns over time, acreages and percentages are only approximations.

2.2.13.2. Current Condition

The RGFO visual resource inventory captures the current condition of visual resources and documents the values that people ascribe to the landscapes within the inventory area. Although the results of this updated inventory are not currently available, demands for resources within the planning area and changes in socioeconomics have resulted in impacts to visual resources and in how these landscapes are valued.

The RGFO has an abundance of resources such as minerals, oil, gas, and timber that have all been extracted over the past several decades. This has created contrasts with the characteristic landscape throughout the field office at a variety of levels and elements.

What has probably changed the most over the past several decades and plays the larger role in current conditions is how people value the landscape and where they are viewing it from. An abundance of private lands are spread throughout and among the fragmented public lands. These

private lands were once large, sprawling ranches that have since been subdivided, and the owners have built retirement and second homes. This has increased the number of people viewing more remote parcels of public land that were previously seldom seen. These people also place higher value on the scenery, because it serves as the backdrop to dream homes and quiet retreats.

There are also noticeable shifts in the values that local communities ascribe to public lands and the scenery that they provide. These historically resource-extraction or industrially based community economies are aligning themselves with trends in outdoor recreation in the hopes of increasing revenues. This shift is largely based on the proximity to the adjacent public land resources, which allow not only for active participation in activities such as hiking and floating down the river, but also for experiencing the passive values that they provide in the form of scenic landscapes that accentuate positive recreational experiences. Communities are placing higher values on the scenic qualities as a way of attracting visitors to the area.

2.2.13.3. Trends and Forecast

It is anticipated that current conditions as outlined above will be exacerbated in the future, placing higher demands on public lands as a visual resource. Contrasts within the landscape will continue to occur as demand for extractive resources continues. Additionally, the subdivision of adjacent lands and the introduction of sensitive viewers as communities increasingly focus on outdoor recreation are anticipated to continue in the future. As a result, it is going to be more and more difficult to develop extractive resources within the planning area while at the same time managing for the scenic values that the public holds in high regard.

The RMP revision will have to carefully evaluate the planning area's scenic resources as identified in the VRI along with the demands of other resources highlighted in other chapters of this document in order to provide a balanced approach to managing the RGFO's public lands. Based on this evaluation, VRM classes would be prescribed to provide guidance for future management decisions while maintaining scenic quality.

2.2.13.4. Key Features

Key features for visual resources have been identified in the Royal Gorge VRI. This inventory identifies landscapes that are important to the public, have a high scenic quality, and are close to key viewing areas.

2.2.14. Lands with Wilderness Characteristics

Consistent with FLPMA and other applicable authorities, the BLM will consider the wilderness characteristics of public lands when undertaking land use planning (BLM 2012b). The BLM will use the land use planning process to determine how to manage lands with wilderness characteristics as part of the BLM's multiple-use mandate. When such lands are present, the BLM will examine a full range of alternatives for managing these lands and determine the most appropriate land use allocations for them.

In order to do this, the BLM must maintain on a continuing basis an inventory of all public lands and their resources and other values, including wilderness characteristics. Regardless of past inventories, conditions relating to wilderness characteristics may have changed over time, and an

area that was once determined to lack wilderness characteristics may now possess them. Updates to the inventory must be considered when the BLM is undertaking a land use planning process.

2.2.14.1. Indicators

BLM Manual 6310 (BLM 2012a) provides the latest policy and guidance for conducting wilderness characteristic inventories under Section 201 of FLPMA. In order for an area to qualify as a land with wilderness characteristics, it must possess sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation.

Sufficient size

To be considered as having wilderness characteristics, the area must meet one of the following size criteria: 1) It must be a roadless area with 5,000 acres of contiguous BLM lands. 2) It must be a roadless areas of less than 5,000 acres of contiguous BLM lands if they are contiguous with a) designated wilderness, b) BLM WSA, or c) an area recommended or proposed as wilderness by another Federal agency. 3) It is demonstrated that the area is of sufficient size for its preservation and use in an unimpaired condition to be practical.

Naturalness

To be considered as having wilderness characteristics, the area must appear to be affected primarily by the forces of nature, with little or no work done by human beings. Some human works are acceptable, so long as they are substantially unnoticeable and do not detract from the overall appearance of naturalness, such as fencing, spring developments, and trails.

Outstanding opportunities for solitude

Visitors may have outstanding opportunities for solitude when the sights, sounds, and evidence of other people in the area are rarely encountered. Size, configuration, and topographic and vegetative screening are all factors or elements that may influence solitude and the ability of a visitor to find seclusion.

Outstanding opportunities for primitive and unconfined recreation

Primitive and unconfined recreation are those activities that provide for dispersed recreational experiences in undeveloped areas where there are no facilities, motor vehicles, motorized equipment, or mechanized transport. Examples include hiking, backpacking, fishing, hunting, horseback riding, and rock climbing in remote areas. An area may possess outstanding opportunities by providing either diverse primitive and unconfined recreational activities or by providing one opportunity of outstanding quality.

2.2.14.2. Current Condition

The inventory for lands with wilderness characteristics within the planning area was updated in 2013 (Table 2.35). The updated inventory found that 89 parcels met the minimum sufficient size/adjacency requirements. Intensive inventory found that 40 of these parcels had portions that possessed wilderness characteristics, totaling 77,756.5 acres out of 257,324 acres.

Table 2.35. RGFO Lands with Wilderness Characteristics as of 2013

ID number	Acres	Inventory name
COF-020-001	4,866.9	Badito Cone
COF-020-002	521.9	North Hondo
COF-020-003	319.0	Chitwood Gulch
COF-020-004	38.8	Dry Creek Canyon
COF-020-005	2,448.5	Railroad Gulch
COF-020-006	153.8	Crown Point
COF-020-007	199.8	Little Fountain Creek
COF-020-008	663.5	Copper Gulch
COF-020-009	2,476.1	Turkey Creek
COF-020-010	142.7	Red Rock Subdivision
COF-020-011	38.8	COF-020-011
COF-020-012	459.2	War Dance Mine
COF-020-013	242.2	West Pierce Gulch
COF-020-014	113.2	Westfall Gulch
COF-020-015	235.8	Bull Domingo West
COF-020-016	478.9	Marsh Gulch
COF-020-017	21,162.2	Cooper Mountain
COF-020-018	8,928.0	North Badger Creek
COF-020-020	66.3	NW corner of Beaver Creek WSA
COF-020-021	814.5	East Pierce Gulch
COF-020-022	8,137.4	Badger Creek South
COF-020-023	137.8	Goat Park
COF-020-025	1,787.8	Dead Mule
COF-020-029	348.1	N Bear Gulch
COF-020-030	147.3	Horseshoe Mountain
COF-020-033	209.6	West of Beaver Creek WSA
COF-020-034	601.0	SE Phantom Canyon Road
COF-020-035	941.1	East Fork
COF-020-036	548.5	NE Steel Bridge
COF-020-041	5,127.9	Waugh Mountain
COF-020-044	97.0	Browns Canyon North
COF-020-047	204.8	Sheep Basin
COF-020-051	28.1	Iron Mountain
COF-020-070	6,454.2	Red Canyon
COF-020-071	7,193.2	Bear Mountain
COF-020-077	262.6	Mineral Creek
COF-020-079	39.1	Middle Hardscrabble Creek
COF-020-080	118.1	Graneros Creek
COF-020-085	79.3	Porcupine Gulch
COF-020-087	923.5	Badito Cone North
Total	77,756.5	

2.2.14.3. Trends and Forecast

When conducting the inventory update, many of the original inventories were referenced. This provided insight into past conditions, particularly for parcels that were determined to not qualify under naturalness. In several of the original descriptions, statements such as “it would take several decades for this disturbance to appear natural” were made. Interestingly enough, these same areas were reviewed several decades later, and it was determined that previous disturbances had in fact “naturalized” over time and did not detract substantially from an overall natural appearance.

Several parcels that were originally found to not possess wilderness characteristics were most recently found to meet these criteria simply from the passage of time and lack of new disturbance.

Various management decisions have allowed changes in land characteristics to occur from the lack of surface disturbance. Travel management plans that were completed in the last 10 years provide a good example of recent management decisions that reflect this trend. Through these travel management plans, the BLM designated roads as open, closed, or for administrative use only. Roads previously designated as closed or for administrative use only are no longer being used and are slowly naturalizing. In some instances, they are already difficult to find on the ground. Over time, this naturalization process will result in more lands that appear natural and may meet the criteria for possessing wilderness characteristics.

Current management does not provide any direction regarding the management of lands that possess wilderness characteristics, and they are currently not given priority over other resources or resource uses. Because of this, future decisions could reduce or increase the acreage of these lands depending upon a number of factors such as future recreation demand, regional growth, energy development, and the location of valuable resources. Through the land use planning process, the BLM will consider the wilderness characteristics of public lands and determine how to manage these lands as part of the BLM's multiple-use mandate. The BLM will consider a full range of alternatives for such lands when conducting land use planning that could result in a number of outcomes, such as 1) emphasizing other multiple uses over protecting wilderness characteristics, 2) emphasizing other multiple uses while applying management restrictions (conditions of use or mitigation measures) to reduce impacts to wilderness characteristics, or 3) protecting wilderness characteristics over other multiple uses.

2.3. Resource Uses

2.3.1. Recreation

Recreation and visitor services

Management of recreation is guided by BLM regulations and policies, Federal and State laws, current and emerging trends in public demand for recreational activities and opportunities, and an area's physical and natural surroundings. Current management direction is based on objectives in RMPs and RMP amendments, activity level plans, and recreation management guidance, including 43 CFR 8340, Subchapter H on recreation (Parts 8342 and 8364); H-1601-1, *Land Use Planning Handbook* (BLM 2005), Appendix C, part II, section C, Recreation and Visitor Services; and *BLM Recreation Permit and Fee Administration Handbook* (BLM 2014d). The intent of the various laws, policy, and guidelines is to meet public demand for outdoor land-based recreational opportunities, while preventing or minimizing adverse impacts to the natural and cultural elements of public lands in Colorado.

Recreational activities in the RGFO area include opportunities to hike, backpack, mountain bike, horseback ride, rock climb, ride off-highway vehicles (OHVs), hunt, fish, whitewater raft, kayak, camp, photograph, and view wildlife. Management strategies in the past revolved around these activities, associated with different areas. On a practical level, the RGFO manages recreation by establishing recreation management areas and issuing recreation use permits.

2.3.1.1. Current Level of Use

Recreation management areas

Recreation management areas are the primary means of managing recreational use on BLM land. There are two types of designated recreation areas:

1. SRMAs: Management in these areas is intensive, and outdoor recreation is a high priority.
2. ERMAs: This encompasses all surface lands within the RGFO that are not SRMAs.

Special recreation management areas

The RMP planning process identifies SRMAs where recreation is the primary management focus. These SRMAs were traditionally areas that had higher recreation use, required extra investment in recreation, or needed more intensive recreation management. The 2005 revision of the BLM *Land Use Planning Handbook* (BLM 2005) amended the reasons for designating an SRMA. SRMAs are now identified in land use plans in order to direct recreation funding and personnel to fulfill commitments made to provide specific, structured, recreational opportunities (i.e., activity, experience, or benefit opportunities). SRMAs must identify a distinct, primary recreation-tourism market (destination, community, or undeveloped), as well as a corresponding and distinguishing recreation management strategy. Recreation settings or natural resource settings are prescribed as part of the land-use allocation decision. Subsequent implementation actions, as identified in the activity planning framework, are proactive, and they address management, marketing, visitor information, monitoring, and administration.

The RGFO planning area currently has two SRMAs: the Gold Belt SRMA and the Arkansas River SRMA. The diversity of land uses within these SRMAs has led the BLM to manage recreation to provide for a variety of opportunities and settings, from primitive to urban.

Gold Belt SRMA

The Gold Belt SRMA contains approximately 130,000 acres of BLM-administered lands. The majority of the SRMA is in Fremont and Teller Counties, between the towns of Cripple Creek and Victor to the north and the cities of Cañon City and Florence to the south. Colorado State Highways 115 and 9 are the east and west boundaries, respectively. The topography of the area consists of the rolling park lands of the High Park area and rugged canyons dissected by the drainages of Beaver, Eightmile, Sixmile, Fourmile, Cripple, and Currant Creeks. The elevation of the SRMA ranges from 4,500 to over 10,500 feet. The Gold Belt Byway is contained within the SRMA and is a popular scenic driving route. Other recreation highlights are the Beaver Creek WSA, Penrose motorized area, and Garden Park National Natural Monument.

Within the Gold Belt SRMA is the Shelf Road Recreation Area, which has two developed campgrounds. The Bank and Sand Gulch campgrounds are managed intensively as special recreation fee areas. According to data listed on recreation use permits, approximately 85 percent of visitors come to the Shelf Road Recreation Area for rock climbing.

Arkansas River SRMA

The Arkansas River SRMA consists of approximately 109,000 acres. This SRMA is characterized by the Arkansas River and its many drainages; steep rugged canyons; open expanses of irrigated

pastures; high mountain peaks; and lush riparian zones. The SRMA encompasses the area along the Arkansas River corridor between Cañon City and Leadville, including upland areas surrounding the corridor. Recreational opportunities within the SRMA range from highly structured to very isolated and dispersed. The most intensive recreation management is in those sections that are in close proximity to three main communities along the river: Cañon City, Salida, and Buena Vista.

The Arkansas River corridor is managed jointly by the BLM and Colorado Parks and Wildlife under a cooperative management agreement (CMA) and recreation and public purpose lease (R&PP). Arkansas Headwaters Recreation Area (AHRA) manages approximately 6,000 acres of BLM-administered lands, including 14 developed recreation sites. The remainder of the upland area is managed by the RGFO.

Extensive recreation management areas

ERMAs are areas where dispersed recreation is encouraged and where visitors have recreational freedom of choice with minimal regulatory constraint. All areas within the RGFO that are not part of an SRMA are included within the ERMA. Typically, these areas receive very little recreational use. The eastern plains contains fragmented BLM land parcels that are included in the ERMA but have no recreational use due to their limited public access.

Public recreation issues or management concerns are limited and little management is needed in an ERMA. Detailed planning is not usually required for these areas; however, some areas receive large numbers of visitors, which creates a need for more management. These ERMAs may include both developed and primitive recreation sites having minimal facilities.

Several areas were included as ERMAs in the 1999 RMP, but use of these areas has dramatically increased, requiring more intensive management:

Methodist Trail System

Located south of Salida. the Methodist Trail System was developed for non-motorized use. The area receives very little snowfall, allowing year-round accessibility to the trails. Use in this area has increased significantly due to its proximity to Salida and because its routes are relatively easy.

Cache Creek

Cache Creek is known for recreational placer mining, which consists of non-motorized, non-mechanical activities such as panning. The number of visitors fluctuates with gold prices and has seen a dramatic increase in the past five years. The amount of time the BLM monitors this area has also increased because of resource damage incurred when miners move soil to find gold. Due to its remote location, dispersed camping in this area has also increased.

Guffey Gorge

At one time, Guffey Gorge was a quiet swimming hole mainly visited by a few locals. Eventually, word spread and use of the swimming hole increased. In recent years, internet sites have boosted the area's use to 15,000–20,000 people annually, mainly during summer months. Guffey Gorge has become a destination swimming and cliff-jumping area for visitors from the Front Range.

Texas Creek

Texas Creek is open to all motorized activities. Half of the area was included in the Arkansas River SRMA, but the northern section of Texas Creek was excluded. Visitors using the trail system access the northern area in equal numbers as the southern area.

Visitor use data

The BLM uses the Recreation Management Information System (RMIS) to track and report recreation visitation. The system enables BLM employees to estimate recreation participation in 65 types of recreation activities. Numbers are recorded at BLM sites and areas, based on registrations, permit records, observations, and professional judgment. Visitation is estimated by number of participants as well as visitor days. Participants are defined as the actual number of people who take part in a recreational activity. A visitor day is a recreation unit of measure commonly used by Federal agencies, and represents an aggregate of 12 visitor hours at a site or area. Table 2.36 displays the RMIS figures for the planning area for fiscal years 2009 through 2013.

It is important to note that the visitation figures shown in the table are estimates. There are 27 traffic counters in the RGFO area, mainly in the SRMAs. Motorized traffic is counted per vehicle, but a single vehicle may carry more than one visitor. ERMAs lack direct visitation monitoring facilities, such as traffic counters or visitor registers. Direct monitoring by BLM staff must focus on areas of greatest use or conflict, with the result that more remote locations within the planning area may not receive adequate monitoring. In addition, many popular trails and use areas are not designated, making it difficult to accurately determine the amount of recreational use these areas receive. Therefore, the numbers recorded for specific activities in specific areas may not accurately reflect the level of use, and the origin of changes in use patterns (such as a change in numbers or types of non-local users) are difficult to determine.

Table 2.36. Visitor and Visitor Use Days 2009−2013 in RGFO Planning Area

Year	Visits	Visitor days
2009	1,624,327	607,789
2010	1,601,065	595,032
2011	1,888,604	735,121
2012	1,708,484	680,180
2013	1,784,754	720,627
Source: BLM 2014a		

Recreation permits

Special recreation permits

Special recreation permits (SRPs) are issued for commercial, competitive, vending, as well as organized group activities and events. Commercial SRPs are issued to outfitters, guides, vendors, recreation clubs, and commercial competitive event organizers that provide recreational opportunities or services not using permanent facilities. SRPs for competitive and organized group events are also included in this category. SRPs may be issued for 10 years or less, with annual renewals. The permits are issued to manage visitor use, protect natural and cultural resources, and accommodate commercial recreational uses. In 2013, the RGFO issued over fifty SRPs, and there was a high demand for more permits. Most new SRP requests are for rock climbing in Shelf Road, guided mountain bike tours, and events near communities.

Letters of agreement

Letters of agreement are used as an alternative to issuing SRPs when the proposed recreation use has no foreseeable impact on resources and stipulations are not required. Agreements have been used to allow activities such as club events, educational events, and customer appreciation days.

Recreation use permits

Recreation use permits (RUPs) are issued for short-term recreation use of specialized sites, facilities, equipment, or services furnished at Federal expense. Most often, the BLM uses RUPs to authorize individual and group use of recreational facilities, also known as fee sites. The RGFO has two fee sites: the Bank Campground and the Sand Gulch Campground within the Shelf Road Recreation Area. The fees collected go to support maintenance, security, visitor information, and improvements. Table 2.37 shows a summary of total permits and revenue collected from each site.

Table 2.37. Recreation Use Permit Data—Annual Use for Shelf Road Campgrounds

Fiscal year	Bank permits	Revenue	Sand Gulch permits	Revenue	Total permits	Total revenue
2009	943	$5,038.20	667	$3,790.67	1,610	$8,828.87
2010	640	$4,286.80	573	$3,795.80	1,213	$8,082.60
2011	871	$6,108.54	747	$5,019.00	1,618	$11,127.54
2012	996	$9,584.50	670	$6,300.17	1,666	$15,884.67
2013	913	$10,171.89	676	$7,192.81	1,589	$17,364.70
Note: A fee increase was implemented in mid-2012 and is reflected in revenue.						

2.3.1.2. Trends and Forecast

Increased use and demand for recreational opportunities

Indicators for measuring trends in recreation include visitor use levels, user conflict levels, impacts to resources, and compliance with commercial authorizations. The Colorado Statewide Comprehensive Outdoor Recreation Plan (SCORP) measures trends through participation, visitation, licenses, and registrations. In a 2008 study, participation in land-, water-, and snow-based activities increased between 1995 and 2006. Land-based activities increased by 53 percent, with day hiking being the most popular, followed by visiting wilderness or primitive areas (http://cpw.state.co.us/aboutus/Pages/SCORP.aspx).

According to the SCORP study, more than 66 percent of respondents recreate within 10 miles from home on weekdays. This supports the shift by RGFO recreation to focus on the demand on BLM land adjacent to local communities. Three communities within the Arkansas River SRMA—Salida, Buena Vista, and Cañon City—are located within a 10-mile radius of BLM public lands. These recreational areas are also in close proximity to larger Front Range cities such as Denver, Colorado Springs, and Pueblo. The SCORP study also stated that approximately 54 percent of people travel at least 20 miles on weekends for outdoor recreation. The RMP planning area lies within this recreational distance, which serves a large part of the Colorado population. Most demand for new trails and SRP requests are submitted from these areas. No increase in demand is expected in the eastern plains, where land patterns are fragmented and have limited public access.

Weather patterns affect the time of year for recreational demand. Most of the BLM areas close to communities are at low elevation and/or have mild temperatures. These areas see an increase in use during fall, winter, and spring when higher elevations have snow. Traffic counter data support this use pattern for the Shelf Road Recreation Area. Monthly visitation averages are 80 percent lower in the summer months. Data collected from the recreation use permits for campgrounds in the area also show a drop in summer use. The data in Table 2.37 above do not reflect an annual increase in use at campgrounds, due to the limited number of sites. Visitation numbers remain steady, and the public has made requests for new campsites.

Although the visitor use data shown in Table 2.37 do not show an increase in overall visitation to the RMP area over the last 5 years, there are other indications that the demand has shifted. Requests for trails adjacent to municipalities or areas close to major subdivisions outside of incorporated towns in the planning area are increasing. With increased local visitation, SRP requests typically increase, as communities hope to see rising economic benefits. More communication between the BLM, counties, and communities will be needed to identify recreational opportunities. Community partnerships will increase the need to provide additional management tools to protect resources and reduce conflict. The BLM will need to address negative impacts from overuse as well as conflicts from multiple user groups such as hikers, equestrians, mountain bikers, hunters, and motorized users, as the area's capacity to accommodate increased use is stretched, especially in places with developed access. Areas that are managed for their recreational values would benefit by more input from the public to better define desired settings.

The RMP planning area contains many fragmented parcels, or parcels less than 40 acres with no public access, that do not fit the RMA categories. The BLM would give consideration to a "No RMA" category, which would mean an area has no recreation concerns that would impact future decisions.

2.3.2. Livestock Grazing

2.3.2.1. Current Level of Use

Currently there are approximately 602,000 acres of BLM-administered public land allocated for livestock use. As of 2013, 455,000 acres—or 76 percent of the total allocated allotment acres—are actively grazed. The public range is permitted at a level of 27,671 animal unit months (AUMs) of forage. An AUM is equal to the approximate amount of forage needed to sustain one cow, five sheep, or five goats for a month. The permitted level includes 27,671 active AUMs and 5,473 suspended-use AUMs.

Over the past five years, billed use has been on average 59 percent of the total permitted use. This difference can be attributed to a number of variables. Seasonal variation in precipitation results in more or less available forage from one year to the next. Drought has required a reduction in grazing use in order to maintain good range conditions. Grazing permittees may also voluntarily opt out of using an area for a variety of reasons, resulting in AUMs that are available but not used.

Within the planning area, there are a total of 530 allotments. Of these, 387 allotments contain an active grazing permit or lease. The remaining 143 allotments are currently not active for various reasons, including lack of livestock water or steep terrain. The allotments vary in size from 20 to 36,852 acres, with grazing allocations ranging from one to 1,200 AUMs in each allotment. As of 2013, the RGFO is administering 323 active grazing permits and leases. The majority of

permits/leases in the resource area are scheduled for cattle use. A very small percentage of permits/leases are scheduled for bison and horse use. No sheep grazing is currently scheduled in the RGFO.

Allotments within the planning area are broken into one of three descriptive management categories: Custodial (C), Maintain (M), and Improve (I). Determination of a category depends on resource conditions within an allotment, potential for resource improvements, and the amount of BLM-administered land within an allotment. Allotments in category C either do not lend themselves to intensive management or lack the potential to improve under current economic conditions. Many of the category C allotments consist of relatively small, scattered parcels of public land that are surrounded by private land and are not fenced separately, making them difficult to manage. Category M allotments have moderate to high resource potential where present rangeland condition is satisfactory. Those allotments in category I have a definite potential for improvement with more intensive management, range improvements, or a change in use. Allotments can change management category as conditions change, relative to management objectives, on a case-by-case basis. Within the planning area, there are a total of 430 category C, 19 category M, and 81 category I allotments.

Grazing within the planning area occurs throughout the year, depending on the elevation. A significant amount of BLM-administered land is only grazed during the dormant season of vegetative growth.

All grazing permits include terms and conditions regarding the management of the allotment. In some cases, allotment management plans (AMPs) have been developed, which provide details about the location, amount, and timing of permitted grazing use, and incorporate allotment-specific planned grazing systems.

Most allotments in the planning area contain portions that are only slightly used or not used at all by livestock because of topography, distance from water, limitations caused by natural barriers, or for other reasons. The BLM has implemented rangeland improvement projects in the RGFO, particularly water developments, to better distribute livestock grazing.

RGFO grazing allotments are used for many other activities, such as recreation, wildlife protection, energy development, mining, and providing utility easements. Resources requiring special management attention, such as T&E species, SRMAs, wilderness areas, and ACECs also occur within grazing allotments.

The BLM conducted public land health assessments in the planning area between 2002 and 2013. During the assessment process, allotments were individually evaluated for conformance with the BLM Colorado standards for public land health (BLM 1997). Table 2.38 below summarizes the status of grazing allotments in relation to public land health standards.

Table 2.38. Status of Allotments Meeting Public Land Health Standards

Description	Number of allotments	Acres/miles
Upland soils, healthy plant and animal communities, and T&E species standards		
Total number of allotments assessed	530	600,000
Allotments meeting standards with problems and/or NOT meeting standards, with livestock grazing identified as the cause	6	1,000
Allotments meeting standards with problems and/or NOT meeting standards, with causes other than livestock grazing identified	71	48,545

Description	Number of allotments	Acres/miles
Riparian and water quality standards		
Total number of allotments assessed	530	600,000
Allotments meeting standards with problems and/or NOT meeting standards, with livestock grazing identified as the cause	6	13.4 acres 5.4 miles
Allotments meeting standards with problems and/or NOT meeting standards, with causes other than livestock grazing identified	9	22.35 miles

2.3.2.2. Trends and Forecast

Rangeland health assessments identified issues in relation to pinyon-juniper woodland encroachment into open grassland meadows. As woodland vegetation begins to invade more productive sites with deeper soils, herbaceous plant cover decreases and bare ground increases, and the productivity, vigor, and diversity of the site decrease. Forage previously available to livestock disappears, creating distribution issues on the allotments. Over time, as these successional patterns continue, forage production on some allotments will decline.

Chaffee, Custer, Fremont, Park and Teller Counties contain 86 percent of the lands administered by the BLM in the planning area. Table 2.39 shows that in five counties of the planning area, cattle numbers have steadily increased over a 4-year period. This increase may be due to higher beef prices and greater economic return (USDA 2012).

Table 2.39. Cattle Number Trends 2009−2012

Counties	2009	2010	2011	2012
Chaffee	7,500	7,500	7,700	7,900
Custer	6,200	6,200	6,400	6,600
Fremont	14,600	14,500	14,900	15,300
Park	8,200	8,200	8,400	8,700
Teller	2,200	2,200	2,200	2,300

2.3.2.3. Key Features

The planning area contains many small, isolated tracts of BLM land typically surrounded by private land. These lands are currently authorized for grazing under Custodial management and have management challenges such as difficult access. The planning area also contains numerous allotments that are not grazed, because of difficult topography and lack of available water, and the ranching community has not desired them for grazing use.

2.3.3. Forestry

2.3.3.1. Indicators

BLM forests and woodlands are managed under the principles of multiple use, sustained yield, the Healthy Forest Restoration Act of 2003 (Public Law 108–48), and environmental quality protection principles in accordance with FLPMA and the BLM Colorado standards for public land health (BLM 1997). Values and uses associated with forests, such as timber production, recreation, aesthetics, water quality, wildlife habitat, and wilderness, are managed through an ecologically based program that emphasizes biological diversity, sustainability, and long-term forest health.

There are a wide variety of forest types found throughout the RGFO. On the whole, tree species found within the area are hardy, drought-tolerant trees that are well suited to the landscape. Forest management recommendations to ensure optimum tree health include providing adequate space and water, and avoiding wounding of trees. Generally, an overcrowded forest is more susceptible to catastrophic wildfire, insect infestations, and disease. Current ongoing treatments strive to increase forest resiliency to disturbance, maintain species diversity, improve age-class diversity, and work toward a mosaic of successional patches across the lands managed by the BLM.

2.3.3.2. Current Condition

Forest resources

In the RGFO, the total number of forest and woodland acres is 464,959, with 54 percent woodlands and 46 percent commercial forests. The total acreage for the RGFO is 668,928, which means approximately 70 percent of the land managed by the RGFO is forest or woodlands.

The BLM in the RGFO manages approximately 215,401 acres of commercial forested land within the planning area (Table 2.40). Commercial species include ponderosa pine, Douglas-fir, Engelmann spruce, white fir, lodgepole pine, bristlecone pine, limber pine, and quaking aspen. Most of the forests or stands within the RGFO are considered mixed-conifer forests, which contain multiple species with relatively few pure single-species stands.

Table 2.40. Commercial Species by Acres in the RGFO

Species	Acres
Ponderosa pine	45,388
Douglas-fir	93,866
Spruce	11,233
Aspen	55,468
Lodgepole pine	7,787
Bristlecone/limber pine	1,659
TOTAL	215,401

The forests along the Arkansas River corridor from Cañon City to Leadville were heavily harvested in the late 1800s when minerals were discovered in the region. From the 1950s through the 1980s, the primary commercial species harvested in the RGFO were ponderosa pine, Engelmann spruce, Douglas-fir, and lodgepole pine. During the 1990s, BLM forestry budgets declined, and very little forest management occurred. In the 2000s, BLM forestry budgets improved, and the RGFO forestry program increased output until 2010 when budgets began to decline once again.

In 1984, the first and only complete stand-by-stand inventory was completed for the RGFO. Based on the results from this inventory, the annual allowable harvest was set at 1.7 million board-feet, including both the commercial forests and woodlands. In the 1990s, with the approval of the Royal Gorge Resource Area RMP (BLM 1996), the harvest level was reduced to 1.4 million board-feet.

Woodland resources

There are approximately 249,558 acres of woodlands within the planning area, consisting mainly of pinyon pine, juniper, and Gambel's oak. Most of the recent treatments in the RGFO woodlands have been hydro-axing or mulching by the fuels and range programs. There have also been

many small fuelwood sales over the past 5–10 years. The average annual firewood harvest in the woodlands for the past 5 years has been approximately 300–500 cords per year. There are known cases of small-scale timber theft, including fuelwood and fencing materials removed by the public without permits; however, this has been difficult to quantify. Realistically, in the RGFO, this type of use is estimated to be less than 3 percent of known use. When combined with known harvest levels, this still equates to less annual volume harvested than annual volume growth, which is sustainable.

Riparian deciduous

This forest community type is the most dispersed forest and woodland type occurring in the planning area. Riparian forests occur adjacent to the larger streams and rivers, within smaller canyons, and in stand-alone saturated areas not associated with streams. These forests are generally associated with surface water, but can also occur in areas with high water tables. Mapping riparian areas yields length and acreage values (see section 2.2.8); however, there is no available vegetation classification protocol that separates out the riparian forest component from other riparian vegetation species to determine acres of riparian forest. Common riparian species include quaking aspen, plains and narrow leaf cottonwood, alder, birch, and a variety of willow species. Many of the riparian forest stands are experiencing impacts from wildlife and livestock browsing, insects, disease, and conifer encroachment. Most forest treatments or activities avoid these areas due to water-quality concerns.

2.3.3.3. Trends

Forest and woodland health

A healthy forest is resilient to natural disturbances such as wildfire, insect infestations, and disease outbreaks. Most of the forests in the RGFO show several indicators of poor health, including too many small-diameter trees, small crown ratios, moderate to high natural fuel accumulations, limited herbaceous production, and increased bark beetle activity. Overall, the recently untreated forests and woodlands are in decline. In the past 10 years, through multiple programs, the RGFO has treated 1,000–2,000 acres each year by restoration thinning and a small amount of patch cutting to improve age-class diversity. These recent treatments have moved the forest condition toward a much healthier condition or the desired condition (Figures 2.17, 2.18, and 2.19).

Most the forests have too many trees per acre. The RGFO forestry program intensely inventories over 1,000 acres each year. Variable plot and fixed plot inventories are used to determine trees per acre, tree characteristics, and to identify other forest health issues. These recent inventories reveal that stands vary in density by 300–3,500 trees per acre. Most scientific studies of the historic forest conditions along the Front Range of Colorado indicate that there were typically less than 100 trees per acre (see, for example, Covington et al. 1997; Covington and Moore 1994; Veblen, Kitzberger, and Donnegan 2000),

Figure 2.17. Examples of Dense Pretreatment and Open Forest Condition Post Treatment—Clear Creek Reservoir

Figure 2.18. Examples of Dense Pretreatment and Open Forest Condition Post Treatment—Fairplay Stewardship

Figure 2.19. Examples of Dense Pretreatment and Open Forest Condition Post Treatment—Kerr Gulch Stewardship

The forests in the RGFO lack age-class diversity and old growth due to historic timber harvests. Most forests are around 110-130 years old, and most of these trees were probably not

merchantable in the late 1800s when these forests were affected by timber harvests. Most of the forests in the RGFO are considered mid-seral, closed-canopy stands with very little understory and fairly heavy fuel loads. Additionally, shade-intolerant species such as ponderosa pine or aspen are being replaced by more shad— tolerant species such as Douglas-fir and white fir.

The RGFO forests and woodlands have been affected by drought in recent years. Drought limits moisture availability to each individual tree, which causes them to become stressed and highly flammable. Bark beetles are able to detect when trees are highly stressed and prefer to attack those trees, so bark beetle outbreaks follow drought years.

Although people sometimes view them as catastrophic, outbreaks of native forest insects are natural events. Native insect outbreaks are only a problem when they conflict with people's interests in an area (e.g., recreation, wildlife habitat, scenic beauty, wood production, or property values). Bark beetle populations are on the rise in forested areas within the RGFO. The increase in beetle populations is caused by two factors present in Colorado: large areas that are dense with mature trees, and trees stressed by drought. High levels of forest insect activity will likely continue if current conditions do not improve (USFS 2006). There is debate between forest researchers whether the scale of Colorado's on-going bark beetle epidemics is within the natural range of variability (Verblen 2005, Fettig et al. 2007).

Since bark beetles typically attack the larger trees, there are forest management activities that can reduce the risk of bark beetle attack; however, these management activities must be implemented before the beetles attack, because once a tree has been successfully attacked, nothing can be done to save the tree. More importantly, there is very little that can be done once bark beetle populations reach epidemic levels. The following are recommended mitigations for an area prior to bark beetle attack or an epidemic:

1. Remove all trees currently under bark beetle attack. Each tree under attack has the potential to release a new generation of beetles the following year that can kill an additional 4–5 trees.

2. Remove or burn all activity slash wood greater than 4 inches in diameter and any trees that have recently been felled by wind ("blowdowns").

3. Avoid damaging trees by knocking bark off the bole with machinery.

4. Thin dense stands, leaving the most healthy and vigorous trees.

5. Increase age and species diversity to enhance stand resistance and resiliency.

Mountain pine beetle (*Dendroctonus ponderosae*), or MPB, is one of the most destructive bark beetles in Colorado. This beetle attacks lodgepole pine, ponderosa pine, bristlecone pine, and limber pine. Beetles are known to inflict heavy damage on stagnated, over-stocked stands. MPB impacts are increasing in the higher elevation sites in Colorado, with tree mortality occurring as high as 10,000 feet. This expansion is likely due to recent warmer summers, winters, and possibly global warming (State of Colorado 2004). Silvicultural strategies to reduce tree losses from MPB attacks typically seek to reduce relative densities in order to increase tree resistance and vigor. The current MPB population in the RGFO is considered endemic.

The Douglas-fir bark beetle (*Dendroctonus pseudotsugae*) attacks individual trees and small clumps of trees throughout the RGFO. The Douglas-fir beetle typically attacks the mid- to upper bole of the tree. Infestations often occur in larger, stressed trees that have been damaged by wind-throw (uprooted or broken by wind), fire scorch, drought, competition, or defoliating

insects. The best management strategy is to minimize stress or damage, to thin all dense stands, to maintain healthy vigorous growing conditions.

The spruce bark beetle (*Dendroctonus rufipennis*) is active in many parts of the State of Colorado. Field reconnaissance indicates that the spruce beetle epidemic in the Rio Grande National Forest has moved into the RGFO. Typically, the spruce beetle infests wind-thrown or downed trees, but the current infestation is mainly in standing green spruce. Spruce beetles may attack standing trees ranging from 4 inches to greater than 30 inches in diameter at breast height (DBH) but rarely attack a tree less than 4 inches DBH. This could prove catastrophic given the relative lack of age-class diversity present in the RGFO. If preventative silvicultural activities are not conducted, these forests will become more conducive to spruce beetle epidemics. Utah recently experienced a spruce beetle epidemic that killed 90 percent of the mature, relatively evenly aged spruce stands in the state. Thinned stands with mixed age classes will provide trees for the future, whereas evenly aged stands could have complete mortality. Treatments in areas with infrequent fire regimes can provide a hedge against complete forest destruction by bark beetle.

The pinyon ips beetle (*Ips confusus*) is extremely active in the forests around Cañon City, Colorado. Since 2011, the population of this bark beetle has progressively increased, and small pockets of mortality can currently be found in nearly every drainage and throughout the mountains around Cañon City and up the Arkansas River corridor. Most of the large pinyon pines in the lower elevations around Cañon City have been killed by this bark beetle.

The spruce budworm (*Choristoneura occidentalis*) is active within the RGFO. This insect is a defoliator whose larvae feed on the needles of spruce and Douglas-fir trees. Defoliators do not typically cause mortality but can weaken and stress trees. However, repeated consecutive defoliating events can eventually lead to tree death.

The tent caterpillar (*Malacosoma* spp.) affects the riparian forests along the Arkansas River. This insect is a defoliator whose larvae feed on the leaves of cottonwoods and other deciduous species. Defoliators do not typically cause mortality but can weaken and stress trees. However, repeated consecutive defoliating events can eventually lead to tree death.

Dwarf mistletoe (*Arceuthobium* spp.) is a native parasitic plant that attacks trees of all sizes and affects all conifer species. Impacts from mistletoe include the formation of “witches’ brooms” (round balls of abnormal growth) in the crowns and branches; reduced tree growth and seed production; premature death; and increased susceptibility to insect attack, root disease, and storm damage. Even-aged management is the most effective means of eradicating mistletoe from a stand, because multi-storied stands promote the transfer of mistletoe from larger trees to the small trees that are the next forest.

In the last 10 years, the wildfires occurring within the RGFO have increased in size and intensity. These uncharacteristic wildfires have been called “mega-fires.” Examples include the Waldo Canyon, Black Forest, Hayman, Iron Mountain., Wetmore, and Royal Gorge wildfires. Many wildfire studies have been conducted on wildfire frequency in the Front Range of Colorado (see, e.g., Brown 2000, Arno 2005, Kauffmann 2000). These studies estimate a wildfire frequency of every 5–35 years, excluding the infrequent wildfire forest types such as spruce/fir or lodgepole pine. Most forest types that experience historic frequent or moderate wildfire return intervals have missed at least one or more natural wildfire-return intervals, which results in very high fuel loads and too many trees per acre.

Special forest products

The RGFO issues approximately 600 special forest product permits each year (Table 2.41). These permits are issued on BLM form 5450-5 or 5450-10a, and they help meet the local demand by individuals and small companies for forest products. Wood products (fuelwood, posts and poles, craftwood , transplants, and Christmas trees make up most of the special forest products sold by the RGFO). Christmas tree boughs, pinyon nuts, native seed, teepee poles, and biomass[5] are only purchased occasionally in the RGFO.

Table 2.41. Permits Sold and Receipts Received 2009–2013 in the RGFO

Permits/receipts	2009	2010	2011	2012	2013	5-year average
Bough permits	4	4	3	3	2	3
Bough receipts	$125	$123	$108	$148	$64	$114
Craftwood permits	7	2	2	7	7	4
Craftwood receipts	$48	$168	$380	$182	$72	$166
Christmas tree permits	247	203	386	266	181	257
Christmas tree receipts	$6,982	$6,826	$5,754	$4,618	$3,940	$5,624
Edibles and medicinal permits	0	0	5	1	0	1
Edibles and medicinal receipts	0	0	$260	$24	0	$57
Native seed permits	2	2	1	1	2	2
Native seed receipts	$24	24	$12	12	24	$7
Transplant permits	19	27	22	7	9	17
Transplant receipts	$8,811	$3,453	$3,732	$4,240	$2,056	$4,458
Wood product permits	278	384	393	302	323	336
Wood product receipts	$11,416	$12,408	$11,642	$9,846	$12,758	$11,614
Total permits:	557	622	812	587	524	620
Total receipts:	$27,406	$23,002	$21,888	$19,070	$18,914	$22,056

Wood products include fuelwood, corral poles, fence posts, corner posts, fence stays, and tepee poles. Most of the permits sold over the past 5 years were for fuelwood. These special forest product permits are for both personal use and commercial use. Table 2.41 shows that there is a fairly high demand for forest products in the communities within the RGFO.

Commercial timber sales

Another important forest management activity in the RGFO is the use of commercial timber sales for treating forest stands (Table 2.42). Commercial timber sale projects include restoration thinning, salvage, and patch cutting. These contracts are issued using BLM timber sale forms 5450-25 and 5450-3a.

Table 2.42. Timber Sales Awarded in the RGFO, 2009–2014

Sale name	Treatment	Acres	Year
Cache Creek	Beetle salvage	54	2009
Stoney Face No. 1	Green patch cutting	20	2010
Stoney Face No. 2	Green patch cutting	30	2011
East Antelope	Restoration thinning	260	2011
Delilaha Peak	Restoration thinning	29	2012
Sand Gulch	Restoration thinning	74	2012
Basin Gulch	Restoration thinning	20	2012

[5] Biomass is considered the organic matter in a living or dead tree, usually the limbs, tops and non-merchantable portion that is chipped and can't be used for higher value forest products such as lumber or fuelwood.

Sale name	Treatment	Acres	Year
Jack Hall 2	Green patch cutting salvage	126	2013
Tyndall Mountain	Restoration thinning	55	2013
Deer Haven	Restoration thinning	145	2013
Two Creek	Green patch cutting salvage	47	2014
2014 Lodgepole Flats	Patch cutting	14	2014
Falls Gulch Mountain	Restoration thinning	54	2014

In the last 6 years, the RGFO has treated 155 acres each year on average through commercial timber sales. Since 2010, with declining budgets, the RGFO forestry program has concentrated on using commercial sales rather than stewardship projects to meet its objectives.

Stewardship projects

Stewardship contracts are also used in the RGFO to manage forest stands (Table 2.43). These contracts allow the harvest of commercial products that help pay for restoration services or other resource management needs in the area; however, the value of timber in Colorado does not typically cover all of the associated costs. Since 2006, the RGFO has awarded eight stewardship contracts totaling 1,091 acres, with all completed except for 30 acres in the North Cotopaxi project.

Table 2.43. Stewardship Projects Awarded in the RGFO, 2009–2014

Project name	Treatment	Acres	Year
Clear Creek	Restoration thinning	46	2009
Buffalo Gulch	Restoration thinning	141	2010
Fairplay	Restoration thinning	70	2011
Poverty Mountain	Restoration thinning	28	2011
North Cotopaxi	Restoration thinning	39	2012
N/A	N/A	0	2013
Stone Cabin	Restoration thinning	58	2014

In the last 6 years, the RGFO has treated 64 acres each year on average through stewardship projects. Since 2010, with declining budgets, the RGFO forestry program has concentrated on commercial sales versus stewardship projects to meet objectives.

Management objectives

The primary emphasis of the BLM's RGFO forests and woodlands program is to offer a scientifically based, environmentally responsible level of timber sales, as well as provide for forest and woodland health restoration treatments. Forest and woodland management objectives are to improve forest health and landscape diversity to build resiliency to drought, fire, insects, and disease. The management program aims to conduct vegetation treatments such as density reduction of overstocked stands, restoration of historic species composition, removal of encroaching conifers from aspen stands, improvement of forest age-class diversity, treatment of disease or insect outbreaks, and restoration of riparian tree communities while meeting local demand for forest products.

From the early 1950s through the early 1980s, the RGFO forestry program's objectives were to provide sawtimber to the local sawmills and increase forage for livestock and big game species. These objectives were achieved through the practice of chaining and roller chopping, as well as fuelwood and commercial timber sales. Most of the past treatment areas have adequately regenerated. Many of these have received maintenance thinning treatments through transplant

sales, Christmas tree sales, fuels, and Habitat Partnership Program projects. Presently, large-scale treatments in the pinyon-juniper woodlands are accomplished through mastication, a process that involves mulching trees into small chips.

2.3.3.4. Forecast

It is extremely difficult to forecast how the forests will develop in the future, because one spark in the right location and on the wrong day can change a forest to grassland for hundreds and possibly thousands of years without human intervention. Listed below are the estimated trends by the RGFO forester.

1. Recent rangeland health assessments indicate that most forested or wooded acres are too dense. These dense forests shade the shrubs, grasses, and forbs from sunlight, which decreases plant vigor. The loss of the understory species results in a loss of site plant diversity. One should expect all wildlife populations that use dense forests and woodlands to thrive and those wildlife populations that prefer open forest conditions to decline. This trend is expected to continue until forest treatments or natural disturbance reduces the tree density.

2. Since 2000, the bark beetle activity within the RGFO has been increasing, with several outbreaks reaching epidemic levels. The mountain pine beetle was very active in the early 2000s, but today the population is endemic. The pinyon ips beetle has been active in the area since 2003, following the drought of 2002. Today this beetle has reached an epidemic level in the woodlands around Cañon City, but is endemic in the pinyon-juniper woodlands further west of Texas Creek.

   Large active spruce beetle spots have been found on Stoney Face and Jack Hall Mountains north of Cotopaxi. The area's entomologist believes these beetles were blown in from the spruce beetle epidemic in the Rio Grande National Forest. The extent of this outbreak is currently unknown. One should expect bark beetle activity throughout the field office to increase until the forest densities are decreased and the landscape has more of a variety of successional patterns rather than a monoculture of one successional stage. Current treatments are working toward creating a variety of successional patterns and more diverse age class structure in the landscape.

Demand for forest products

Sawtimber

Recent government initiatives, including the National Fire Plan of 2001 (Public Law 106–291), Healthy Forest Restoration Act of 2003, and Healthy Forest Initiative have called for the treatment of forests and woodlands to reduce fire and insect threats and improve overall forest health, while also providing incentives for the development of local, community-based forest product businesses. In 2012, the Wilkersen Sawmill in Salida, Colorado, reopened after being closed for approximately 20 years. Montrose Forest Products, the large sawmill in Montrose, Colorado, was purchased in 2013 and is in need of supply. Today, the demand for sawtimber within the RGFO remains moderate to high and is expected to continue at this level into the foreseeable future.

Special forest products

Fuelwood

The demand for fuelwood has been increasing over the last decade, and this trend is expected to continue in response to oil and natural gas price fluctuations, as the population along the Front Range of Colorado grows and the price of fossil fuels increases.

Biomass

There is currently no demand for biomass in the RGFO. In 2005, the BLM began partnering with the local Black Hills Power Plant in Cañon City, which was attempting to burn wood chips mixed with coal. After 4 years of very limited wood chip use, the power plant was shut down by the State for air quality reasons. If a biomass market develops within the RGFO, more biomass generated by forest and woodland treatments could be used.

Transplants

As communities along the Front Range continue to grow and water resources become more stretched, it is reasonable to expect that xeriscaping[6] trends will accelerate, increasing the demand for native transplant trees from public lands. While difficult to project, as community planners impose water restrictions and promote green community development, the demand for water-conserving transplants can be expected to parallel community growth.

Christmas trees

Christmas tree harvesting by local residents is also a common use of forest and woodland resources. The main species sold are white fir, Douglas-fir, pinyon pine, and lodgepole pine. The annual harvest of Christmas trees has fluctuated over the past five years, with the greatest demand occurring in 2011 and the lowest demand occurring in 2013. The trend for Christmas tree sales is expected to remain steady.

Fencing materials

Fencing materials include corral poles, fence stays, line posts, and corner posts. Most of these permits over the past 5 years have been for corral poles for buck and rail fence. The trend for fencing material sales is expected to remain steady.

Pinyon pine nuts

Pinyon pine nuts are another forest product available within the RGFO. Pinyon pine nut crops vary from year to year. In the past 5 years, 2011 was the only year where there was a large pinyon pine nut crop in the RGFO. Cone development is based on ideal environmental conditions 2 years prior to harvest. The cones take 2 years to mature. The RGFO allows the harvest of two 5-gallon buckets of pinyon nuts per year per family for personal use. All commercial pinyon nut harvesting requires a permit at fair market value. Trends will be expected to follow annual nut production: when there is a decent pinyon nut crop then demand will be moderate to high. In 2011, two pinyon nut harvesters from out of state purchased permits from the RGFO.

2.3.3.5. Key Features

The following key features are seen as critical to effectively manage forests and woodland resources on public lands within the planning area:

[6] Xeriscaping is landscape design that minimizes the need for water (see Glossary).

- An adequate forestry budget.
- A reduction in tree densities and improvement in age-class diversity throughout the RGFO, thereby creating a mosaic of differing stand structures and densities.
- The reduction of pinyon-juniper expansion by removing pinyon and juniper encroaching upon parks, meadows, ponderosa pine, and Douglas-fir.
- The restoration of historic forest types where old stumps reveal a past forest type that after historic harvesting regenerated to a different forest type.
- Management of riparian deciduous tree stands and aspen stands to focus on retaining key species or structures, protecting stands from high intensity wildfire, and limiting surface erosion or soil deposition, as these stands are important for landscape diversity, ecosystem functioning, and water availability for wildlife, cattle, and horses.

2.3.4. Fluid Minerals

Fluid minerals include oil and gas, coal-bed methane, and geothermal resources.

2.3.4.1. Oil and Gas (Including Coal-bed Methane and CO_2)

2.3.4.1.1. Current Level of Use

The RGFO currently manages approximately 6,538,000 acres of Federal oil and gas estate (Figure 2.20). Much of the surface estate above the mineral estate is not managed by the BLM but by other Federal agencies, and it can be State or privately owned. Approximately 648,700 acres of the Federal oil and gas minerals in the RGFO are not leasable, because they are either designated wilderness, WSA, part of the National Parks System, or incorporated cities. These areas are designated by 43 CFR 3100.0-3 as no-lease areas. Of the 5,889,000 acres of Federal oil and gas estate that is open to leasing within the RGFO, 405,000 acres are currently leased. This leaves approximately 5,241,000 acres available to lease for oil and gas development.

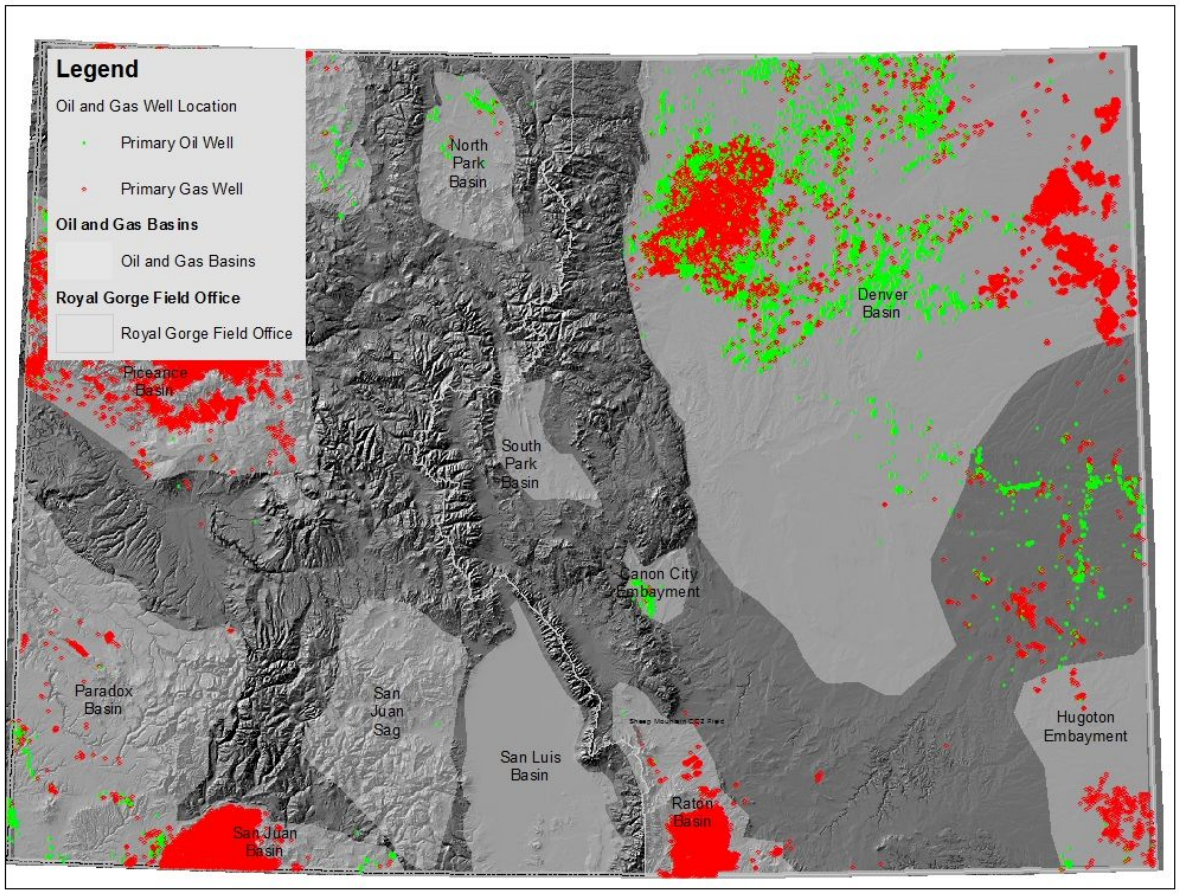

Figure 2.20. Oil and Gas Wells in Colorado

The acres open to leasing for the purpose of oil and gas development within the RGFO are subject to stipulations, typically applied to the lease on a case-by-case basis by the RGFO at the leasing stage, if analysis shows that such stipulations are necessary to protect other resources or human health and safety. These stipulations consist of no-surface-occupancy (NSO), timing limitation (TL), and controlled surface use (CSU) stipulations.

No surface occupancy

The NSO stipulation is intended for use only when other stipulations are determined to be insufficient to adequately protect the public interest; i.e., when the plan analysis shows that less restrictive stipulations are inadequate to protect the resources/values in question, but these resources/values were also considered for designating as no-lease areas, and it was determined that the NSO stipulation was adequate for their protection. An NSO stipulation is not needed if the desired protection does not require relocating proposed operations by more than 200 meters (43 CFR 3101.1-2).

Timing limitation

The TL (often called seasonal) stipulation prohibits construction and drilling activities for fluid mineral exploration and development activities for time periods of less than one year. The dates and locations where activity is limited are described in as much detail as possible. A TL stipulation is not necessary if the timing limitation involves prohibiting new surface-disturbing operations for periods of less than 60 days (43 CFR 3101.1-2).

Controlled surface use

The CSU stipulation is intended to be used when fluid mineral occupancy and use are generally allowed on all or portions of the lease area year-round, but because of special values or resource concerns, some aspects of lease activities must be strictly controlled. The CSU stipulation is used to identify constraints on surface use or operations that may otherwise exceed the mitigation available under Section 6 of the standard lease terms, regulations, and operating orders. The CSU stipulation is less restrictive than the NSO or TL stipulations, which prohibit construction or drilling activities on all or portions of a lease for all or portions of a year. The use of the CSU stipulation should be limited to areas where restrictions or controls are necessary for specific types of activities rather than for all activity.

In 2011, there were 543 active oil and gas wells on RGFO-managed minerals estate. Of these, 53 were on Forest Service-managed surface estate. In these cases, the BLM works in conjunction with the Forest Service. The Forest Service typically manages the surface/environmental issues, and the RGFO manages all other aspects of these wells.

Coal-bed methane (CBM) is natural gas produced from coal layers. Much of the technology to produce CBM uses standard drilling and production techniques, however, CBM wells are typically shallow, don't produce oil or condensate along with gas, and produce large amounts of water. With CBM wells, water is pumped out of the formation in order to allow the methane that is adsorbed onto the coal particles to escape and travel to the surface.

The lands within coal-bed gas assessment units (Raton and Vermejo assessment units) in the Raton Basin Province designated by the U.S. Geological Survey are considered to have high occurrence potential for coal-bed natural gas (USGS 2005).

2.3.4.1.2. Trends

The trends for oil and gas development in the RGFO, as with anywhere, are market driven. Rapidly advancing technology also plays a factor in what resources can be economically developed.

In the past, when gas prices were higher than they are now, natural gas development was prevalent in the RGFO. Along with (primarily) gas production in the Denver-Julesburg Basin, located in northeastern Colorado, the vast natural gas resources in eastern Colorado near the Kansas and Nebraska borders, and the CBM resources in Las Animas County, Colorado, were heavily developed. Other, smaller, gas fields have been developed throughout the RGFO.

Drilling activity over the last few years in the Denver-Julesburg Basin has increased significantly. New horizontal drilling and hydraulic fracturing techniques developed in other similar geological formations, such as the Barnett in Texas, and the Bakken in North Dakota, are being successfully applied to economically extract oil from the Niobrara formation in the Denver-Julesburg Basin. In addition to producing large volumes of oil and gas from each well, this new technology also

makes it practical to drill many wells on one pad, so fewer pads are needed to drill more wells, and drain larger blocks of mineral estate. This new increase in development has been mostly fueled by oil, which has traded at higher prices over the last few years, rather than by gas, which has traded at relatively low prices since 2008. The large increase in oil and gas supply due to horizontal drilling and hydraulic fracturing technology over the last few years has recently resulted in a drop in oil prices.

The vast majority of applications for permits to drill (APDs) recently received by the RGFO have been for horizontal wells sited on multi-well pads and targeting oil in the Noibrara formation in the Denver-Julesburg Basin in Weld County. The RGFO has seen a lull in APDs for dry gas and CBM wells. The RGFO has not received any APDs in recent years, and one operator of multiple developed Federal CBM units within the Raton Basin in the RGFO recently allowed some previously approved APDs to expire rather than drill new wells.

2.3.4.1.3. Forecast

Because future oil and gas development is driven by economics and is affected by new technologies, it is impossible to forecast with certainty. It can be assumed that over the long run, demand for oil and natural gas will increase. Although gas prices are lower now domestically than they have been in recent years, advances in liquefied natural gas technology are making it easier to transport or export natural gas. Even if demand for oil and gas falls domestically due to economic factors, increased supply, or the availability of other sources of energy; as global populations increase, and more developing countries industrialize and increase their standard of living, demand for oil and gas will increase.

If it is assumed that the demand for oil and gas increases or remains steady, oil and gas development within the RGFO will increase or remain steady throughout the planning period. As geological formations that are currently economical to tap into with today's technology and given current economic conditions are depleted of their fluid minerals, advancements in new technology will likely make formations that are not currently considered economically viable economically feasible to develop.

In March 2012, the BLM completed a reasonable foreseeable development scenario (RFD) for oil and gas development in the RGFO for 2011–2030 (Stillwell, Elser, and Davis-Lawrence 2012. This document was developed to provide resource information on the potential magnitude and trend of future oil, natural gas, and CBM activity in the RGFO. This information will be incorporated in the fluid mineral portions of the RMP revision.

2.3.4.2. Geothermal

2.3.4.2.1. Indicators

Geothermal energy is energy derived from the earth. The Colorado Geological Survey has long been interested in geothermal energy because of the abundance of thermal waters (such as hot springs) in the State. Thermal springs and wells are found in several parts of the RGFO planning area. They are evidence at the earth's surface of the potential geothermal resources that exists in the planning area. Most of these hot or warm springs and wells are either in or near to the mountainous areas in the western part of the RGFO planning area. The most important

geothermal springs and wells in the RGFO planning area and their associated geothermal systems are located in Chaffee County.

From preliminary heat flow and geothermal gradient maps, several areas can be identified within the RGFO that have potential for geothermal power generation. These areas are in Chaffee, Clear Creek, Fremont , Las Animas, and Park Counties.

Figure 2.21 shows locations of thermal springs and wells within the RGFO, potential indicators of geothermal resources.

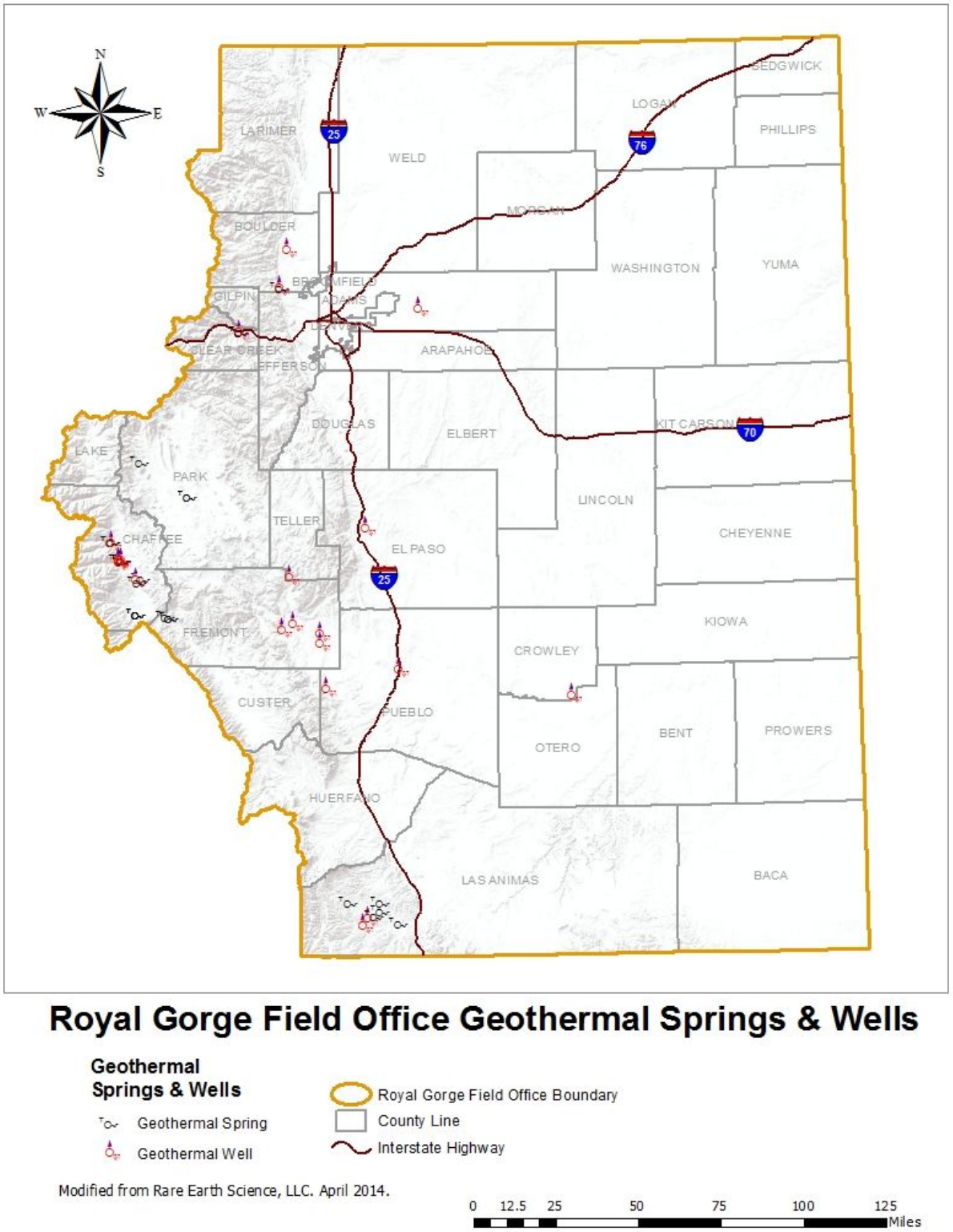

Figure 2.21. Thermal Springs and Wells within the Royal Gorge Field Office

2.3.4.2.2. Current Condition

Chaffee County

Three significant geothermal areas are identified in Chaffee County: Mount Princeton–Chalk Cliffs, Poncha Springs, and Cottonwood Springs. The hottest spring in Colorado (Hortense) and several of the hottest thermal features in the State are all found in the Mount Princeton-Chalk Cliffs area. The temperature of Hortense is 82–83 °C, while the temperature of Mount Princeton is 44–56 °C, and nearby wells in the area produce water at 39–82 °C (Barrett and Pearl 1978; Cappa and Hemborg 1995). Temperatures at Poncha Hot Springs are 50–71 °C, and Cottonwood Springs and a nearby spring and well are 46–58 °C (Barrett and Pearl 1978; Cappa and Hemborg 1995).

The Mount Princeton-Chalk Cliffs and Cottonwood Spring areas lie along the Sawatch Fault, a major, north-south trending, rift-related fault at the eastern base of the Sawatch Range. The fault drops down to the east and has ruptured as recently as the late Quaternary. Both geothermal areas occur in places where there are steps or en echelon strands of the fault (Morgan 2013), a geologic setting similar to many known geothermal areas in the Basin and Range Province in Nevada. The Poncha Hot Springs are also located at a step or offset in a young rift-related fault, in this case an east-west trending fault.

Held and Henderson (2012) briefly summarized geothermal exploration activities in the Mount Princeton-Chalk Cliffs area, which probably is the most extensively explored geothermal area in Colorado. Amax Exploration drilled about 40 geothermal gradient holes there in 1973–1975. Mount Princeton Geothermal, in partnership with the Colorado School of Mines, Colorado Geological Survey, and the Governor's Energy Office, conducted geological, geochemical, and geophysical studies and drilled some geothermal gradient holes in the Mount Princeton-Chalk Cliffs area in 2006–2010. Magnetotelluric geophysical investigations were conducted for Mount Princeton Geothermal in 2011 and 2012. These studies suggest there is a shallow, lower-temperature geothermal reservoir in the vicinity of the hot springs and possibly a deeper, higher-temperature target further east, with 150 °C temperatures at depths of 2,500–3,500 feet beneath the valley floor (Held and Henderson 2012).

Initial geological and geophysical studies were also conducted between 2009 and 2011 at the Poncha Hot Springs by the City of Salida, Hendco Services, Colorado Geological Survey, Colorado School of Mines, and the Governor's Energy Office (Held and Henderson 2012). A magnetotelluric geophysical study was conducted there in 2011 and 2012, which resulted in the discovery of a low-resistivity geothermal target about 1,600 feet deep, north of the east-west fault. Easley et al. (2011) also describe some of the exploration work at Poncha Hot Springs and point out the presence of helium isotopes in the water, suggestive of a mantle-source gas signature.

Clear Creek County

The Colorado Geological Survey conducted an assessment of the resources at Idaho Springs a few decades ago (Repplier, Zacharakis, and Ringrose 1982), and the following information is from their report. Three springs and three wells exist in the Idaho Springs area with temperatures of 20–46 °C. All are associated with the Indian Springs resort. The springs discharge from, and the wells are completed in, Precambrian crystalline rocks that locally are intruded by early Tertiary granitic dikes. The Tertiary dikes are several times more radioactive than other rocks in the area,

suggesting that radioactive decay may be the source of the heat. The thermal waters may be associated with the Idaho Springs Fault, a Laramide-age, northwest-trending fault zone.

Electrical resistivity and soil mercury studies were also conducted by Repplier, Zacharakis, and Ringrose (1982). Due to anthropogenic and topographic complications, the resistivity study was of limited use. A significant mercury anomaly was detected, although it was uncertain whether it was related to the geothermal system or to mineralization in the bedrock. Geothermometry estimates of the subsurface reservoir temperatures by Barrett and Pearl (1978) ranged from 59 to 231 °C, but the authors questioned the validity of their results, because some of the assumptions in the model were apparently violated.

Fremont County

Several thermal springs and wells are found in Fremont County (Barrett and Pearl 1978; Zacharakis and Pearl 1982; Cappa and Hembor 1995). The hottest is the Cañon City Hot Spring, with a temperature of 39–40 °C. It discharges from the contact between the Fremont Limestone and overlying Fountain Formation and is the only true hot spring in the county (Zacharakis and Pearl 1982). The Desert Reef Hot Springs is an old oil well that was plugged back to a depth of 1,096 feet and now produces 54 °C water. Water from the Florence Artesian Well (also known as the Penrose Artesian Well) is 28 °C. The water in the 1,800-foot-deep well at the Fremont Natatorium is 35–36 °C. The water at Swissvale Warm Springs is only 20–28 °C, and the water at the Wellsville Warm Spring is 28–35 °C. Geothermometry models described by Barrett and Pearl (1978) suggest subsurface reservoir temperatures may be as high as 35–50 °C, but they note that the models may not be appropriate for use, because some of the assumptions in the model were violated.

As previously described, Ringrose (1980) ran temperature logs in 11 drill holes in the Cañon City area that were drilled specifically to determine geothermal gradients. The gradients in these holes ranged from 21.8 to 89.7 °C/km, with the highest gradients located on the Brush Hollow Anticline. A couple of years later, a researcher from Southern Methodist University determined the gradients to be 11.6–85.1 °C/km and that the heat flows ranged from 34 to 130 mW/m^2 (Zacharakis and Pearl 1982).

Zacharakis and Pearl (1982) conducted an assessment of the geothermal resources of the Cañon City area that used several geophysical methods: electrical resistivity; telluric, audio-magnetotelluric, and seismic surveys. They also performed soil mercury geochemical sampling in three areas: near the Penrose artesian thermal well; on the grounds of the Colorado Department of Corrections facility; and at the Cañon City Hot Springs. The geophysical studies provided some useful information for the geothermal assessment, but the mercury survey did not, because of anthropogenic disturbances. Zacharakis and Pearl concluded that the geothermal resources of the area were “large,” and were chiefly a result of favorable geological conditions and heating by radioactive decay. Gamma-ray logs indicated the presence of radioactive minerals in the Dakota Group, Morrison Formation, Fountain Formation, and Precambrian rocks, and high levels of dissolved radium-226 were detected in groundwater in the Dakota Group (Vinckier 1982). The overlying Pierre Shale, which has low thermal conductivity, was proposed to be a cap that effectively trapped the heat in the underlying formations.

Dixon (2002) evaluated bottom-hole temperatures in petroleum wells in the Cañon City Embayment. About 30 wells were included in the analysis. The hottest borehole temperature was about 87 °C at a depth of 3,930 feet in the Jurassic Morrison Formation. Due to the limited

amount of data and their scattering on a depth-versus-temperature plot, Dixon (2002) was unable to draw any conclusions from the data, but this report does contain a summary of bottom-hole temperatures for each well, which could be useful.

Las Animas County

Although Barrett and Pearl (1978) did not report any thermal springs or wells in Las Animas County, Cappa and Hemborg (1995) described seven in their report: five springs and two wells with temperatures of 20–29 °C. These warm geothermal waters provide subtle hints of the deep system that is now thought to be one of the better geothermal prospects in the RGFO planning area. The deep geothermal system is in the Raton Basin, a deep Laramide-age sedimentary basin. The geothermal system was discovered by the numerous, recently drilled CBM wells and associated injection wells in the basin.

Morgan (2009) and Bohlen (2013) provide information on the geothermal resource in the central part of the Raton Basin. Pioneer Natural Resources is the principal private enterprise involved in the methane drilling and production. This company also actively evaluated the geothermal resource but released only limited data to the public (Macartney 2011). Morgan (2009) used bottom-hole temperatures from over 1,900 drill holes to characterize the resource. This study built upon the previous work by Dixon (2002). These bottom-hole temperature data, although admittedly less than perfect for evaluation of the resource, indicate that temperatures of 150 °C may exist at depths less than 5,200 feet in the east-central part of the basin where the calculated geothermal gradients are highest. Similar temperatures were thought to exist over a larger area at depths less than 8,200 feet.

Morgan (2009) described the mean geothermal gradient from uncorrected bottom-hole temperatures as 45.3 ±12.5 °C/km, and a mean gradient from corrected bottom-hole temperatures as 49.2 ±11.9 °C/km. He reported gradients in the northeastern part of the central Raton Basin in the 40–70 °C/km range, and noted that gradients decreased to below 40 °C/km in the northwest part of the central Raton Basin. He calculated the mean heat flow in the basin at 115–65 mW/m^2, which is about twice as high as the typical heat flow in the High Plains.

The deep geothermal resource in the central part of the Raton Basin is thought to exist in Paleozoic and Middle and Lower Mesozoic sedimentary rocks that are unlikely to have high permeability, meaning this is an enhanced geothermal system prospect. The Triassic Chinle Formation, Permian-Pennsylvanian Sangre de Cristo Formation, and Pennsylvanian Madera Formation are potential hosts of the deep geothermal reservoir.

Park County

Geothermal waters flow to the ground surface in two areas in Park County. One of the areas is at the Hartsel Hot Springs area, where two springs discharge 45–52 °C water. At the second area, the Rhodes Warm Spring is 24 °C (Barrett and Pearl 1978). McCarthy, Zacharakis, and Pearl (1982) conducted a geothermal resource assessment of Hartsel Hot Springs and described the springs as emerging from the lower part of the Morrison Formation, near its contact with the underlying Garo Sandstone. They discuss the various interpretations of the structural geology of the area, and conclude that it is not possible to accurately characterize the geologic structure using the available data. On their map (their Figure 3) the trace of the Santa Maria Fault is ~600 feet northeast of the springs.

McCarthy, Zacharakis, and Pearl (1982) also conducted an electrical resistivity survey, shallow temperature measurements (~5 feet deep), and soil mercury sampling at the Hartsel area. The highest shallow temperatures were between the hot springs and the fault (35.5 °C). Temperatures decreased slowly southeastward to 12.8 °C. The resistivity survey found a low resistivity trend that paralleled the fault. The soil mercury sampling yielded mixed results, although the mercury concentrations peaked near the fault in the sampling area north of the Town of Hartsel. They concluded that the heat source is probably either radioactive decay in the Precambrian granitic rocks or simply a higher than normal geothermal gradient, and that the heated water rises up the Santa Maria Fault. The springs may mark a zone of higher permeability along the fault zone.

2.3.4.2.3. Trends and Forecast

Based on current energy use trends and recent legislation (e.g., Energy Policy Act of 2005), research and development on energy production from geothermal resources will continue to increase.

2.3.4.2.4. Key Features

The Mount Princeton Geothermal area is currently being evaluated for development potential as Colorado's first electrical power generation source.

2.3.5. Solid Minerals

Solid minerals include locatable minerals, saleable minerals, and solid leaseables.

2.3.5.1. Indicators

The presence and distribution of minerals is largely controlled by the associated geology. Indicators for a particular commodity include known occurrences and deposits; mineral potential reports from various industries, government agencies, and academic institutions ; and geologic factors derived from studies of controlling fault structures, hydrothermal alteration of rocks, geochemical surveys, satellite imagery, and geophysical surveys.

2.3.5.2. Current Condition

A comprehensive mineral potential report is being prepared under contract for the entire Royal Gorge Field Office. This information will provide additional mineral resource details that will enhance the current descriptions in this section.

Management of locatable minerals

There are three categories of locatable minerals recognized under the Mining Law of 1872: Metallic minerals (e.g., gold, silver, copper, lead, and zinc); energy minerals (e.g., uranium and thorium); and industrial non-metallic minerals (e.g., gypsum, limestone, bentonite, fluorite, mica, and rare earth elements).

Metallic minerals

Gold (chemical symbol, Au): Colorado has been a major gold-producing state since the mid- to late 1800s, and much of the State's early economic growth depended upon the mining of gold (Davis and Streufert 2011). As of 2009, Colorado ranked fourth in production among all 11 gold-producing states, with most production coming from the Cripple Creek & Victor Gold Mining Company's Cresson Mine in Teller County (USGS 2010).

Although occurrences of metallic minerals can be widely dispersed, geological controls of mineralization cause concentrations of mines in certain areas, which have been designated as mining districts (Figure 2.22). The RGFO has the following important and large mining districts: Boulder, Clear Creek, and Gilpin; and Cripple Creek and Leadville. In addition, there are several smaller important districts.

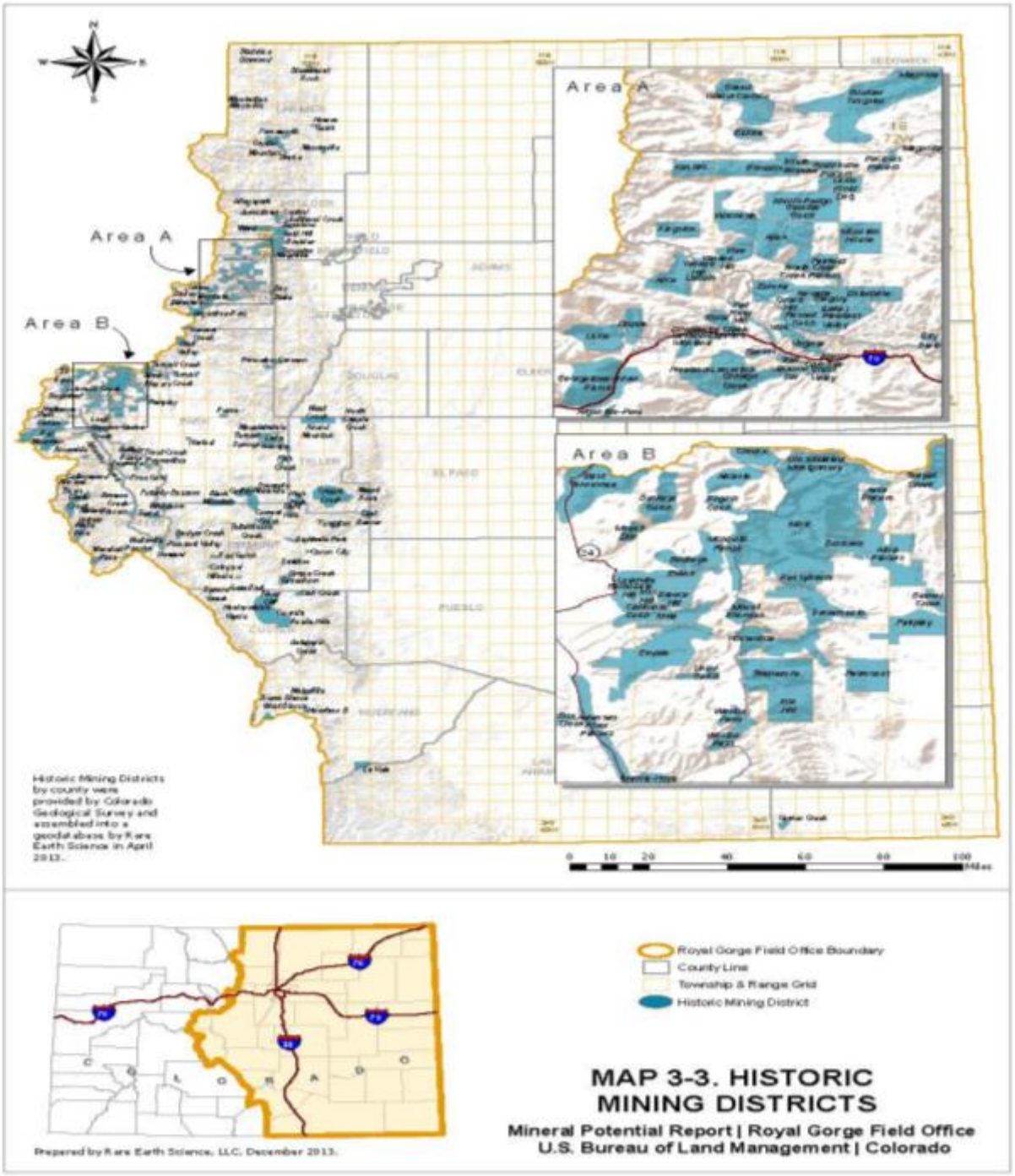

Figure 2.22. Historic Mining Districts in the Royal Gorge Field Office

Energy minerals

The most important occurrence of energy minerals within the RGFO is the Tallahassee Creek uranium deposit, located 25 miles northwest of Cañon City. Two separate ore bodies occur there, which are estimated to total about 200,000 tons at a grade of approximately 0.08 percent U_3O_8 (U3O8). Other minor occurrences of uranium and thorium also occur within the RGFO.

Industrial minerals

Locatable industrial minerals are found throughout the RGFO planning area.

Management of mineral materials

Mineral materials generally include sand and gravel, limestone aggregate, building stone, moss rock, cinders (clinker), clay and decorative rock. Mineral materials are sold or permitted under the Mineral Materials Sale Act of 1947 and consist of those "common variety" industrial (non-metallic) minerals, which include, but are not limited to, sand and gravel, crushed stone, dimension stone, specialty/monument stone, clays, pumice, cinders, and commercial petrified wood. Disposal of these materials is regulated by 43 CFR 3600.

Most of these materials are used in the aggregate industry, a major contributor to the American economy. Aggregate is a vital ingredient in Portland cement, concrete, and asphalt products. In addition to the aggregate industry, other uses of mineral materials include those for sealants or layering (clay and riprap), landscaping (specialty stone, quartz, and dimension stone) and brick making (clay). Mineral material utilization is often dependent on factors such as proximity to market, transportation networks, and available labor force.

Many of the bedrock formations in the RGFO planning area are potentially suitable for crushed stone aggregate. Dense igneous rocks, both of intrusive and extrusive origin and of any age, are commonly suitable for crushed stone. Granitic rocks in the Front Range (e.g., the Sherman, Boulder Creek, and Pikes Peak batholiths) have been quarried and used for road surfacing and landscaping materials, along with deep layers of weathered granite (known as grüs) that can be excavated and used for the same purposes.

Precambrian metamorphic rocks can also be important sources of crushed stone, although metamorphic deposits with varying amounts of mica minerals may require selective mining to avoid areas with high mica content. Some sedimentary rocks, including limestone, quartzite, and well-cemented sandstone, can be suitable for crushed stone aggregate and other purposes; for example, finely ground limestone is used for cement and stucco, coal-mine dust control, agricultural soil conditioner, and other applications.

Management of solid leasable minerals

Leasable minerals are defined by the Mineral Leasing Act of 1920 (as amended) and include solid minerals such as potash, sodium, native asphalt, and bituminous rock. In 1947, the Mineral Leasing Act for Acquired Lands provided a new statutory scheme for leasing most minerals on lands acquired by the United States under specific types of legislation. For the RGFO, solid leasable minerals itemized under the Act are not common. However, the northwest portion of the field office area consists of multiple Bank Head Jones land acquisitions, which are subject to this 1947 Act, so the significant uranium reserves in this portion of the RGFO planning area are managed under the solid leasable minerals program.

2.3.5.3. Trends

A comprehensive mineral potential report is currently being prepared for the entire Royal Gorge Field Office. This information will provide additional mineral resource details that will enhance the current descriptions in this section.

2.3.5.4. Key Features

To date, the most sought after mineral commodity in the RGFO has always been gold. Colorado is still ranked as the 4th state in terms of overall gold production, following Nevada, Alaska, and Utah. Historically, the RGFO locatable minerals program is very active along drainages throughout the planning area and in all of the historic mining districts. The RGFO also has the following large mining districts with a high potential for future production: Boulder, Clear Creek, and Gilpin; and Cripple Creek and Leadville. In addition, there are several smaller important districts.

Construction materials, including sand, gravel, and crushed stone aggregate, are ubiquitous across the planning area.

In the past, the BLM has received applications for exploration of the uranium deposits located on Bankhead Jones Act lands in the northeast part of the State that are managed under the solid leaseable program, and the BLM would expect to see interest in this area in the future.

2.3.6. Coal

2.3.6.1. Indicators

The presence and distribution of coal is largely controlled by the associated geology. Indicators for coal include known occurrences and deposits; mineral potential reports from various industries, government agencies, and academic institutions; and geologic factors derived from studies of controlling fault structures, geochemical surveys, satellite imagery, and geophysical surveys.

2.3.6.2. Current Condition

The coal resources in the planning area have had extensive historic development but are now in a state of limited development with no active coal leases on Federal minerals. Most of the coal resources within the planning area are in areas on private and split-estate lands, with only a small percentage of the area totally administered by the BLM. Approximate acres of Federal mineral management within each of the coal regions are shown in Table 2.44. These acreages include split estate.

There are four designated coal regions within the RGFO: Denver, Cañon City, Raton Mesa, and South Park (Carroll 2006; Landis 1959). The Cañon City coal field lies just south of Cañon City, and is all on private land. The Cañon City coal region is also in the Great Plains province. It occupies a relatively small area (~50 square miles) in the Cañon City embayment, with the Wet Mountains to the south and west, the Front Range to the north, and the Great Plains to the east. The South Park field, in Park County, encompasses Federal, State, and private lands, but the coal dips very steeply (25–90 degrees), making mining difficult. The South Park coal region is the smallest and historically least productive, located in an intermontane basin in the Southern Rocky Mountains province between the Mosquito Range and the Front Range. This coal region extends across an estimated 86 square miles in an area with very complex geology. This estimate is based upon the boundaries of the coal region shown by Carroll (2006). Prior estimates described the size of the South Park coal region as only 20 square miles (Landis 1959; Hornbaker, Holt, and Murray 1976), but these estimates involved only the northern part of the region where the geology

was best understood. It is uncertain at this time exactly how much of the southern part of the region is indeed underlain by coal.

The Denver coal region lies in the Colorado Piedmont section of the Great Plains physiographic province, east of the Front Range. It extends from near Colorado Springs in the south, beyond the Colorado-Wyoming line to the north, and eastward to near Limon. The Denver coal region is the largest coal region in the RGFO and covers about 7,500 square miles. The Raton Mesa coal region is in the Raton section of the Great Plains and lies east of the Sangre de Cristo Mountains. It straddles the Colorado-New Mexico state line and covers about 1,250 square miles, making it the second largest coal region in the RGFO. The northern half of the Raton coal basin lies within Colorado from the New Mexico border to south of Walsenburg, and is known as the Trinidad-Walsenburg field.

Figure 2.23 shows the coal regions and coal fields in the RGFO planning area.

Table 2.44. Number of Acres of Federal Minerals within Each of the Four Coal Regions in the Royal Gorge Field Office

Coal region	Acres of Federal minerals
Denver Basin	383,364
South Park Basin	16,264
Cañon City Basin	0
Raton Basin	255,816

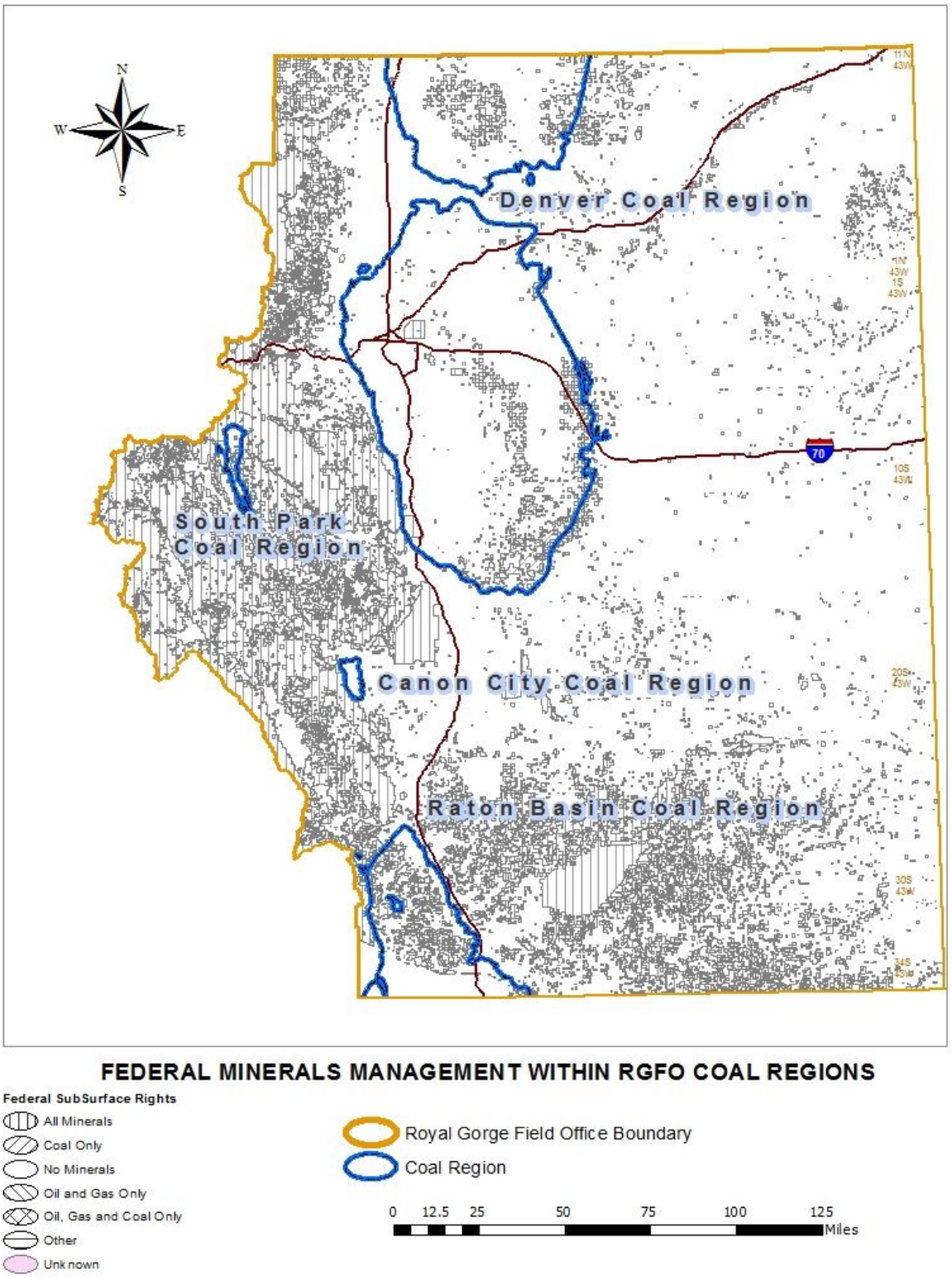

Figure 2.23. Coal Regions and Coal Fields in the RGFO Planning Area

2.3.6.3. Trends

A comprehensive mineral potential report is currently being prepared for the entire RGFO. This information will provide additional mineral resource details that will enhance the current descriptions in this section.

2.3.6.4. Forecast

A comprehensive mineral potential report is currently being prepared for the entire RGFO. This information will provide additional mineral resource details that will enhance the current descriptions in this section.

2.3.6.5. Key Features

The Trinidad known recoverable coal resource area (KRCRA) within the Trinidad field generates the most interest in the RGFO planning area. The Trinidad KRCRA covers about 438,204 acres in parts of Las Animas and Huerfano Counties, of which approximately 131,000 acres are Federal coal. It is roughly bounded on the east by I-25 and on the west by Colorado State Highway 12. The Purgatoire River forms the southern boundary, and the northern boundary is a few miles north of Walsenburg.

The KRCRA area is a dissected upland consisting of a series of flat-topped benches that rise from an elevation of about 6,000 feet on the east side to about 9,000 feet at the western boundary. Just to the west of the KRCRA, West Spanish Peak is the highest point in the area at 13,623 feet. There are approximately 286 million tons of Federal strippable coal and approximately 936 million tons of Federal underground coal within the Trinidad KRCRA. This area covers about 131,000 acres, with 53,000 acres suitable for both strippable or underground mining and 78,000 acres suitable for underground mining only.

2.3.7. Renewable Energy

Renewable energy resources on BLM-administered land in the planning area include wind, solar, biomass, hydropower, and geothermal energy. Biomass, hydropower, and geothermal resources—including their BLM-permitted use—are discussed under Forestry (section 2.3.3), Withdrawals and Classifications (section 2.3.12), and Fluid Minerals (section 2.3.4), respectively. Wind and solar energy generation projects on public lands are permitted as rights-of-way (ROWs) under FLPMA through the BLM Lands and Realty Program, and they are discussed in this section.

The potential for solar and wind energy resources was not evaluated in the 1996 RMP (BLM 1996) in the Royal Gorge Resource Area. Since passage of the Federal Energy Policy Act (2005), as well as State-level legislation adopting renewable energy portfolio standards (RPS), the DOI and the DOE have analyzed renewable energy resource potential, public land allocation, and environmental standards under NEPA for generating renewable energy through individual wind and solar energy projects (BLM and DOE 2005; BLM and DOE 2012).

BLM wind and solar energy program activities respond directly to the nation's increased focus on achieving energy independence from foreign supplies of fossil fuel. Transitioning toward clean energy sources as a means to reduce carbon emissions and other greenhouse gases and as an

adaptation and response to climate change guide BLM's planning for solar and wind energy in the RGFO.

2.3.7.1. Wind Energy

2.3.7.1.1. Current Condition

The planning area includes over 5,600,000 acres of lands with high-potential wind energy resources, as characterized by the DOE National Renewable Energy Labs (NREL: 50 m, WPC Classes 3–7). Less than ~80,000 acres or ~1.4 percent of high-potential wind energy lands in the planning area are administered by the BLM. The RGFO currently has no wind energy projects, either authorized or under study. Previously, applications for six Type II wind-testing and monitoring projects were received and are listed in Table 2.45. The six projects were intended to authorize wind meteorological evaluation towers (METs) for wind resource data collection on 45,140.3 acres of public lands in the planning area. Only one project (COC-71391) was eventually authorized and resulted in the erection of MET towers. All RGFO wind-testing projects were closed prior to 2012 at the request of the applicants, without applications being received for wind energy development projects.

Table 2.45. Wind Energy ROW Applications on Public Lands Administered by the BLM Royal Gorge Field Office

Case file number	Applicant	Date closed	Acres
COC-71391	Pacific Wind Investments	2/4/2011	4,470.83
COC-73606	EC&R Colorado	5/18/2009	8,959.47
COC-73823	EC&R Colorado	6/8/2009	14,510.00
COC-73944	EC&R Colorado	4/21/2010	10,480.00
COC-74358	Clear Creek Power	7/9/2010	1,760.00
COC-74359	Black Mountain Wind Farm	9/6/2011	4,960.00
Total:			45,140.30

2.3.7.1.2. Forecast

The 2005 wind PEIS (BLM and DOE 2005) amended the 1996 Royal Gorge Resource Area RMP to allow for development of wind resources on public lands. It is difficult to predict if and when wind energy testing and/or ROW applications might be received by the RGFO. The challenges to forecasting include the availability of prime wind resources on private lands; variable market conditions, which drive the purchase of renewable energy power, including in-state generation preferences; changes in wind production tax credits; and the fulfillment of RPS by some states. Nevertheless, the NREL has forecast a shortfall of up to 53.5 terawatt-hours annually of renewable energy to meet Colorado RPS and for export by 2025. According to the NREL, the highest proportion of new RPS energy will be from prime wind resources in eastern Colorado. Based on wind resource availability and past ROW wind applications, there might be interest in developing wind energy on public lands in Huerfano, Park, and Fremont Counties. Based on prime wind energy resources in the eastern plains, as private lands are developed, there might also be interest in developing wind energy in Pueblo, Las Animas, Bent, Prowers, and Baca Counties.

2.3.7.1.3. Key Features

BLM-administered wind energy resources in the RGFO planning area are characterized as having a high potential along the Mosquito Range, Reinecker Ridge, Waugh Mountain, Black Mountain, Deer Haven, Crampton Mountain, Arkansas Valley, Phantom Canyon, and the entire Huerfano River drainage. A high percentage of the BLM-administered terrain that is characterized as having a high wind potential, excluding Huerfano County, would require ridge-top development and includes challenges to development such as ACEC and/or WSA designation, steep slopes, and limited access. Finer-scale wind resource characterization on BLM-administered lands may be possible using proprietary and restricted 80-foot wind resource data managed by the NREL. Dissected and fragmented Federal land ownership would also constrain exclusively Federal wind energy development to relatively few areas. The proximity of nearby power demand in Front Range markets, potential purchase by both rural and urban utility providers, as well as accessibility to current and planned power lines or upgrades are also key features of the wind energy resource management situation in the planning area.

2.3.7.2. Solar Energy

2.3.7.2.1. Current Condition

The planning area includes over 10,890,000 acres of lands with high-potential solar energy resources, as characterized by the DOE National Renewable Energy Labs (NREL: direct normal irradiance (DNI) 1 km, 6.5 kWh/m^2 or greater). Approximately 485,000 acres or ~4.4 percent of the high-potential solar energy lands in the planning area are administered by BLM. However, the majority of those high-potential solar resources are limited for development due to exclusion factors such as slopes exceeding 5 percent grade as defined in the solar energy development PEIS (BLM and DOE 2012).

The solar energy development ROD (solar ROD; see BLM and DOE 2012) amended the Royal Gorge Resource Area RMP in 2012 and identified approximately 29,477 acres of BLM-administered lands available as variance areas. Under the solar ROD, variance areas are potentially available for utility-scale (>20 MW) solar energy development outside of exclusion areas and solar energy zones (SEZs). The BLM will typically process ROW applications in variance areas on a first-come, first-served basis, but the BLM has the discretion to apply competitive procedures to variance areas. To date, no ROW applications have been received for solar energy projects within the RGFO.

2.3.7.2.2. Forecast

Colorado has a high potential for solar energy. BLM has not yet designated SEZs in the RGFO. Under the BLM solar energy program, the BLM prioritizes utility-scale solar energy development in SEZs. Applications outside of SEZs would be evaluated on a case-by-case basis under variance-area policies (BLM and DOE 2012). The BLM identified all areas not defined as SEZs or variance areas as exclusion areas for utility-scale solar energy development. The majority of high-potential solar energy resources in the RGFO fall under those exclusions. Under the BLM solar Energy Program, the solar ROD policies and design features apply to applications within SEZs and variance areas. Over time, under the BLM solar energy program, new SEZs could be identified following the SEZ identification protocol and NEPA land use planning described in the ROD.

Variance areas in the RGFO would be open to application but would require developers to adhere to the proposed variance process as detailed in the ROD. Under the program, where public lands are nominated by the public or developers , additional lands could become SEZs within the RGFO, or applications for commercial scale solar facilities could be considered in variance lands as identified in the solar PEIS (BLM and DOE 2012).

Within the RGFO planning area, access to large electric power lines for distribution remains a challenge for utility-scale solar energy development, as it does throughout Colorado. Distributed, or roof-top solar energy generation, is well established in the planning area, promoted by feed-in tariff purchases by urban utilities. Factors contributing uncertainty in forecasting utility-scale solar energy developer interest in BLM RGFO-administered lands include extensive private land availability; price competitiveness with wind resources, which are the prime renewable energy resource in the planning area; and future power purchase by urban and rural utilities due to unforeseen changes to the RPS. As solar energy installation becomes less expensive and technologies become more available, and as a result of Colorado's community solar garden legislation, co-location of solar panels on rooftops or near buildings will likely become more prevalent. Communication facilities in the Front Range District often use solar panels on mountain tops as a viable alternative to power lines, or even as a back-up for power line failures. It can reasonably be expected that this type of solar use (ancillary to existing and proposed projects) will continue in the future.

2.3.7.2.3. Key Features

BLM-administered solar energy resources in the RGFO planning area include high-potential lands throughout the uplands of the Arkansas River Valley and the Phantom Canyon-Beaver Creek area, the vast majority of which are excluded from utility-scale development (BLM and DOE 2012). The 3,602 parcels identified as variance areas are heavily concentrated in Park, Fremont, and Huerfano Counties, and they average 8 acres in size, with a maximum of 967 acres. The small parcels and their scattered distribution in the planning area limit SEZ designation of purely BLM-administered lands. On the other hand, solar development focus areas that integrate public-private land or consider BLM-administered parcels for community-scale solar gardens (< 20 MW) in nearby rural subdivisions could offer opportunities to meet the BLM Colorado RPS.

2.3.8. Travel and Transportation Management

Travel and transportation management is a comprehensive approach to on-the-ground management and administration of the BLM's travel and transportation network of roads, primitive roads, trails, and areas (BLM 2012c). Travel and transportation management consists of implementing travel and transportation planning decisions, inventorying and mapping routes, signing areas and designating routes, educating and interpreting, enforcing laws, acquiring easements, monitoring, and undertaking other measures necessary for providing access to and across public lands for a wide variety of uses. Such uses include recreational, traditional, authorized, commercial, educational, and other kinds of uses involving travel and transportation, as well as all forms of motorized and non-motorized travel or use, such as foot, pack stock or animal-assisted, mountain bike, and OHV travel.

2.3.8.1. Current Condition

As required under the land use planning process, pursuant to the regulations found in 43 CFR 1600, all public lands are required to have OHV area designations (see 43 CFR §8342.1). Areas must be designated as open, limited, or closed to motorized travel activities. These designations were established through the Royal Gorge Resource Area RMP (BLM 1996) and Northeast RMP (BLM 1986b) along with subsequent plan amendments. The breakdown by designation is outlined in Table 2.46 below.

Table 2.46. Travel Management Designations

OHV designation	Acres	Percentage of planning area
Closed	76,692	11%
Open	35,275	5%
Limited	560,795	84%
Total:	672,762	100%

The 1996 Royal Gorge Resource Area RMP went one step further and directed that areas shown as limited to OHV use will be limited to existing roads and trails until route designations are determined within activity plans. BLM Manual 1626, *Travel and Transportation Manual* (BLM 2011c), directs that these planning documents use an interdisciplinary approach and should consider and address all resource and administrative access needs. This requires the consideration of the impact of travel and transportation alternatives on other resources and uses and the impact of managing other resources and uses on travel and transportation management.

Four travel management plans have been developed and implemented in the RGFO that designate routes in the highest use areas covering approximately 396,606 acres. Details of each of these plans and travel management designations are in Table 2.47 below.

Table 2.47. Travel Management Plans

Name of plan	Date	BLM acres covered under plan	Percentage of RGFO
Fourmile TMP (BLM 2002d)	12/16/2002	13,803	2%
Gold Belt TMP and amendment (BLM 2004a)	8/18/2004	139,781	21%
Arkansas River TMP (BLM 2008d)	5/1/2008	240,340	36%
Box Creek TMP (BLM 2004c)	4/21/2003	2,682	1%
Royal Gorge Resource Area RMP (BLM 1996); limited to existing (TMP still required)	May 1996	156,673	23%
Royal Gorge Resource Area RMP; closed through RMP	May 1996	76,692	11%
Miscellaneous *Federal Register* notices; temporary closure	Various dates	7,516	1%
Northeast RMP (BLM 1986b)	September 1986	35,275	5%
Total:		672,762	100%

Although the current travel management plans focus on high-use areas where resources are most affected, approximately 24 percent, or 164,189 acres, of the RGFO are still in the "limited to existing" category or under a temporary closure notice and still have unresolved issues that need to be addressed through planning efforts. In addition to the potential for impacts to other resources

such as soils and wildlife because of an unplanned route network, the lack of consistent rules throughout the planning area causes numerous complaints from the public. This is particularly obvious on parcels where there is no legal motorized public access but where an existing road network connects to adjacent private property. This has led to several user conflicts, particularly during the big game hunting seasons.

This issue relates to an office policy that was developed during previous travel management planning efforts. This policy states that other than for foot and horse uses, entry to public lands from private lands must comply with the designated transportation system and be limited to the same means of travel that the general public uses from public access points. Access from private lands using any type of motorized or mechanized vehicle is only allowed in cases where the use is authorized by an ROW or permit issued by the BLM, or where the access point to public land leads directly onto a road or trail that has been designated by the BLM for motorized or mechanized travel.

Several temporary and emergency closures to motorized vehicles have been put in place on various lands throughout the RGFO. Typically, these were associated with the acquisition of a parcel to prevent the development of unauthorized routes or areas where severe impacts to resources were occurring. Generally, these closures will remain in effect until a travel management plan is developed. In some instances, these areas were covered under a planning document, but several of these types of closures still exist throughout the RGFO. Table 2.47 identifies the acreage and percent of the field office that is still under a temporary closure that has not been covered by a subsequent travel management plan.

The lack of clear laws or planning direction is confusing for BLM staff and public land users. Because of differences between travel management plans and the RMP, the allowed distance to travel off a route in order to park a vehicle differs throughout the field office. Guidance regarding travel over snow is also somewhat unclear and is not specifically identified in current travel management plans or the 1996 RMP.

Although recreation is one of the dominant resource uses of public roads and trails in the RGFO, other resources also rely on them. Every program requires access to public land to manage the resource under their stewardship, as well as access to roads designated for administrative use only. New roads are often required in order to implement a project, and existing roads sometimes need to be upgraded or improved. In most instances, new roads created specifically for a project are not needed in the long term and would not be incorporated into the designated route network. However, in some instances, particularly for lands and realty actions, new roads are requested for a variety of reasons and need to remain open. These would then be incorporated into the travel management network.

It also important to note that BLM-managed lands play a very small and somewhat specific role in the overall transportation network of a region. States, counties, cities, and adjacent land management agencies all have roads within this larger network, and the BLM often needs access to them as well.

2.3.8.2. Trends

Recreation

From 1995 to 2003, OHV annual sales more than tripled to over 1.1 million vehicles, and from 1982 to 2001, driving motor vehicles off road became one of the fastest growing categories of outdoor activity in the country, with western States seeing the highest level of participation (Cordell, Betz, Green, and Stephens 2008). This resulted in a variety of new management challenges for land managers that they were not prepared for. The RGFO was not immune to this, as evidenced by the abundance of emergency and temporary closures issued in the late 90s and early 2000s and by subsequent travel management planning efforts.

The development of a network of routes—some of which are signed and mapped—that take resources and recreational demand into consideration has drastically decreased impacts to public lands within the RGFO. Effective messaging, such as the *Tread Lightly* campaign, and organized OHV groups such as the Colorado Off-Highway Vehicle Coalition (COHVCO) educate users about responsible recreation, and this has also helped to improve resource condition and management.

As indicated in Table 2.47 above, travel management plans cover approximately 60 percent of the RGFO. Approximately 24 percent falls under the "limited to existing" category or is temporarily closed because there is no designated route network. Areas without a designated route network have benefited from an improved recreational use ethic among users, and several of these areas appear to be functioning under the current management prescription; however, issues still persist that would be addressed through a designated route network.

As traffic counter data at motorized recreation sites show, participation continues to increase at a steady level, with ongoing requests for additional trail opportunities. At the same time, observations by staff indicate that side-by-side recreational off-highway vehicles (ROVs) are becoming increasingly popular and more prevalent at trailheads. This is backed by trends in sales, as sales of new ATV units have steadily declined since 2008, while new sales of side-by-side ROVs have steadily increased (Vitrano 2013). Even though travel management plans were only recently developed, they did not take into account side-by-side ROVs, and the rules are ambiguous and confusing both for participants and agency staff.

Participation in hunting activities on a per capita basis shows some decline from past decades (Cordell, Betz, Green, and Stephens 2008). Participants in these activities rely heavily on the road and trail networks managed by Federal agencies. and it is not uncommon that certain roads are only used during the hunting season.

Other uses

As indicated above, although recreation is the dominant use for roads and trails, every other resource also relies on them, which may include the need for additional new or temporary routes. The demand for the travel network has remained flat for some resource uses, such as grazing, but it has increased for other uses, such as realty actions and energy development. Public land is increasingly in demand to provide a variety of infrastructure developments to support growth, which results in constant updates and modifications to the travel and transportation network.

Access to existing road networks is becoming increasingly challenging as private lands change hands and new owners no longer allow the public to cross their private property. Although the existing RMP states that new access will be provided to all BLM-administered lands identified for retention and multiple use, several parcels fitting this description still lack public access.

2.3.8.3. Forecast

According to projections made by the U.S. Forest Service (Bowker et al. 2012), future participation in off-road driving is expected to decline under two of the three scenarios analyzed. Bowker et al. (2012) associated these declines largely with anticipated slower levels of income growth and less available land. This report is probably applicable to the RGFO given the fragmented land pattern of the field office, which limits the length of road and trail networks available for "destination" motorized recreation. This most likely explains the difference between the RGFO and other field offices, which manage larger contiguous tracts of land and have reported dramatic increases in motorized recreation.

Resource conditions are anticipated to improve as a result of effective educational campaigns and on the ground management efforts, but OHV management will continue to be an ongoing workload for the field office. Given existing planning guidance to limit the majority of the field office to designated routes, the forecast is for conditions to improve, so long as the BLM develops and implements travel management plans and funding is available to provide on the ground monitoring and maintenance. In the interim, the "limited to existing" designations, especially in areas with higher recreation value, will continue to be challenging to manage and will continue to generate conflicts between users until route designations are established. Generally, the areas designated as open under the Northeast RMP have limited public use or are managed through a cooperative management agreement. For these areas, conditions are expected to remain the same.

With strong increases in new unit sales of side-by-side ROVs and increased use of these vehicles within the field office, it is anticipated that there will be more issues associated with these wider, longer recreational vehicles. Most likely, the use of side-by-sides would widen existing designated ATV trails—where not limited by natural barriers and topography—affecting soils and vegetation. Side-by-side ROV use on narrow trails will also most likely result in increased concerns for public safety and conflicts with other travelers, as these trails are not designed to accommodate larger vehicles, and the rules regarding where these vehicles may be driven are not clear.

Other areas of travel management that are unclear and have not been addressed may also cause user conflict and a diminished recreational experience. The BLM allows visitors to travel 300 feet off route in order to park vehicles in some areas, but only 100 feet in others. Traveling over snow is not a large issue for most of the field office, because snow loads in the planning area are usually small, but it does occasionally come up in areas where cross-country travel is prohibited.

The BLM will continue to modify the existing designated route network to meet the need for infrastructure development on public lands. Providing access to all BLM-administered lands that are identified for retention and multiple use will continue to be an issue within the planning area.

2.3.9. Utility Corridors and Communication Sites

2.3.9.1. Current Condition

Utility corridors

Utility corridors are preferred routes that co-locate multiple, linear, utility rights-of-way and are generally adjacent to existing highways or county roads. Utilities within these corridors may include gas and water pipelines, electric transmission and distribution power lines, and

communication lines such as telephone, fiber optic, or cable lines. The BLM encourages the placement of new rights-of-way within corridors; however, factors such as origin, destination, purpose, compatibility, and saturation of an existing corridor may prevent or limit the routing of a new facility within an existing corridor. In general, the highways and major county roads within the planning area already have some type of utility adjacent to them.

Section 368 of the Energy Policy Act of 2005, Public Law 109-58 (H.R. 6), enacted August 8, 2005, directed the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior to designate under their respective authorities corridors on Federal land in 11 western states for oil, gas, and hydrogen pipelines and electric transmission and distribution facilities, or for energy corridors. *Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* (BLM 2009a) designated corridors within Colorado and the corridors are shown in Figure 1 of the ROD.

Communication sites

The BLM typically issues leases for siting communication facilities on public lands. The planning area currently has 25 authorized communication facilities, as shown in Table 2.48.

Table 2.48. Communication Sites in the RGFO

Area name	Number of facilities	Location
Buena Vista	1	T14S/R78W/Sec 9
Cotopaxi Falls Gulch	1	T47N/R11E/Sec 10
Cotopaxi North	1	T48N/R11E/Sec 25
Cotopaxi South	1	T48N/R11E/Sec 36
Howard	1	T48N/R10E/Sec 1
Idaho Springs	1	T3S/R73W/Sec 36
La Veta Pass	3	T29S/R70W/Sec 24
Lookout Mountain	2	T22S/R71W/Sec 17
Mosquito Pass	2	T9S/R79W/Sec 14
Otero	1	T24S/R59W/Sec 20
Salida	3	T49N/R9E/Sec 7
Short Creek Baldy	2	T48N/R10E/Sec 35
Spike Buck Echo Canyon	1	T18S/R73W/Sec 1
Twin Mountain	4	T18S/R71W/Sec 2
Waugh Mountain	1	T50N/R12E/Sec 9
Source: BLM 2014b		

2.3.9.2. Trends and Forecast

Utility corridors

Use of utility corridors and the co-location of rights-of-way is becoming a more common practice within the BLM. As energy development and population in the planning area increase, the demand for utility or energy corridors will also increase. Highways and most county roads within the planning area will continue to have some type of utility located adjacent to them. As existing corridors become saturated, the BLM will need to designate new corridors.

Communication sites

Demand for communication sites is anticipated to increase given the rapid advancement of technology and the boom in wireless networking. The BLM will encourage new applicants to co-locate their equipment on existing towers and, to the extent feasible, co-locate any new towers at existing sites with other towers. Ultimately, the BLM will need to designate new communication sites, as the existing sites become filled to capacity.

2.3.9.3. Key Features

Utility corridors

Areas with the highest demand potential for utility corridors would include corridors designated by *Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* (BLM 2009a). In addition, the BLM would consider existing major roads as well as existing transregional pipelines and electric transmission power lines for designated utility corridors.

Communication sites

Communication facilities are usually located at higher elevations within a general area and are often located adjacent to or near well-traveled roads. Locations with these attributes have the potential for development as communication sites.

2.3.10. Land Tenure

2.3.10.1. Current Condition

Background

Land transactions

Land tenure adjustments are accomplished through acquisitions, exchanges, or disposals. Land may be acquired when it is in the public interest, provides resource protection, improves land management through consolidation, provides recreational opportunities, enhances wildlife habitat, provides access to public lands or waters, or preserves archaeological or historical resources. Lands identified for disposal are typically small, isolated parcels that are difficult or uneconomical to manage, or that serve important public objectives such as the development of public utilities and community expansion. Public lands that are classified, withdrawn, reserved, or have special designations are not available for sale.

Acquisition

Land and interests in land (including access easements, conservation easements, mineral rights, and water rights) may be acquired through exchange, purchase, or donation. Acquisitions must be consistent with the BLM mission and applicable land use plans. The acquisition process is designed to ensure that any title, hazardous material, or other issues affecting the property are resolved or satisfactorily mitigated prior to conveyance to the United States. Acquiring land through purchase provides an alternative when a land exchange is not feasible or when other alternatives are not available.

Exchange

Land exchange allows the BLM to trade public land for equivalently valued private property in order to meet resource needs, improve public access and use, and achieve management efficiencies. Exchanges are only pursued with willing landowners, including governmental entities. The lands involved on both sides of the exchange must be of equal monetary value and located within the same state. Exchanges are the preferred method of acquiring and disposing of public land.

Disposal

Public lands must be identified for disposal in a land use plan, or an amendment to the plan, before being offered for sale. Sales are typically conducted through the competitive bid process. Under certain circumstances, sales may be conducted using a modified competitive bid process or without competitive bidding. Public land cannot be sold at less than fair market value.

The United States reserves all minerals and associated mineral rights when public lands are sold. The mineral estate may be conveyed in conjunction with the surface estate if it is determined that no known mineral values are in the land or that reservation of the minerals would preclude a more beneficial use of the land. (FLPMA, Section 209)

The Recreation and Public Purposes Act of 1926 (R&PP) authorizes conveyance of public land to state and local governments or non-profit organizations at a reduced cost or no cost for qualified uses. To qualify, the transferred land must be used for an established or specifically proposed public project, need, historic monument, or recreational purpose. The R&PP may not be used to convey land for public uses if a major function is to generate revenue or financial benefits (e.g., a water treatment plant that sells potable water to customers or economic development projects). Except in specific situations, lands conveyed under the R&PP are subject to a reservation of minerals to the United States and a reversionary clause that returns title to the United States if the conveyed land ceases to be used for the approved purpose.

Current level of use

The Royal Gorge Resource Area RMP of 1996 identified 183,041 acres of public lands scattered throughout the planning area as suitable for disposal. Non-Federal lands that meet established criteria for exchange, where the acquisition would enhance the management of resources, are considered for acquisition through exchange

The Northeast RMP identified 17,104 acres of public lands as suitable for disposal. These tracts include small, unmanageable, isolated parcels of land with limited public value scattered throughout the planning area. Disposal is accomplished through sales, exchanges, or other title transfer means.

2.3.10.2. Trends and Forecast

The BLM will continue to negotiate land exchanges, acquisitions, easements, and potential sales within the planning area commensurate with public needs, staffing levels, and workload priorities. Each prospect will be carefully reviewed for potential public benefit.

2.3.10.3. Key Features

Areas with potential for acquisition include inholdings or lands adjacent to specially designated areas such as ACECs, NCAs, special management areas, WSAs, and existing or potential recreation sites. Public lands interfacing with areas of urban development have the potential for disposal through tenure adjustments.

2.3.11. Rights-of-Way and Land Use Authorizations

2.3.11.1. Current Condition

Background

Rights-of-way

A right-of-way grant is an authorization to use a specific piece of public land for a certain project, such as a road, pipeline, transmission line, communication site, or energy-related project. An ROW grant authorizes rights and privileges for a specific use of the land for a specific period. In general, a BLM ROW is granted for a term appropriate to the life of a project. Land use ROWs are authorized by grants, leases, or permits. An ROW authorizes the holder to construct, operate, maintain, and/or terminate a new or existing facility over, under, upon, or through public lands. Such authorizations are issued to businesses for commercial purposes and to private citizens for non-commercial purposes. ROWs are issued to other Federal agencies, as well as state, county, and local government agencies.

An ROW is typically authorized through a grant, although sometimes a permit or lease may be issued. Permits are generally short-term authorizations (not to exceed three years) that have a negligible impact on the land (e.g., film permits, temporary storage areas, and apiaries). Leases are usually long-term authorizations requiring a significant capital investment (e.g., communication sites).

The BLM considers impacts to resources when evaluating the routing or siting of an ROW. Land use authorizations contain specific stipulations for surface reclamation, weed control, and other resource mitigation concerns. Additional mitigation stipulations (e.g., to protect cultural, plant, or wildlife resources) are applied on an individual basis.

Current level of use

Public lands throughout the planning area are generally made available for all types of land use authorizations, which are analyzed and issued on an individual basis. Certain lands within the planning area may be designated as areas to be avoided or excluded. Examples of designated areas include ACECs, NCAs, SMAs, SRMAs, and WSAs (see Glossary). Land use authorizations, when approved within specially designated areas, are subject to stringent stipulations.

In the past five years, the BLM has processed an average of 25 land use authorizations per year in the RGFO. Land use authorizations within the planning area are currently typically issued for the following facilities:

- Roads, including Federal and State highways (which may include material storage sites), RS 2477 (see Glossary) county road systems, as well as roads authorized for commercial or private use.
- Oil, gas, and water pipelines.
- Other water facilities, including storage or irrigation facilities, ditches, and canals.
- Electrical power lines, including transmission and distribution lines.
- Energy-related facilities such as compressor stations.
- Authorizations to other Federal agencies.
- Temporary use or short term (less than three years) permits.
- Railroads.
- Communication sites (discussed in section 2.3.9.1).

It is the BLM's responsibility to protect public lands from trespass and encroachment through prevention, detection, and resolution. Land authorizations, including grants, permits, and land exchanges, are issued to resolve trespass issues. Trespass is more likely to occur in areas where residential and commercial development are adjacent to public lands. The BLM pursues resolution of trespass occurrences as time, personnel, and priorities allow.

2.3.11.2. Trends and Forecast

Demand for land use authorizations in the planning area is anticipated to increase in conjunction with future residential and commercial development and increasing population and energy demand. The BLM may issue authorizations for renewable energy projects (wind, solar, and geothermal) in the planning area in response to applications once the energy potential is determined.

2.3.11.3. Key Features

Increasing population and development may potentially create an increase in demand for land use authorizations within the planning area for energy related projects.

2.3.12. Withdrawals and Classifications

2.3.12.1. Current Condition

Withdrawals are formal actions that segregate or reserve public land by statute or administrative order for public purposes. Withdrawals are often used to preserve sensitive environmental values, protect major public investments in facilities or improvements, support national security, and provide for public health and safety. The majority of withdrawals issued prior to FLPMA remain in effect until they are specifically revoked. Since FLPMA was enacted, withdrawals typically have a term not to exceed 20 years unless the term is specifically declared by the Secretary of the Interior on the basis of resource use.

Withdrawals typically accomplish one or more of the following:

- Transfer total or partial jurisdiction of public land between Federal agencies without the land leaving Federal ownership.
- Close, segregate, or suspend public land from operation of all or some of the public land laws and/or mineral laws (withdraw land from settlement, disposal, location, or entry).
- Dedicate public land to a specific purpose.

Table 2.49 below shows the current withdrawals in the planning area.

Table 2.49. Current Withdrawals in the Planning Area by Type

Type of withdrawal	Holder of withdrawal	Purpose
Public water reserve	BLM Colorado State Office	Water resource protection
Power site reserve	BLM Colorado State Office	Power site
Power site classification	BLM Colorado State Office	Power site classification
Reservoir sites	BLM Colorado State Office	Reservoir
Reservoir sites reserve	BLM Colorado State Office	Reservoir
BLM miscellaneous	BLM Colorado State Office	Administrative site
BLM miscellaneous	Royal Gorge Field Office	Administrative site
BLM miscellaneous	BLM Colorado State Office	Transfer of jurisdiction
Reclamation	Bureau of Reclamation	Irrigation project
U.S. Fish and Wildlife Service National Refuge System	U.S. Fish and Wildlife Service	Wildlife refuge
U.S. Fish and Wildlife Service National Management System	U.S. Fish and Wildlife Service	Fish hatchery
National Parks	National Park Service	Wilderness
National Park Service national monument	National Park Service	Transfer of jurisdiction
Department of the Army	U.S. Army Corps of Engineers	Military training
Corps of Engineers	U.S. Army Corps of Engineers	Dam and reservoir
Department of the Air Force	U.S. Air Force Academy	Administrative site
Federal Energy Regulatory Commission (FERC)	City of Colorado Springs	Power site
FERC	Public Service Company of Colorado	Power site
FERC	Public Service Company of Colorado	Transmission line
FERC	FERC	Power site
FERC	City and County of Denver	Power site
FERC	City of Boulder	Power site
FERC	BLM Colorado State Office	Power site
Department of Transportation	Department of Transportation, Federal Railroad Administration	Administrative site
Department of Commerce miscellaneous	National Oceanic and Atmospheric Administration, National Bureau of Standards (now called National Institute of Standards and Technology), National Telecommunications and Information Administration.	Administrative site
Veterans Administration	Veterans Administration	Administrative site

Note: This table excludes withdrawals to the U.S. Forest Service.

Source: BLM 2014b

2.3.12.2. Trends and Forecast

The majority of BLM withdrawals were issued between 1915 and 1966 under the authority of specific acts of Congress to achieve a specific purpose (e.g., power site, military training, or hot springs). Withdrawals since 2000 have primarily been designated to create special management areas, developed recreation areas, and national conservation areas, and for protection of T&E species or cultural sites.

The lands and realty program will continue to administer both new and existing withdrawals in accordance with FLPMA on an individual, site-specific basis. If any existing withdrawals are revoked, the lands would be managed in accordance with the surrounding lands and the objectives of the management unit in which they are located.

2.3.12.3. Key Features

Areas with a high potential for withdrawals include newly designated special management areas, national conservation areas, and recreational sites.

2.4. Special Designations

2.4.1. Areas of Critical Environmental Concern

2.4.1.1. Indicators

An area of critical environmental concern is defined in Section 103(a) of FLPMA as an area within BLM-administered public lands where special management attention is required to protect and prevent irreparable damage to important cultural, historic , or scenic values; fish and wildlife resources or other natural systems or processes; or to protect life and safety from natural hazards. BLM regulations for implementing the ACEC provisions of FLPMA are found in 43 CFR 1610.7-2(b). An ACEC possesses significant cultural, historic, or scenic values; fish or wildlife resources (including habitat, communities, or species); natural processes or systems; or natural hazards. In addition, the significance of these values and resources must be substantial in order to satisfy certain criteria.

Relevance criteria are as follows:

1. Area is of significant cultural, historic, or scenic value (including but not limited to rare or sensitive archeological resources and religious or cultural resources important to Native Americans).

2. Area is a fish or wildlife resource (including but not limited to habitat for endangered, sensitive, or threatened species, or habitat essential for maintaining species diversity).

3. Area has a natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relict plants or plant communities that are terrestrial, aquatic, or riparian; or rare geological features).

4. Area has a natural hazard (including but not limited to areas susceptible to avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or containing dangerous

cliffs). A hazard caused by human action may meet the relevance criteria if the RMP process determines that it has become part of a natural process.

Importance criteria are as follows:

1. The area has more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
2. The area has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.
3. The area has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA.
4. The area has qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare.
5. The area poses a significant threat to human life and safety or property?

2.4.1.2. Current Condition

Nine ACECs were designated in the 1996 Royal Gorge Resource Area RMP (BLM 1996) to protect a variety of resources and values (Table 2.50).

Table 2.50. Areas Currently Designated as ACECs

ACECs	Acres
Arkansas Canyonlands	23,921
Beaver Creek	12,081
Browns Canyon	11,697
Cucharas Canyon	1,866
Droney Gulch	705
Garden Park	2,728
Grape Creek	15,978
Mosquito Pass	4,036
Phantom Canyon	6,096

Arkansas Canyonlands

The following values are found within this ACEC: scenic, historic, and cultural values; endangered peregrine falcons; key raptor habitat; bighorn sheep and fisheries; accessibility to Arkansas River; and rare cliffs suitable for peregrine habitat and fragile and vulnerable to recreational use.

Beaver Creek

The following values are found within this ACEC: WSA with 20,750 acres recommended as wilderness and 5,400 not recommended as wilderness; significant naturalness character; primitive recreation; water-related recreation; and scenic and visual qualities. The bluffs in the area have very significant raptor values and significant bighorn sheep and mountain lion habitat values. This area includes BLM, private and State land considered very important to the integrity and management of this canyon land environment (BLM 1996).

Browns Canyon

The following values are found within this ACEC: 6,614 acres of scenic river canyon within the WSA recommended to Congress as wilderness for its unique naturalness character; primitive recreation; water-related recreation; and scenic and visual qualities. It is under consideration as an archaeological district. The bluffs in the area have very significant raptor values, and the area has significant bighorn sheep habitat values. This area includes BLM, private, and State land considered very important to the integrity and management of this canyon environment (BLM 1996).

Cucharas Canyon

The following values are found within this ACEC: significant archaeological sites and significant recreation, riparian, and scenic values. The riparian conditions on public lands in this ACEC are assumed to be poor similarly to the areas on adjacent private lands. These poor conditions appear to be caused by grazing practices (BLM 1996).

Droney Gulch

The following values are found within this ACEC: location of the best population of Brandegee's buckwheat (*Eriogonum brandegeei*) in the world. *E. brandegeei* is presently on the Federal T&E list, and the Droney Gulch area is proposed as an ACEC by The Nature Conservancy. This area includes some private lands as a buffer to maintain the integrity of the plant community. The Nature Conservancy is attempting to buy some of these private lands.

Garden Park

The following values are found within this ACEC: outstanding potential for paleontological resources and historic values; naturalness; undeveloped recreation; and water-related recreation. It has been designated as a national natural landmark. Significant riparian and wildlife values also exist.

Grape Creek

The following values are found within this ACEC: two WSAs that were not recommended as wilderness; significant naturalness character; primitive recreation values; water-related recreation; riparian, scenic and visual qualities; and significant wildlife values (bighorn sheep). It includes all BLM-managed lands as well as some private lands from 2 miles south of DeWeese Reservoir down through Temple Canyon Park to the Arkansas River.

Mosquito Pass

The following values are found within this ACEC: location for Penland's eutrema (*Eutrema Penlandii*), a sensitive plant species that only occurs in the region; the highest continuous road in the United States; and four mountains over 13,000 feet in elevation, with very significant visual and scenic values.

Phantom Canyon

The following values are found within this ACEC: outstanding historic values and significant scenic, recreation, visual, archaeological, riparian, wildlife, paleontological, and wildlife values in the corridor along Phantom Canyon Road. This area has been designated as a portion of the Gold Belt National Back Country Byway and is presently within the Gold Belt SRMA.

2.4.1.3. Trends

The current ACECs within the RGFO will be reviewed to ensure the ACECs are still relevant and to determine whether they should continue to be managed as ACECs. Those values associated with each ACEC should be used to determine whether the ACEC is trending in a positive or negative direction. Currently, the ACECs seem to be trending in a positive direction. ACECs should continue to be monitored to determine if those values remain in good condition.

2.4.1.4. Forecast

The Garden Park National Natural Landmark has been expanded to include some additional public lands that hold significant paleontological resources. The current boundary of the Garden Park ACEC should be revisited in the RMP revision to determine whether the boundary should be changed to reflect the new boundary of the Garden Park Fossil Area National Natural Landmark.

2.4.2. National and State Scenic Byway Designations

2.4.2.1. Indicators

The Colorado Scenic and Historic Byways program is a statewide partnership intended to provide recreational, educational, and economic benefits to Colorado residents and visitors. The system of outstanding touring routes in Colorado affords the traveler interpretation and identification of key points of interest and services while providing for the protection of significant resources.

Scenic and historic byways are nominated by local partnership groups and designated by the Colorado Scenic and Historic Byways Commission for their exceptional scenic, historic, cultural, recreational, and natural features. America's scenic byways are designated by the U.S. Secretary of Transportation (Colorado Tourism Office 2007).

2.4.2.2. Current Condition

There are 25 designated byways in Colorado. The byways listed below are located in the RGFO. The length of each byway is indicated. The RGFO does not manage all the byways within its jurisdiction.

Trail Ridge Road—Rocky Mountain National Park (48 miles)

This byway is part of the America's Byways program. This is the highest continuously paved through road in North America. Beginning in 1929, the Civilian Conservation Corps (CCC) began building the road for the National Park Service. The road was completed in 1932. Trail Ridge derives its name from the numerous prehistoric pathways that crisscross its open, treeless expanse. Archaeologists have gathered evidence that suggests humans have been traversing the area for at least 6,000 years. The RGFO does not manage the byway directly.

Frontier Pathways Scenic and Historic Byway (103 miles)

This byway is part of the America's Byways program. Driving west out of Pueblo across the prairie and desert scrubland, travelers can almost imagine what American lieutenant Zebulon Pike, who led an expedition through this area in 1806, thought when he came upon the Rocky Mountains. With a sudden movement upward, everything changes. Plants, animals, geology and even the weather shift every 1,000 feet in elevation. The RGFO has no direct role in the management of the byway.

Gold Belt Tour National Scenic and Historic Byway (131 miles)

This byway is part of the America's Byways program. "Greatest" is a fitting word for the small area that miners tapped—and continue to work—around Cripple Creek and Victor. From 1891 to 2005, more than 500 mines have removed an estimated 23.5 million ounces of gold from the corridor. This figure surpasses the production of the entire Alaska and California gold rushes combined. The RGFO has a direct role in the management of this byway.

Santa Fe Scenic and Historic Byway (184 miles)

This byway is part of the America's Byways program. In 1833—the year the number of travelers and traders using the Santa Fe Trail was at its peak—Bent's Old Fort was constructed. The adobe fort was originally built as an outpost for pelt trappers and buffalo skinners, but thanks in large part to its convenient location along the trail, the fort soon took on other roles. The RGFO has no direct role in the management of this byway.

Top of the Rockies Scenic and Historic Byway (115 miles)

This byway is part of the America's Byways program. The Top of the Rockies crosses three passes and dips into four watersheds. Along the way, Colorado's two tallest peaks—Mount Elbert (14,433 feet) and Mount Massive (14,421 feet)—soar into the sky. The origins of the Arkansas River are just a short hike away. The entire route never drops below 9,000 feet. The RGFO has an indirect role in the management of this byway.

Cache La Poudre–North Park Scenic and Historic Byway (101 miles)

This byway stretches from Fort Collins to Walden. The Cache La Poudre River is not dammed for much of its course and is revered by kayakers, rafters, and fisherman for its wild attributes. At points, the Poudre seems to be a torrent that has outgrown its banks. In May and June, thick, muscular rapids swell through granite slots, overwhelming the shore. The rock formations within the canyon are spectacular, and numerous pullouts afford great picture taking. The Poudre has also been designated as a wild and scenic river. The RGFO has no role in the management of this byway.

Collegiate Peaks Scenic and Historic Byway (57 miles)

The Collegiate Peaks Byway picks up where the Top of the Rockies Byway leaves off, along the Upper Arkansas River Valley near Twin Lake. This valley's convergence of natural elements—soaring peaks, geothermal hot springs, granite-carved canyons, and the surging

Arkansas River—make it unique and convenient from Denver, Colorado Springs, and points beyond. In fact, the long stretch of the Arkansas River along this byway is the most rafted in the nation. The RGFO has a direct role in the management of this byway.

Guanella Pass Scenic and Historic Byway (22 Miles)

There is a lot of history to absorb even before this short 22-mile byway begins. Back in Georgetown, the byway heads to the south and alternates between a paved and unpaved surface while climbing up into the subalpine environment of the Front Range. Bighorn sheep, golden eagles, and the occasional mountain goat can all be seen on the jaunt up to the pass. At the top, views stretch over a craggy and eroded peak simply known as "The Sawtooth," as well as Mount Bierstadt, a 14,060-foot peak that is one the State's most accessible "fourteeners" to hike. The RGFO has no role in the management of this byway.

Highway of Legends Scenic and Historic Byway (110 miles)

Its name, while exotic, couldn't be any more appropriate. The area has long produced folktales about conquistadors and Aztec Indians seeking gold at the foot of the prominent mountains. At different times, the Comanche, Pueblo, and Tarahumar Indians (who now reside in Mexico's Copper Canyon) called this area beneath the Spanish Peaks home. The Pueblo Indians referred to the peaks as "Wahatoya," meaning "breasts of the world." The RGFO has no role in the management of this byway.

Lariat Loop Scenic and Historic Byway (40 miles)

The Lariat Loop begins in the small city of Golden and takes its name from the ride up the front of Lookout Mountain. Rising 2,000 feet in 4.6 miles, it guides visitors around 56 strategically banked curves and hairpins to Buffalo Bill's Grave and Museum. Because of its technical incline and 1913 construction, the trail is a celebrated engineering feat and a favorite for cyclists who want to put their quadriceps to the test. The RGFO has no role in the management of this byway.

Mount Evans Scenic and Historic Byway (49 miles)

Idaho Springs has a historical character that the pressures of time and modernization have not tarnished. Wedged in a canyon and founded on one of the first gold discoveries in Colorado (1859), the town has successfully adapted to the times without sacrificing its past. The Charlie Taylor Water Wheel spins beneath Bridal Veil Falls (where it was moved in 1946), even if it no longer powers the nearby gold mill. The downtown area maintains its 1800s charm with impeccable stone masonry and a slew of historic sites, among them the Idaho Springs Public Library, the Underhill Museum, and the Central Hose House. The RGFO has no role in the management of this byway.

Pawnee Pioneer Trails Scenic and Historic Byway (128 miles)

The unassuming prairie town of Fort Morgan was home to a well-known World War II hero and 1940s musical mastermind—Glenn Miller. Miller spent his high school years here, playing football and honing his soon-to-be-famous musical prowess. The RGFO has no role in the management of this byway.

Peak to Peak Scenic and Historic Byway (55 miles)

Peak to Peak's southernmost point swoops through steep terrain to the remnants of Colorado's mining heydays. Black Hawk marks the narrow gulch where Georgia prospector John Gregory first struck gold in 1859. Central City was coined "the richest square mile on earth" after 2 million dollars in gold was discovered that year. The RGFO has no direct role in the management of this byway.

South Platte River Trail Scenic and Historic Byway (19 miles)

Julesburg is a city that was built, razed, rebuilt, and abandoned three times over three decades, beginning in the early 1850s. Its current and final incarnation was founded in 1881 and sits in the extreme northeast corner of the State. It is the first town to welcome visitors crossing the Nebraska border along Interstate 76. The RGFO has no direct role in the management of this byway.

2.4.2.3. Trends

It is unlikely any more byways will be dedicated in the State. All the byways have a corridor management plan in place. Until another revenue source is found, most byways will have to rely on what they currently have in place. It is possible that local governments will continue to fund projects along the byways.

2.4.2.4. Forecast

Federal dollars that the State once received for the byway grant program are being reduced. The Colorado Department of Transportation is also considering a reduction in byway staffing. Without grant money that was mainly used to prepare corridor management plans and interpretive materials, the byway program may take on a more custodial role. The fate of the byway programs is currently unknown at this time.

2.4.3. Wild and Scenic Rivers

2.4.3.1. Indicators

The Wild and Scenic Rivers Act of 1968 led to the National Wild and Scenic River System (NWSRS), which is a system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geological, fish and wildlife, cultural, and other similar values and are preserved in a free-flowing condition.

A wild and scenic designation does the following:

- Protects a river's outstanding remarkable values, the water quality necessary to support those values, the river's free-flowing condition, and the current level of development along the river corridor.
- Allows current uses of the river corridor to continue, and allows new uses in the river to the extent such uses are consistent with maintenance of the outstanding remarkable values.

- Prohibits federally licensed dams, and any other federally assisted water resource project if the project would negatively impact the river's outstanding values.
- Establishes a quarter-mile protected corridor on both sides of the river.
- Requires the creation of a cooperative river management plan that addresses resource protection, development of lands and facilities, user capacities, etc.

When a river is designated as part of the national system, it is classified as either wild, scenic, or recreational, which reflects the level of development allowed within a designated river corridor:

- *Wild rivers* are vestiges of primitive America.
- *Scenic rivers* are free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads.
- *Recreational rivers* are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundments or diversions in the past.

2.4.3.2. Current Condition

There are currently no designated segments of the NWSRS within the RGFO. During development of the Royal Gorge Resource Area RMP/EIS (BLM 1996), two streams were analyzed for potential addition to the NWSRS. Those streams were a 126-mile stretch of the Arkansas River from Leadville down river to the Royal Gorge Park, and a 20-mile stretch on the main branch and east branch of Beaver Creek from below Skagway Dam downstream to the southern boundary of the Beaver Creek State Wildlife Area.

A wild and scenic river study was conducted during development of the Royal Gorge Resource Area RMP/EIS between December 1989 and March 1991 to determine if any streams or rivers should become a part of the NWSRS. The report included basic physical and biological descriptions of each stream or river corridor, analysis of the potential for meeting wild and scenic eligibility criteria, classification of various segments, suitability determinations, and evaluations and recommendations by the study team.

During the development of the Royal Gorge Resource Area RMP/EIS, 61 streams and rivers were analyzed for eligibility (Table 2.51).

Table 2.51. River Segments Analyzed for Eligibility in 1993

River segment	Length (miles)	Free-flowing	Outstandingly remarkable values	Determination
Arkansas River, Segment 1	47	Yes	Yes	Eligible
Arkansas River, Segment 2	29	Yes	Yes	Eligible
Arkansas River, Segment 3	20	Yes	Yes	Eligible
Arkansas River, Segment 4	31	Yes	Yes	Eligible
Arkansas River, Segment 5	6	Possibly	Possibly	In-depth analysis
Arkansas River, Segment 6	23	Possibly	Possibly	In-depth analysis
Birdseye Gulch	2	Yes	No	Not eligible
Indiana Gulch	3.5	Yes	No	Not eligible
Iowa Gulch	4.25	Yes	No	Not eligible
Low Pass Gulch	1	Yes	No	Not eligible

River segment	Length (miles)	Free-flowing	Outstandingly remarkable values	Determination
Hayden Gulch	1	Yes	No	Not eligible
Sevenmile Creek	1.25	Yes	No	Not eligible
Little Cottonwood Creek	1.25	Yes	No	Not eligible
Middle Cottonwood Creek	2.5	Yes	No	Not eligible
Cottonwood Creek (Nathrop)	2.25	Yes	No	Not eligible
Pass Creek	2	Yes	No	Not eligible
Poncha Creek	1.25	Yes	No	Not eligible
Badger Creek	6	Yes	Possibly	National River Inventory stream
Bills Creek	2	Yes	No	Not eligible
Little Badger Creek	2	Yes	No	Not eligible
Kerr Gulch	3.5	Yes	No	Not eligible
Hamilton Creek	2.5	Yes	No	Not eligible
Cedar Springs Gulch	3	Yes	No	Not eligible
Butter Creek	1	Yes	No	Not eligible
Falls Gulch	2.5	Yes	No	Not eligible
Sullivan Creek	1.75	Yes	No	Not eligible
Henthorn Gulch	1.5	Yes	No	Not eligible
Arkansas Gulch	1.75	Yes	No	Not eligible
Red Gulch	1.75	Yes	No	Not eligible
Fernleaf Gulch	4.5	Yes	No	Not eligible
McCoy Gulch	1.75	Yes	No	Not eligible
Reese Gulch	3	Yes	No	Not eligible
Texas Creek Gulch	5	Yes	No	Not eligible
Texas Creek	3.25	Yes	No	Not eligible
Road Gulch	4	Yes	No	Not eligible
Turkey Gulch	0	Yes	No	Not eligible
Heck Gulch	2.75	Yes	No	Not eligible
Five Points Gulch	6.5	Yes	No	Not eligible
East Gulch	6	Yes	No	Not eligible
Grape Creek	19	Yes	Possibly	In-depth analysis
Temple Canyon	3.25	Yes	No	Not eligible
Currant Creek	4.25	Yes	No	Not eligible
Cottonwood Creek	6.25	Yes	No	Not eligible
Tallahassee Creek	3.25	Yes	No	Not eligible
Fourmile Creek	6	Possibly	Possibly	In-depth analysis
Barnard Creek	3.25	Yes	No	Not eligible
Little High Creek	1.25	Yes	No	Not eligible
High Creek	1	Yes	No	Not eligible
Long Hungry Gulch	1.75	Yes	No	Not eligible
Pony Gulch	1.5	Yes	No	Not eligible
Cripple Creek	1	Yes	No	Not eligible
Wilson Creek	5	Yes	No	Not eligible
Oil Creek	1.5	Yes	No	Not eligible
Eightmile creek	7	Possibly	Possibly	In-depth analysis
Mack Gulch	3.75	Yes	No	Not eligible
Beaver Creek	12	Yes	Yes	Eligible
East Fork Beaver Creek	6	Yes	Yes	Eligible
Crooked Creek	1.25	Unknown	No	Not Eligible
Threemile Creek	6	Yes	No	Not eligible
Devils Gulch	1.25	Unknown	No	Not eligible

River segment	Length (miles)	Free-flowing	Outstandingly remarkable values	Determination
Muddy Gulch	1.25	Yes	No	Not eligible
Pantleon Creek	1	Unknown	No	Not eligible
Palo Duro Creek	1.5	Unknown	No	Not eligible
South Fork Yellowstone Creek	1	Unknown	No	Not eligible
Greasewood Creek	1.25	Unknown	No	Not eligible
South Apache Creek	.25	Yes	No	Not eligible
Cuchares River	0	N/A	N/A	No analysis
Huerfano River	0	N/A	N/A	No analysis
Purgatoire River	0	N/A	N/A	No analysis

2.4.3.3. Trends

The BLM continues to protect the outstandingly remarkable values of eligible and suitable streams since the 1996 Royal Gorge Resource Area RMP was signed. These waterways include approximately 20 miles of Beaver Creek and a 126-mile stretch of the Arkansas River from just south of Leadville, Colorado, to the mouth of the Royal Gorge. These segments were found to be suitable under the "Recreational" classification. Water quality has been improved in the last 18 years through various projects that targeted water discharge from some of the historic mines in the vicinity of Leadville. The success of these mine reclamation projects resulted in the river receiving a Gold Medal designation from the Colorado Parks and Wildlife Commission. However, during this 18-year period, the river has seen a lot of development on private lands, mainly in the form of single-family homes. The Arkansas Headwaters Recreation Area has also played a role in reducing sedimentation loading in the river through the hardening of some of recreation sites and the installation of sediment catch basins. These catch basins are cleaned after significant rain events, and the sediments collected from the basins are cleaned and deposited in an area where they cannot get washed into the river. The Cuchares, Huerfano, and Purgatoire Rivers were not analyzed in the previous RMP and should be studied as part of the RMP revision.

2.4.3.4. Forecast

- The public is paying and is likely to pay increasing attention in the future to water-dependent values and to what mechanisms are used to maintain those values.
- Management along the Arkansas River has changed significantly since the last resource management plan, and this has bearing on future use.
- Ongoing drought has stressed water-dependent values and has changed assumptions about how streams should be managed.
- Conditions along many of the streams in the planning area have not changed significantly since the last planning effort.

The BLM will conduct further wild and scenic river studies and will make wild and scenic recommendations as part of this current RMP revision.

2.4.4. Wilderness Areas and Wilderness Study Areas

2.4.4.1. Indicators

Under FLPMA, wilderness preservation is part of the BLM's multiple use mandate, and wilderness is recognized as part of a spectrum of resource values to be considered during land use planning. Under the wilderness review program, existing designated WSAs are managed in accordance with BLM Manual 6330, *Management of Wilderness Study Areas* (BLM 2012e). The status of these WSAs will not change as a result of the RMP revision.

Congress said Federal lands must have certain characteristics to be considered wilderness (Wilderness Act of 1964):

- They must be in a generally natural condition.
- They must have outstanding opportunities for solitude or a primitive and unconfined recreation.
- They must be at least 5,000 acres or large enough to preserve and use as wilderness.
- They may contain ecological, geological, or other features of scientific, scenic, or historical value.
- They must be managed to preserve their wilderness character.

2.4.4.2. Current Condition

Table 2.52 below lists WSAs within the RGFO.

Table 2.52. Wilderness Study Areas within the Royal Gorge Field Office

Wilderness study areas	Acres of WSAs in planning area	Acres recommended for wilderness
Beaver Creek	26,150	26,150
Browns Canyon	6,614	6,614
Upper Grape Creek	10,200	0
Lower Grape Creek	11,220	0
McIntyre Hills	16,800	0
High Mesa Grasslands	680	0

Beaver Creek

The Beaver Creek WSA is located in Fremont, Teller, and El Paso Counties, approximately 10 miles northeast of Cañon City and 12 miles southwest of Colorado Springs. This WSA includes 26,150 acres of BLM lands and an 870-acre State inholding. The area is bounded on the southwest by Eight Mile Creek and on the northeast by the Pike National Forest. The remainder of the boundary goes through a patchwork of mostly State and private lands, with several narrow extensions of BLM ownership. A "cherrystem" was delineated in the north central boundary during the inventory process so that the remains of an abandoned hydroelectric power plant and the associated tramway and penstock could be excluded from the area.

Topography varies from rocky rolling hills in the southern portion of the WSA to steep rugged peaks in the northern portion. Elevations range from 6,200 feet along the lower reaches of Beaver Creek to 9,922 feet at Crown Point. The vegetation is very diverse and includes semi-arid species in the lower elevations; riparian zones along streams; and spruce, fir, and pine forests on the mountain slopes.

The WSA was studied under Section 603 of the FLPMA and was included in the *Canon City District Wilderness Final Environmental Impact Statement* (BLM 1987).

The 26,150-acre area that makes up the central portion of the WSA was recommended for wilderness designation primarily because of its outstanding scenery and opportunities for solitude and primitive and unconfined recreation. The focal points of the area are the east and west branches of Beaver Creek, which twists through several miles of deep, rugged, granite-walled canyons, offering spectacular scenery. Beaver Creek is one of the highest quality streams in the Cañon City District and is a popular fishing area for brook, brown, rainbow, and cutthroat trout. The creek valleys and gulches also provide access for other recreational activities, including hiking, backpacking, hunting, and rock climbing

Browns Canyon

The Browns Canyon WSA is located in Chaffee County approximately 6 miles south of Buena Vista and 7 miles northwest of Salida. The north and south borders of the WSA go through BLM lands. During the inventory process, the former was delineated to exclude a roadway and the latter was delineated to exclude a narrow area with no outstanding wilderness qualities. Beginning in the southwest corner of the WSA, the western boundary follows the eastern edge of the Union Pacific railroad right-of-way that is 100 feet from the track center line

This WSA varies in elevation from about 7,400 feet along the Arkansas River to about 9,000 feet near its eastern boundary. Topography of the area is very rugged, with many mountains, canyons, and gulches. Drainages generally cross the WSA in an east to west direction and empty into the Arkansas River. Over-story vegetation is mostly pinyon pine and juniper on the lower slopes with some ponderosa pine and Douglas-fir in the higher elevations and more sheltered coves. Broadleaf species include aspen, willow, and cottonwood also occurs in scattered pockets within the drainages. Understory vegetation includes rabbitbrush, blue gramma grass, mountain muhly, Indian ricegrass, prickly pear cactus, cholla, and yucca. This WSA was studied under Section 603 of FLPMA and was included in the *Canon City District Wilderness Final EIS* (BLM 1987).

In recommending this WSA for wilderness designation, the area's spectacular scenery and outstanding opportunities for primitive, unconfined recreation and solitude were the primary considerations. The rugged topography and groupings of vegetation within the WSA create a variety of settings ranging from canyons and gulches with enclosed, intimate qualities to open ridge tops with sweeping views of the Arkansas River valley and the nearby Sawatch Mountain range, the highest group of peaks in the Rockies. Numerous rock spires located throughout the area make Browns Canyon particularly scenic. The WSA's relatively low elevation and proximity to a major highway also make it accessible for recreational activities during the winter seasons when nearby high-elevation wilderness areas cannot be reached by most potential users (BLM 1991a).

Upper Grape Creek

The Upper Grape Creek WSA is located in Fremont and Custer Counties, 10 miles southwest of Cañon City. This WSA includes 9,840 acres of BLM lands, 360 acres with State subsurface and BLM surface ownership, and two privately owned inholdings totaling 30 acres. A roadway along the northern border separates this area from Lower Grape Creek WSA. An area of BLM-managed land along the north-central boundary of the WSA was excluded during the inventory process because of major human impacts, including several cut/filled ways and two mines with areas of surface disturbance. The remainder of the boundary abuts on State and private lands with several narrow extensions of BLM ownership). This WSA was studied under Section 603 of FLPMA and was included in the Cañon City District Wilderness Final EIS (BLM 1987).

The limited extent of outstanding wilderness qualities within this WSA is the primary reason for the non-wilderness recommendation. Although the area contains the minimum wilderness characteristics as defined by the WSA review process, the overall quality of these characteristics is considered to be less than outstanding in representing wilderness values in the national system. Other than the somewhat rugged terrain along Grape Creek, most of the WSA consists of a series of rolling interconnected hills with relatively uniform vegetation cover. Also, unlike the rugged narrow canyons in the Beaver Creek and Lower Grape Creek WSAs, Grape Creek flows through a more open and less dramatic landscape within this WSA. The limited number of prominent and varied features results in the landscape within this WSA having only average scenic qualities (BLM 1991a).

Lower Grape Creek

The Lower Grape Creek WSA is located in Fremont County, 6 miles southwest of Cañon City. The WSA includes 10,630 acres of BLM lands, 590 acres with subsurface and BLM surface ownership, and two privately owned inholdings totaling 75 acres. The area is bounded on the northwest by the Copper Gulch road and on the east by the San Isabel National Forest. A roadway along the southern border separates this WSA from the Upper Grape Creek WSA. The remainder of the boundary is mostly a combination of State and private lands. Several extensions of BLM lands were excluded from the WSA during the inventory process because they contain impacts including roadways and old mining sites. (See map)

Topography varies from rocky rolling hills to steep rugged canyons and mountains. Elevations range from 6,100 feet along Grape Creek to about 8,300 feet on some of the higher peaks near Goat Park. Vegetative cover is comprised mostly of sparse stands of pinyon and juniper with riparian species along Grape Creek and ponderosa pine and Douglas-fir ins one of the higher elevations.

The WSA was studied under Section 603 of FLPMA and was included in the *Canon City District Wilderness Final EIS* (BLM 1987). The recommendation is not to designate the Lower Grape Creek WSA as wilderness.

In recommending that the Lower Grape Creek WSA be released for other uses, some major considerations were the problems that could result for managing mineral development and the resource conflicts that could arise should this area be designated as wilderness. This WSA includes 188 mining claims (including 24 pre-FLPMA claims) and 2 patented inholdings. A large favorable zone showing moderate potential for base and precious minerals extends across the central portion of the WSA, and the public has expressed considerable interest in developing these resources.

McIntyre Hills

The McIntyre Hills WSA is located in Fremont County, 12 miles west of Cañon City. This WSA includes 15,910 acres of BLM lands, a 520-acre State inholding, a 40-acre private inholding, and 740 acres of State subsurface inholdings. Much of the northern boundary of the WSA parallels U.S. Highway 50, and Copper Gulch Road forms part of the southeastern border. The remainder of the boundary crosses a combination of BLM, State, and private lands. Where the boundary crosses BLM lands, it was delineated to exclude human impacts including a power line system, the three water catchments and filled remnants of an old railroad grade, and several mines with associated ways. Drainages generally follow a south to north direction, with many side canyons. Vegetation consists primarily of pinyon pine and juniper, with some ponderosa pine and Douglas-fir in the higher elevations, and riparian species along the drainages. This WSA was studied under Section 603 of FLPMA and was included in the *Canon City District Wilderness Final EIS* (BLM 1987).

The limited extent of outstanding wilderness qualities within this WSA was the primary reason for recommending that it be released for uses other than wilderness. Although the area contains the basic wilderness characteristics, it is considered to be less than outstanding in representing wilderness values in a national system. Other than the rugged canyon slopes that rise above U.S. Highway 50 in the northern portion of the WSA, most of the area consists of a series of rolling interconnected hills with somewhat uniform vegetative cover. The lack of prominent and varied features results in a landscape with only average scenic qualities throughout most of the WSA. The area also has no special ecological, geological, scientific, educational, or historic values.

Numerous opportunities exist for solitude and primitive and unconfined recreational activities. However, outstanding settings for these activities are limited to a small portion of the WSA. Sights and sounds from the thousands of vehicles per day that travel U.S. Highway 50 are evident for at least one-half mile into the WSA. This impacts solitude along the canyon slopes throughout much of the northern portion of the area.

High Mesa Grasslands Instant Wilderness Study Area

The High Mesa Grasslands Research Natural Area and contiguous public lands were found not to possess wilderness characteristics as defined by the Wilderness Act of 1964. Specifically, the area does not meet the size requirements, is not natural within the context of wilderness requirements, and does not offer outstanding opportunities for solitude or a primitive and unconfined type of recreation. The social and economic impacts of this recommendation are insignificant, because the designation of the High Mesa Grassland as a research natural area will not change as a result of this recommendation. Section 603(a) of FLPMA states, “the Secretary of the Interior shall report to the President by July 1, 1980, his recommendations on those areas which the Secretary has prior to November 1, 1975, formally identified as natural or primitive areas.” The High Mesa Grasslands Research Natural Area is located in south-central Colorado in Fremont County (BLM 1991b).

2.4.4.3. Trends

The WSAs have been managed in accordance with BLM Manual 6330 (BLM 2012e) for the past 22 years and are trending toward improvement in their natural condition. The imprint of human activities is receding from these areas.

2.4.4.4. Forecast

The RGFO will continue to manage all WSAs in accordance with BLM Manual 6330, *Management of Wilderness Study Areas*. This management will continue until Congress either designates the WSAs as wilderness or releases the lands from further wilderness consideration. There are currently no designated wilderness areas in the RGFO. Legislation has been before Congress, primarily regarding Browns Canyon WSA, over the last 14 years or so; however, no legislation has succeeded in creating any new wilderness areas. Colorado U.S. Senator Mark Udall sponsored a bill to create Browns Canyon National Monument, but the bill was never enacted. President Obama used his authority under the Antiquities Act of 1906 to create Browns Canyon National Monument in March 2015.

2.5. Social and Economic Conditions

2.5.1. Abandoned Mine Lands, Hazardous Materials, and Public Safety

2.5.1.1. Abandoned Mine Lands

2.5.1.1.1. Indicators

Until the latter half of the 20th century, few environmental regulations existed to encourage mining companies to minimize or prevent the environmental impacts caused by their facilities. The result is a legacy of abandoned mine features that include physical hazards such as mine openings, human health hazards such as exposure to toxic gases and chemicals, and environmental hazards such as acid mine drainage and contaminants that damage habitats.

2.5.1.1.2. Current Condition

The abandoned mine lands program is a national and State BLM safety priority with an emphasis on ensuring public safety and protecting watersheds from hazardous materials and mine drainage. At the field office level, the program's role is to identify and characterize inactive mine sites; inventory hazards or potential hazards to human health, safety, and the environment; and store data in the BLM's national Abandoned Mine Site Cleanup Module (AMSCM) database. Specific sites may be closed or remediated in order to protect human health or the environment. According to the Colorado Division of Reclamation, Mining and Safety (CDRMS), approximately 23,000 abandoned mines are located in Colorado, and of those, only 6,127 have been made safe by this State agency. Over 5,600 abandoned mine and hazardous material features have been identified within the planning area, and 4,300 of these features need to be assessed. Most of the abandoned mine features are located at the urban interface in the historic mining districts.

2.5.1.1.3. Trends

The BLM's priorities focus on sites that pose a threat to public health, safety, and/or the environment. The BLM selects cleanup projects through a program-wide collaborative process that occurs once a year. The BLM RGFO's priority is to remediate physical safety hazards located

at the urban interface, but the RGFO also has an active environmental cleanup program that is supported by partnerships with other regulatory agencies and local watershed groups.

The RGFO has had a successful partnership with the Lake Fork Watershed Working Group that focuses on cleaning up abandoned mine lands in the watershed of the Lake Fork of the Arkansas River, near Leadville, Colorado, which is one of Colorado's most active historical mining districts. The group formed in 2000 and is presently comprised of representatives from the BLM; CDPHE; EPA; USGS; USFS; Colorado Division of Reclamation, Mining and Safety; Colorado Mountain College; Trout Unlimited; academic institutions; local landowners; and citizens. The goal of the group is to achieve sustainable water quality and quantity within the Lake Fork area to sustain a viable cold-water fishery. The Lake Fork is a tributary to the Arkansas River that is considered a potable source of water for the Front Range population centers of Cañon City, Aurora, Colorado Springs, and Pueblo.

2.5.1.2. Hazardous Materials

Hazardous material is defined as any material that, because of its quantity, concentration, or physical or chemical properties, may pose a real hazard to human health or the environment (40 CFR 261.3). Hazardous materials include flammable, combustible, toxic, poisonous, infectious, and corrosive materials; oxidizers; aerosols; biohazards; and compressed gases.

Hazardous materials may legitimately be brought onto BLM-administered lands during authorized projects. The general types of hazardous materials that may be present during resource development projects include, but are not limited to, petroleum products (fuels and lubricants), solvents, surfactants, paints, explosives, batteries, acids, biocides, gases, and antifreeze. Many of the RGFO hazardous material incidents involve illegal disposal of hazardous materials on public lands. These types of materials include, but are not limited to, petroleum products, household wastes, paints, biocides, and methamphetamine manufacturing wastes. Most illegal dumping activity within the planning area involves solid waste, which is problematic regardless of whether hazardous materials are involved.

There are no approved hazardous waste disposal facilities within the planning area.

2.5.1.3. Geological Hazards

2.5.1.3.1. Indicators

Geological hazards include earthquakes and mass movement such as landslides, rock falls, and debris flows. Colorado's great diversity of rocks, geologic structures, soil types, topography, and climatic conditions combine to create vigorous and diverse geologic processes. When humans live in this dynamic environment, these natural processes can become problematic.

2.5.1.3.2. Current Condition

Colorado is considered a region of minor earthquake activity, with most historic activity occurring west of the Rocky Mountain Front Range. Landslide hazards are relatively limited in eastern Colorado due to the gentle slopes and semi-arid climate; however, the areas along the Hogbacks at the foot of the Front Range are susceptible to sliding, as are some of the Permian and Cretaceous rocks along the Purgatoire River in southeastern Colorado. Tertiary volcanic rocks are also

susceptible to rock failures. Landslide hazards are more predominant within the footprint of large burn scars that are becoming more common in eastern Colorado and in the foothills of the Rocky Mountains. Rock falls are a type of landslide hazard that occur in Colorado's canyons primarily in spring or during summer monsoon events.

2.5.1.3.3. Trends and Forecasts

To limit exposure to geological hazards, the RGFO needs a map combining areas of known geologic hazards within the field office planning area. The BLM should also include a geologic hazard analysis as part of the geologic resource reviews on future actions proposed on Federal lands in the RGFO.

2.5.2. Social and Economic Values

2.5.2.1. Indicators, Current Conditions, and Trends

Background

The social and economic analysis area is based on the RGFO planning area, which includes 38 counties in the eastern portion of the State (Table 1.1). A social and economic analysis of the 38 counties in the RGFO planning area provides several challenges for presenting and discussing current conditions and trends for this AMS. There is an incredible amount of diversity across the 38 counties in terms of population, economies, culture, lifestyle, amount of BLM surface lands, and the amount of BLM subsurface acreage. Given this, this section of the AMS provides a general and broad overview of the planning area by categorizing the counties by population.

Although counties may be in the same population category, they do not necessarily have similar social and economic conditions. The categories below provide a structure to broadly discuss the general social and economic conditions of such a large planning area. Given that this discussion is general in nature, a more detailed social and economic baseline report will be conducted as the NEPA process moves forward.

This baseline report will provide details about several important components of the social and economic conditions of the planning area that are not discussed in this AMS. Additional factors to be addressed in the baseline report include the following: quality of life and social well-being; the culture and history of the planning area; views and values associated with BLM resources and management actions; community infrastructure, capacity, and public finances; and a discussion of BLM resources, resource uses, and their value. This last component helps to connect many of the social and economic components to each other and to the other resources and resource uses BLM manages, such as energy development, recreation, and grazing.

Some of these components are briefly discussed below to highlight what type of information they provide and the importance of understanding them. This helps to explain why they are included in the more detailed social and economic baseline report. Much of the information and data necessary for further discussion will be obtained through the NEPA process, including during scoping. Additional components identified through public scoping and public comments may also be incorporated into the baseline report.

Quality of life/social well-being (QOL/SWB) is an integral aspect of understanding a community and its people. QOL is what brings pleasure and happiness to life and can include "feeling a part of the community where you live; knowing where you stand in relationship to other people; having a sense that you and people in your community have control over the decisions that affect your future…living without undue fear of crime or personal attack" (Branch, Thompson, Creighton, and Hooper 1982). The components of QOL can differ among individuals; however, generally speaking, many components relate to income, employment and job satisfaction, affordable housing, health, food, culture, leisure, and amenities.

QOL is often associated with individuals or families, but SWB can be evaluated at a higher level, such as for groups and communities (Fitzsimmons, Stuart, and Wolff 1977). Community SWB can provide the structure and activities that lead to a positive QOL. SWB pertains to the range of community services and community structures provided such as utilities and transportation, emergency services, health care programs, governmental organization and management, education system, recreational opportunities, land use/land development, community demographics, and economic viability.

Impacts to QOL and SWB components can be perceived differently by individuals, partly due to what they value. Additionally, Federal resource management decisions can be perceived to affect QOL and SWB differently. Understanding the current context of QOL and SWB components can help Federal resource management agencies identify stakeholders, potential key issues, areas of agreement/disagreement regarding possible management actions, and affected community services. Impacts to QOL and SWB components should be examined in terms of spatial, temporal, and linked triggered impacts (Franks, Brereton, and Moran 2011).

Community SWB is influenced by how communities and local governments are structured and the public and private services available. Many of the components related to community services and community structure directly affect an individual's QOL. In particular, the quality, availability, and cost of community services can influence the effects of those services and the perceptions of how they contribute to personal and community well-being (Branch, Thompson, Creighton, and Hooper 1982). Local community services can be affected by changes in population and demographics, which can lead to demand exceeding supply, costs of services increasing, quality of services decreasing, etc. However, if there is an increase in the tax base, services can outpace demand and additional services can be provided.

Federal resource management can influence population changes and tax bases for local communities; thus, the current situation can provide a baseline understanding that can be compared to potential future impacts. The community structure pertains to both the governmental/policy structures as well as the social organizations/groups within a community. Local government provides many community services as well as setting regulations and policies. In addition to community structure, information on community organizations also helps to provide an understanding of the community's capacity to deal with changes, the types of relationships within and across the community, leadership/power, and social processes.

Understanding the social conditions of the study area also includes understanding the views and values held by individuals or groups that are affected by or interested in natural resource issues (stakeholders). Stakeholders base their views toward BLM resources, resource uses, and management actions on the values they hold. Often, these values are the foundation for an individual's or group's focus of interest and the basis for their agenda.

It is a complex matter to fully understand the views and values of stakeholders. This is partly due to the fact that individuals and groups can hold multiple values. At times, those values could be in conflict with each other, and it is up to that individual or group to prioritize those values in order to address the issue at hand. One way to understand possible views toward BLM resources, resource uses, and management actions is to identify a range of values that are held by an individual or group. Brown and Reed (2000) developed a list of 13 typologies as a way to understand how stakeholders value natural resources. An adaptation of this list is presented below, highlighting the variety of views a person may hold toward BLM resources, resource uses, and management:

- Aesthetic—I value BLM resources and uses because I enjoy the scenery, sights, sounds, smells, etc.
- Biological diversity—I value BLM resources because they provide for a variety of fish, wildlife, plant life, etc.
- Life-sustaining—I value BLM resources because they help produce, preserve, clean, and renew air, soil, and water.
- Recreation—I value BLM resources and resource uses because they provide the opportunity for outdoor recreational activities.
- Moral/ethical—I value BLM resources in and of themselves for their existence, no matter what I or others think about those resources.
- Historical/cultural—I value BLM resources and resource uses because they provide natural and historical places and objects that matter to me or to others and/or because they allow me to continue to pass down the wisdom and knowledge, traditions, and way of life of my ancestors.
- Therapeutic—I value BLM resources and resource uses because they make me feel physically and/or mentally better.
- Scientific/learning—I value BLM resources because we can learn about the environment through scientific observation or experimentation.
- Spiritual—I value BLM resources because they provide a sacred, religious, or spiritually special place for me or because they engender feelings of reverence and respect for nature.
- Economic—I value BLM resources and resource uses because they provide timber, fish, minerals, grazing, or tourism opportunities that provide economic benefit.
- Subsistence—I value BLM resources because they provide necessary food and supplies to sustain my life.
- Future—I value BLM resources because they allow future generations to know and experience these resources.

Although the above list of value typologies is not exhaustive, it does provide a glimpse at the variety of views individuals or groups may hold toward BLM resources and resource uses. All of these are valid views, and many people may hold many of them. Conflicts surrounding BLM resources, resource uses, and management often stem from how individuals/groups prioritize their values; for example, an individual may prioritize recreational opportunities over the historical value of an area. These are broad and somewhat simplistic value typologies, and there can be

conflicts within a value typology, such as conflict between people valuing different recreational opportunities.

QOL is often associated with communities, community infrastructure, relationships among residents, educational opportunities, and the like. QOL can also be associated with the amount and quality of available resources, such as recreational opportunities and the resolution of problems related to resource activities. Other, less tangible beliefs that could affect SWB include whether or not individuals feel that they have a sense of control over the decisions that affect their future or whether the government considers their needs. The social and economic baseline report will go into more detail about specific stakeholder values and the views stakeholders have toward BLM resources, resource uses, and possible management actions within the planning area.

Population and Demographics

Population and demographic changes are instrumental to understanding a community, as they may drive many of the other changes that can occur to such things as housing, infrastructure, education, and emergency services. Population changes due to migration into or out of areas can affect local community ties and social relationships. A Federal management action that increases population or changes demographics can have social and economic impacts that ripple throughout the community. For example, an action that brings in a large workforce can have immediate impacts upon housing availability, school enrollment, employment changes, and income. Understanding past and current trends occurring in a community provides baseline information for analyzing potential future impacts.

The 2012 population in the planning area was approximately 4,595,197 residents (DOLA 2014a).[7] As mentioned above, there is considerable diversity in population numbers of the specific counties as current and past trend data indicate. The populations from 1980 to 2012 across the counties can be separated into four categories (Table 2.53). Seventeen counties ranged from 1,000 to 11,000 residents between 1980 and 2012. Seven counties ranged from 11,000 to 50,000 residents during that same time, and three counties—Elbert County, Park County, and Teller County—had populations below 11,000 in 1980 but eventually had between 11,000 and 50,000 residents by 2012.

Nine counties maintained populations between 100,000 and 650,000 residents from 1980 to 2012. Two counties—Broomfield and Douglas—did not fit well into any of the previous categories and were categorized as anomalies. Broomfield County was created in 2001 from portions of Adams, Boulder, Jefferson, and Weld Counties (U.S. Census 2014a) and has had a population ranging from 41,000 in 2001 to a little over 58,000 in 2012. Douglas County is located in the ever-increasing Denver to Colorado Springs development corridor, and its population quadrupled from 1980 to 1995 (25,153 residents to 103,839 residents) and more than doubled from 1996 to 2014 (114,713 residents to 298,167 residents).

All of the counties in the planning area have seen fluctuations in population numbers during 1980–2012. Even with population fluctuations, 28 counties had a higher population in 2012 than in 1980 (DOLA 2014a). Counties that tended to show fewer fluctuations and a more incremental increase tended to be ones with larger populations over 100,000 residents. From 2000 to 2005, the

[7]The data used for this population calculation were collected on 10/21/2014 from the Department of Local Affairs, State Demography Office-Dashboard (http://www.colorado.gov/cs/Satellite/DOLA-Main/CBON/1251590805419). Population estimates have been revised since then for 1990, 2011, and 2012; however, these revisions do not affect the categorizations of the counties.

two counties that saw the greatest average annual percent increase in population were Douglas County (6.3 percent) and Weld County (4.1 percent). The other counties that had positive average annual percent changes ranged between 0 percent and 2.8 percent. Ten counties showed a decreasing average annual percent change ranging from –1.8 percent (Baca County) to –0.01 percent (Huerfano County) for the 2000 to 2005 time period (DOLA 2014a). Seven of these counties were planning area counties with 1,000 to 11,000 residents, two of these counties had 11,000 to 50,000 residents, and one had more than 100,000 residents.

Although Huerfano County had the smallest decreasing average annual percent change in 2000–2005, it had the lowest average annual percent change in 2005–2010 (–3.2 percent). Jefferson County was the only county that had a decreasing average annual percent change for 2000–2005 but then a positive average annual percent change for 2005–2010 (DOLA 2014a). Clear Creek, Las Animas, Phillips, Saguache, and Washington Counties showed increasing average annual percent changes in 2000–2005 but then decreasing average annual percent changes in 2005–2010. Douglas County again had the greatest average annual percent increase in 2005–2010 at 3.3 percent, which is a slower increase than it had in 2000–2005. Overall, from 2005 to 2010, 11 planning area counties with 1,000–11,000 residents and 2 counties with 11,000–50,000 residents saw a negative average annual percent change. The residents of these counties also had higher median ages with all but those in one county having median ages above 40 years old.

Table 2.53. County Populations in Planning Area, 1980–2012

1,000–11,000	11,000–50,000	100,000–650,000	Anomalies
Baca County	Chaffee County	Adams County	Broomfield County
Bent County	Elbert County[a]	Arapahoe County	Douglas County
Cheyenne County	Fremont County	Boulder County	
Clear Creek County	Las Animas County	Denver County	
Crowley County	Logan County	El Paso County	
Custer County	Morgan County	Jefferson County	
Gilpin County	Otero County	Larimer County	
Huerfano County	Park County[a]	Pueblo County	
Kiowa County	Prowers County	Weld County	
Kit Carson County	Teller County[a]		
Lake County			
Lincoln County			
Phillips County			
Saguache County			
Sedgwick County			
Washington County			
Yuma County			

[a]Elbert County, Park County, and Teller County had over 11,000 residents in 1993, 1996, and 1985, respectively.

The highest average annual percent population change for 2015–2020 is forecasted to occur in Elbert County (6.6 percent) and the lowest in Phillips County (0.1 percent) (DOLA 2014b). Elbert County also has the highest forecasted average annual percent population change from 2025 to 2030 at 3.0 percent. Thirty-one counties are forecasted to have the same or lower average annual percent changes for 2025–2030 than for 2015–2020 (DOLA 2014b). This indicates that population growth will be slower during 2025–2030 than 2015–2020 for these 31 counties. Seven counties—Clear Creek, Crowley, Kiowa, Lincoln, Logan, Phillips, and Washington—will have a higher average annual percent population change for 2025–2030 than for 2015–2020 (DOLA 2014b). The population in all 38 counties is forecasted to increase for both 2015–2020 and 2025–2030.

Components of Population Change

Fluctuations in population can occur because of migration into or out of areas or because of natural increases (births) or decreases (deaths). Colorado Department of Local Affairs (DOLA) calculates migration and natural increase population changes. For migration into an area, the Colorado Department of Local Affairs (DOLA) assumes migrants are relocating for a job, for amenities, or for entrance to a specific institution such as a college, a prison, or the military (DOLA 2014c). The BLM can influence migration patterns through various actions such as energy and mineral development of BLM mineral rights or by providing recreation, beautiful views, and other amenities that people desire. Information about the different components of population change in the planning area counties helps promote understanding of how BLM actions affect local populations and what the cumulative impacts of BLM and non-BLM actions—such as county economic development efforts—could be.

For planning area counties with populations of 1,000–11,000 residents (Table 2.53), four counties had greater average and median net natural population increases for the time period 2000–2012 than for the time period 1980–1999 (Baca, Huerfano, Sedgwick, and Yuma Counties), and Crowley and Gilpin Counties had similar averages and medians for the two time periods (DOLA 2014c). Lake County showed a decrease in average net natural increase from the 1980–1999 period to the 2000–2012 period, but saw an increase in the median natural increase (DOLA 2014c). The discrepancy between the average and median natural increases is influenced by the large net natural increases in the early 1980s and smaller increases in the 2000s.

More fluctuations were seen in net migration than natural increase for the planning area counties with populations of 1,000 to 11,000 residents. The average net migration for 2000–2012 across these counties was –18.6; however, net migration within specific counties ranged from –119.7 (Lake County) to +69.9 (Custer County). Only four counties in this population category—Crowley, Custer, Gilpin, and Saguache—had a positive net migration for 2000–2012 (DOLA 2014c). Influenced by the generally low net natural increase numbers and negative net migration numbers, only six of these counties had a population increase during 2000–2012: Crowley, Custer, Gilpin, Kit Carson, Saguache, and Yuma (DOLA 2014a).

Eight planning area counties with populations of 11,000–50,000 saw a downward trend in natural increases for 1980–2012 (DOLA 2014c). Elbert County had a surge in natural increase numbers in 1995–2005 but has since seen decreasing numbers. Fremont County had a continuing surge in natural increase numbers in 2003–2012. These were also the only two counties that saw an increase in the average natural increase from 1980–1999 to 2000–2012. Natural increase was especially important for Las Animas, Logan, Morgan, Otero, and Prowers Counties to maintain their populations during 1980–2012 because of the amount of migration out of these areas (DOLA 2014c). Migration out of Otero and Prowers Counties outpaced natural increases for 2000–2012, contributing to the declining population numbers for those counties.

The considerable fluctuations in net migration played a larger role in affecting the populations in counties with 11,000–50,000 residents. Many of those counties saw considerable in-migration in the 1990s and early 2000s, which peaked around 1995 (1991–1996) for all but Logan and Prowers Counties (DOLA 2014c). Although in-migration peaked in 2001 for Logan County and in 1983 for Prowers, both counties did see unusual increases of in-migration around the year 1995. Since 1990, Chaffee County is the only county that has seen only one year with negative migration (–18 in 2006); the other planning area counties in this population category saw multiple years with negative migration. This out-migration may be caused by job loss or other economic conditions.

The net average natural increase for 2000– 2012 for the planning area counties with populations of 100,000–650,000 residents was over 3,300; however, natural increases ranged from over 5,700 in Denver County to 495.5 for Pueblo County (DOLA 2014c). Three counties—Boulder, Jefferson, and Pueblo—showed declining natural increases in 2000–2012 from the numbers in 1980–1999. This contributed to those counties having some of the lowest population increases in 2000–2012 for planning area counties in this population category (DOLA 2014a).

Of the planning area counties with populations of 100,000–650,000 residents—Boulder and Jefferson Counties—had negative net migration from 2000 to 2012 (DOLA 2014c). One major reason for Boulder County's negative net migration was the creation of Broomfield County, which subtracted an estimated population of over 21,000 people from Boulder County (U.S. Census 2014a). The creation of Broomfield County also affected Jefferson County but did not contribute much to Jefferson County's overall negative net migration: only around 1,700 people were integrated into Broomfield County from Jefferson County (U.S. Census 2014a). The largest net migration during 2000–2012 was in Douglas County, which had a net migration of over 95,000 people.

Age and Gender

The median age of the population of the planning area counties has increased over the last couple of decades. In 1990, the median age of the aggregated planning area counties was 35.1 years old and rose to 41.5 years old in 2012 and is projected to stay around 40-41 years old in 2015, 2020, 2015, and 2030 (DOLA 2013). The highest median age within individual planning area counties also increased from 41.4 years old in Sedgwick County in 1990 to 55.2 years old in Custer County in 2012. The age associated with the lowest median age within individual planning area counties also increased from 30.4 in 1990 (El Paso County) to 33.1 in 2012 (Adams County) and is projected to be between 34 and 34.5 in 2015, 2020, 2025, and 2030 (DOLA 2013). Across the planning area, 17 counties maintained an approximate median age of 30–40 years old in 1990, 1995, 2000, 2005, and 2012. Nineteen counties had approximate median ages of 40–50 years old for that same time period. Custer and Huefano Counties had a median age above 50 years old for 2010, 2011, and 2012.

The average median age in planning area counties with populations of 1,000–11,000 residents increased from 41.8 years old in 2005 to 44.9 years old in 2012. In 2012, the planning area counties with populations of 11,000–50,000 residents and 100,000–650,000 residents also saw the average median age increase to 43.6 and 36.0 years old, respectively. Jefferson County was the only county of 100,000–650,000 residents in the planning area with a median age of over 40 in 2012.

Most of the planning area counties showed similar percentages of males and females in 2012 (DOLA 2014d). Six counties—Bent, Crowley, Kit Carson, Lincoln, Fremont, and Logan Counties—had male populations greater than 55 percent, with Crowley County having over 73 percent. The higher percentage of males in those six counties was due to the adult correctional facilities located in those counties. Group quarters such as correctional facilities, nursing homes, colleges, and military quarters can affect not only overall gender proportions but also age and population fluctuations. Although BLM resources and actions tend to have little direct influence on group quarters[8], BLM actions related to energy development have the potential to affect gender proportions, because energy development jobs are most often held by males.

[8]BLM management actions may influence group quarters when those actions encourage companies to create dormitories or other group living quarters for their workforce, as sometimes occurs with energy development.

Housing

Both short-term and long-term changes in population can have a direct impact on housing availability. The type of housing available, such as single-family homes, multi-apartment buildings, etc., and whether the housing meets the needs of the residents contributes to the QOL. Different types of families (single individuals, nuclear families, extended families, etc.) may have different housing needs and desires. Sudden increases in population can cause housing shortages, especially for affordable housing, and this can be exacerbated cumulatively if there are a multitude of reasons for the rapid population increase

In addition to understanding housing availability, it's important to know the costs associated with housing—such as rent, mortgage, or property value, vacancy rates, and why places are vacant in the first place. Areas with many natural resource amenities may experience an increase in second homes—those that are used seasonally or occasionally for recreation—which could mean that there is a population in that area that may not be as involved in the community as those who live there year-round. Long-term and short-term residents may value different things about the area, which can cause conflict. Housing development is not always in sync with population needs, especially when migration in or out of the areas occurs quickly. Although Federal resource management actions generally have no direct bearing on housing, changes in population numbers and/or demographics caused by those actions can affect housing availability.

Across the planning area, the housing vacancy rate in 2012 varied from a high of 53.33 percent in Custer County to a low of 2.13 percent in Douglas County (DOLA 2012). In general, planning area counties with populations in the 100,000–650,000 range showed the lowest vacancy rates, with an average of 4.41 percent (DOLA 2012). On the basis of 2010 Census data, those vacancy rates are probably attributable to vacated rental or sale properties (U.S. Census 2010).

For planning area counties with populations of 1,000–11,000 residents, the average vacancy rate was 24.93, with a high of 53.33 in Custer County and a low of 11.75 in Yuma County (DOLA 2012). For most of those counties, the vacancy rate was mostly attributable to vacated rental or sale properties, but for six counties—Clear Creek, Custer, Gilpin, Huerfano, Lake, and Saguache—the vacancy rate was primarily due to vacated seasonal, recreational, or occasional-use housing units (U.S. Census 2010).

Five counties with 11,000–50,000 residents—Chaffee, Fremont, Las Animas, Park, and Teller—also had vacancies primarily attributable to seasonal, recreational or occasional-use housing units. Given the large percentage of second homes in those areas, if housing demand rises because of BLM management actions, high vacancy rates do not necessarily mean that housing is available, as vacated units may not actually be available to new residents.

Environmental Justice

Executive Order 12898 of February 11, 1994 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Minority populations as defined by the Council on Environmental Quality (CEQ) under NEPA are those made up of individuals in the following population groups: American Indian or Alaskan

Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (CEQ 1997). A minority population is identified as one where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater" (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997).

Low-income individuals and households are identified by the U.S. Census Bureau on the basis of poverty thresholds developed every year. U.S. Census data are used to determine whether a population residing in the study area constitutes an "environmental justice population" through meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status
- The percentage of population that is of minority or low-income status is at least 10 percentage points higher than for the entire State of Colorado.

CEQ guidance does not provide specific criteria for determining low-income populations as it does for minority populations, so for this planning effort, the BLM will use the criteria for minority populations, which are discussed above, as the criteria for low-income populations. The BLM identifies low-income and minority population percentages that are "meaningfully greater" as at least 10 percentage points higher than for the entire State of Colorado.

Data for the identification of low-income populations are from the U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE). The SAIPE program produces yearly single-year poverty estimates for states, counties, and school districts and is considered the most accurate for these geographic scales, especially for areas with populations of 65,000 or less (U.S. Census 2014b).

Minority populations are identified using the U.S. Census Population Estimates program, which provides estimates for the resident population by age, sex, race, and Hispanic origin at the national, state, and county scales. Total minority population refers to that part of the total population that is not classified as Non-Hispanic White Only by the U.S. Census Bureau. By using this definition of minority population, the percentage is inclusive of Hispanics, multiple-race categories, and any other minority single-race categories. This definition is most inclusive of populations that may be considered as a minority population under Executive Order 12898. Estimates from SAIPE and the Population Estimates program are used in Federal funding allocations.

For this AMS, the identification of environmental justice populations is conducted at the county level due to the large geographic area. Based upon the 2012 SAIPE (U.S. Census 2013) data, four counties—Bent, Crowley, Huerfano, and Saguache—have environmental justice populations in relation to poverty based upon the criteria discussed above. Adams, Bent, Crowley, Denver, Lake, Las Animas, Otero, Pueblo, and Saguache Counties meet the above criteria of environmental justice populations for minority populations when looking at total minorities. Huerfano, Morgan, and Prowers Counties meet the above criteria for environmental justice populations for Hispanic populations in their counties.

Overall, the planning area does have counties that meet the criteria for environmental populations and therefore outreach and collaborative efforts with these environmental populations should be conducted. Additionally, through the NEPA process and analysis, the BLM will determine

whether any disproportionate health or environmental impacts may occur to these environmental justice populations.

Economic Indicators and Conditions

The economic output—the quantity of goods and services produced—within the 38-county region is a function of the complex interactions of numerous internal and external economic factors. Although many of these factors may be affected by BLM actions, this report does not directly address any specific action or corresponding economic impact resulting from that action but rather identifies the current level of economic output within the 38-county region. To provide an overview of the indicators of the current economic conditions, the BLM aggregated county data in Table 2.54.

Table 2.53 illustrates that on a per-person basis, employment income is not the sole factor of economic well-being, as per-capita income exceeds average wage and salary in every county except Crowley County.[9] Additionally, per-capita income and average wage and salary are based on fundamentally different denominators, as per capita measures the total population of the county, while wage and salary are based on the number of full- and part-time workers employed but not necessarily living within the county. Accordingly, per-capita income accounts for wage- and salary-based income and the sum of all transfer payments, rents, interest, and dividends received by individuals within the county.

Additionally, the table shows that the urbanized Front Range counties have greater populations, levels of employment, wages and salaries, and per-capita income than counties in the rural eastern plains. Because of this, the loss of a job and corresponding income will have a greater economic and per-capita impact in rural counties than in urban counties. This disparity is critical, as the magnitude of the economic impact due to a change in the level of employment would be greater in a rural county than in an urban county. Further, the ability of the rural county to buffer this change may not be as robust as that of the urban county, as shown in the current energy boom (WNDEISP 2011).

It is critical to understand that BLM actions can affect wages, salaries, and per-capita income by influencing the economic outlook of the consumer or producer and modifying their behaviors. Additionally, an economic impact may not be noticeable in high-population counties with large and diverse economies, but an economic impact can be significant in counties with smaller populations and economies that lack diversity and are dependent on a few employment sectors. Further, the economic impact may be difficult to analyze due to complex situations arising from BLM actions that aim to reduce barriers to economic development or improve a community's sense of stewardship of natural resources.

Table 2.54. Population, Employment, Wage and Salary, and Per Capita Income listed by RGFO Counties[a]

County	Population	Total employment	Average wage and salary	Per capita income
Adams	459,598	227,686	$33,905.52	$34,695.00
Arapahoe	595,546	439,778	$40,922.36	$51,163.00
Baca	3,751	2,914	$12,593.00	$44,041.00
Bent	5,773	2,416	$15,995.86	$26,459.00
Boulder	305,318	243,033	$40,531.27	$53,772.00

[9]Crowley County has a large population component of adults in a State correctional facility.

County	Population	Total employment	Average wage and salary	Per capita income
Broomfield	58,298	45,585	$52,108.59	$46,346.00
Chaffee	18,150	10,844	$20,859.00	$34,301.00
Cheyenne	1,874	1,835	$16,459.40	$53,441.00
Clear Creek	9,026	9,349	$16,437.05	$60,556.00
Crowley	5,365	2,148	$19,727.65	$19,556.00
Custer	4,249	2,388	$11,515.08	$36,486.00
Denver	634,265	569,640	$50,116.63	$56,319.00
Douglas	298,215	134,754	$46,522.80	$73,516.00
El Paso	644,964	368,746	$37,290.08	$40,893.00
Elbert	23,383	8,805	$13,587.96	$48,747.00
Fremont	46,788	19,273	$26,387.28	$29,033.00
Gilpin	5,491	6,596	$34,350.67	$44,375.00
Huerfano	6,596	3,387	$16,286.98	$32,177.00
Jefferson	545,358	272,299	$41,503.02	$46,684.00
Kiowa	1,444	1,777	$12,703.43	$50,151.00
Kit Carson	8,094	5,257	$19,269.16	$42,066.00
Lake	7,338	3,670	$22,900.27	$33,707.00
Larimer	310,487	196,978	$31,578.55	$41,311.00
Las Animas	14,945	8,081	$24,538.05	$33,578.00
Lincoln	5,453	3,919	$19,691.76	$33,566.00
Logan	22,631	12,634	$24,650.78	$38,427.00
Morgan	28,472	16,464	$27,781.83	$34,752.00
Otero	18,698	9,425	$22,321.59	$32,517.00
Park	16,029	6,142	$13,117.71	$36,401.00
Phillips	4,367	2,992	$18,586.23	$41,817.00
Prowers	12,389	7,268	$21,270.23	$36,259.00
Pueblo	160,852	75,806	$30,952.31	$33,218.00
Saguache	6,108	3,156	$29,762.00	$29,187.00
Sedgwick	2,383	1,876	$14,549.04	$53,644.00
Teller	23,389	11,166	$23,476.72	$43,379.00
Washington	4,766	3,032	$15,228.56	$42,006.00
Weld	263,691	124,743	$31,393.91	$31,657.00
Yuma	10,119	6,935	$21,454.65	$50,706.00
Average	120,886	75,600	$25,587.55	$41,339.71
All Colorado	5,187,582	3,278,941	$51,211.00	$45,744.00

[a]From Bureau of Economic Analysis Personal Income and Employment Summary 2012

2.5.2.2. Employment and Output by Economic Sectors

In 2012, the 38 counties in the planning area had a Gross Regional Product of $264,613,431,289.00; with total employment of 2,836,050 and a regional population of 4,593,859. As previously stated, BLM actions can affect economic conditions, and future impacts will be analyzed using baseline economic data from the Bureau of Economic Analysis, Bureau of Labor Statistics, IMPLAN Colorado State Database, and other sources, as necessary. Employment within the 38-county region is distributed among various economic sectors as defined in the IMPLAN Colorado State Database 2012. The top 10 in terms of employment and output are shown below in Tables 2.55 and 2.56. As shown in Tables 2.55 and 2.56, sector employment size doesn't linearly correlate to sector output, and certain sectors have greater output per worker than others. Overall, this baseline socioeconomic data will be used to analyze the contributions and impacts of BLM actions in the regional planning area.

Table 2.55. Top 10 Economic Sectors by Employment in the 38-County RGFO Region[a]

Sector	Description	Employment	Output
413	Food services and drinking places	185,326	$10,879,920,000
438	Employment and payroll only (State & local govt; education)	163,153	$10,120,750,000
360	Real estate establishments	147,089	$22,328,910,000
437	Employment and payroll only (State & local govt; non-education)	98,795	$8,082,335,000
319	Wholesale trade businesses	95,770	$21,379,590,000
394	Offices of physicians, dentists, and other health practitioners	74,507	$8,855,277,000
356	Securities, commodity contracts, investments	73,499	$10,310,840,000
369	Architectural, engineering, and related services	58,822	$7,457,442,000
36	Construction of other new nonresidential structures	55,510	$6,771,562,000
440	Employment and payroll only (Federal govt; military)	54,392	$9,276,436,000

[a]From IMPLAN Colorado State Database 2012

Table 2.56. Top 10 Economic Sectors by Output in the 38-County RGFO Region[a]

Sector	Description	Employment	Output
360	Real estate establishments	147,089	$22,328,910,000
319	Wholesale trade businesses	95,770	$21,379,590,000
361	Imputed rental activity for owner-occupied dwellings	n/a	$20,113,530,000
351	Telecommunications	29,613	$19,878,640,000
413	Food services and drinking places	185,326	$10,879,920,000
356	Securities, commodity contracts, investments	73,499	$10,310,840,000
354	Monetary authorities and depository credit intermediates	27,291	$10,094,340,000
438	Employment (State & local govt; education)	163,153	$10,120,750,000
20	Extraction of oil and natural gas	28,408	$9,629,095,000
440	Employment (Federal Govt; military)	54,392	$9,276,436,000

[a]From IMPLAN Colorado State Database 2012

2.5.2.3. Non-Market Economic Indicators and Conditions

Market failure is the inability of markets to reflect the full social cost or benefit of a product or service, and it results in an inefficient allocation of resources. Market failure frequently occurs in natural resource management because of the non-excludable but rival[10] nature of common property resources that the BLM manages, such as air, recreation, water, and wildlife.

Accordingly, non-market economic factors are the costs or benefits society receives from natural resources (e.g., wildlife) and ecosystem services (e.g., water quality) that are not exchanged within a market or accounted for in aggregated measures of economic production such as gross domestic product (GDP). In natural resource management, non-market economic costs or benefits can be used to fully account for the social costs and benefits, eliminating market failure and thereby efficiently allocating common property resources.

Non-market economic values include both use and non-use values. The use value of a non-market product or service is the value society receives from its direct or indirect use. Examples of this are the direct value of hiking a trail or the indirect value of the increased property values of houses that border public lands. Non-market, non-use values are those society attributes to a resource beyond its current use. Non-use values include existence, option, and bequest values. An existence value is the amount society is willing to pay for a resource to exist in a certain

[10]See http://www.pitt.edu/~upjecon/MCG/MICRO/GOVT/Pubgood.html for an explanation of "non-excludable but rival."

ecological state. An option value is the amount society is willing to pay for future use. A bequest value is the amount society is willing to pay for use by future generations.

The non-market economic value of both use and non-use values can be estimated using a number of econometric or statistical tools that investigate a consumer's willingness to pay for a non-market good or service. Specifically, use values can be estimated from transaction data and sales receipts using econometric tools that examine the increase in marginal price that consumers are willing to pay for—for example—a less populated trail or a housing unit bordering public lands.

On the other hand, estimating non-use values requires survey data that evaluate consumers' preferences for existence, option, and bequest values. Traditionally, studies based on consumers' revealed preferences that use transaction data have been preferred to survey-based studies using stated preferences, because stated preferences can be exaggerated and are not backed up by a binding transaction. However, because of advances in experiment design and econometric theory used in contingent valuation and choice modeling, stated-preference data can provide better estimates of non-market values, as stated-preference studies can be constructed to estimate a specific resource or ecological condition, while revealed-preference studies are subject to the complexities of social interaction and the natural world.

Another method of estimating non-market economic value is cost avoidance, which establishes the value of a resource as the cost required to avert its damage, degradation, or destruction. Cost avoidance can be either passive or active. One example of passive cost-avoidance is estimating the value of stream-side erosion buffers by measuring the cost of removing sedimentation from a downstream area. An example of active cost-avoidance is estimating the value of forest thinning by subtracting the cost of thinning and the cost of measures to reduce the risk of catastrophic wildfires from the value of the wood product. In both examples, natural resource management tools are used to protect resources and avoid direct economic costs while maintaining ecosystem services.

Regardless of the tool used to evaluate non-market resource value, it is important to understand that economics provides a model or abstraction of the real world. As such, economic analysis should be used to inform—not define—management decisions.

Chapter 3. Current Management Direction

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3.1. Introduction

This chapter describes the current management direction provided by the existing RMPs and amendments for the RGFO. The current management will become the basis for the no action alternative in the new Eastern Colorado RMP/EIS. Current management direction from an existing RMP determined to be still valid may be carried forward to the new Eastern Colorado RMP/EIS as an element of an action alternative. For each resource and resource use, the AMS will identify the management objectives (desired outcomes) and management decisions (land use allocations, allowable uses, and restrictions). The RMPs and amendments currently in place for the RGFO are described in Table 3.1 below.

Table 3.1. Relevant Plans and Amendments

Document	Year	Description
Royal Gorge Resource Area RMP (BLM 1996)	1996	Resource management plan managing public land and Federal mineral estate for southeast Colorado.
Northeast RMP (BLM 1986b)	1986	Resource management plan managing public land and Federal mineral estate for northeast Colorado.
Colorado oil and gas leasing EIS (BLM 1991c)	1991	Amendment to Northeast resource area RMP for oil and gas leasing.
Arkansas River TMP (BLM 2008d)	2008	Amendment to travel management in the Royal Gorge Resource Area RMP for the Arkansas River subunit.
Gold Belt TMP (BLM 2004a)	2004	Amendment to travel management in the Royal Gorge Resource Area RMP for the Gold Belt subunit.
Box Creek vegetation and TMP (BLM 2004c)	2004	Amendment to vegetation and travel management decisions in the Royal Gorge Resource Area RMP for Box Creek.
South Park land tenure adjustment plan (BLM 2009b)	2009	Amendment adjusting land tenure and classification in the South Park region based on updated information and newly discovered resource values.
Amendment to standards for public land health (BLM 1997)	1997	Amendment to decisions common to all areas C-25 from prescribed fire. Formerly, prescribed fire could be used as a management tool to enhance other resources; this amendment allowed prescribed fire and prescribed natural fire to be used as a management tool to enhance other resources.
Designation of energy corridors on BLM-administered lands in 11 western states (BLM 2009a)	2009	Amendment to the Royal Gorge Resource Area RMP to designate corridors.

3.2. Resources

3.2.1. Air Quality and Climate

Royal Gorge Resource Area RMP

Management objectives

- Air quality degradation will be minimized through strict compliance with Federal, State, and local regulations and implementation plans.

Management decisions

- Air quality impacts from prescribed burns are limited by BLM Manual 7723, *Air Quality Maintenance Requirements*, which requires a State-approved open burning permit prior to implementation.
- Additional management activities include monitoring, analysis, and impact mitigation on a project-specific basis, which ensures compliance with applicable regulations and implementation plans.

Northeast RMP

Management objectives

None stated.

Management decisions

- All public lands are in the "General" (attainment or unclassified areas) category, where Federal prevention of significant deterioration Class II or Colorado State Category II standards apply.
- Projects will be designed to minimize air pollutants and will be monitored by the Colorado Air Pollution Control Division to ensure that standards are not exceeded.

3.2.2. Geology

Royal Gorge Resource Area RMP

Management objectives

No objectives indicated.

Management decisions

No decisions.

Northeast RMP

This resource is covered under Geologic Features and Hazards in the Northeast RMP.

Management objectives

No objectives indicated.

Management decisions

- Concern Area (17A)—Presence of significant geologic features or hazards is known or suspected on 6,630 acres. Management actions will be based on field investigations to develop surface protection requirements for preserving the scientific and scenic values of significant geologic features. Field investigations and possible detailed engineering studies will be made to avoid or mitigate problems due to geologic hazards. When management actions are considered for such an area, they will include protective stipulations.

- None (17B)—Occurrence of significant geologic features or hazards is unknown on 30,460 acres. Field investigations during the environmental analysis process and/or new information about features or hazards could change the classification to Concern Area.

3.2.3. Soil Resources

Royal Gorge Resource Area RMP

Management objectives

- Specific objectives for soils are generally lacking. General management objectives are to avoid soil erosion and loss of watershed values throughout the planning area.

Management decisions

- Manage soil-disturbing activities to avoid soil erosion and loss of watershed values.
- Standards with stipulations for other resource actions will decrease erosion and potentially enhance watershed characteristics.

Northeast RMP

Management objectives

- Specific objectives for soils are generally lacking. Management objectives in general are to limit soil erosion.

Management decisions

- The BLM will design projects and implement best management practices in order to prevent unacceptable soil loss, restore soil stability, and/or return soil productivity.

3.2.4. Water Resources

Royal Gorge Resource Area RMP

Management objectives

- Specific objectives for water are generally lacking. General management objectives are to maintain or improve existing water quality.

Management decisions

- Acquire water rights, in compliance with State law, in support of BLM programs.
- Continue to implement the Bureau water use inventory and water rights program in the Area.
- Maintain minimum State water quality standards for all activities.
- Continue to maintain or improve water quality in accordance with State and Federal standards. BLM will consult with the appropriate State agencies.

- Design management actions on BLM-administered lands within designated municipal watersheds to protect water quality and quantity.
- Continue monitoring selected groundwater and surface water stations in cooperation with the USGS.
- Interface watershed activity planning with existing plans as appropriate.
- Make watershed activity planning a component of integrated activity plans (IAPs) in areas where livestock grazing plan adjustments do not fully correct any determined water quality problems.
- Ensure that monitoring and evaluating water quality and quantity, as well as controlling erosion and sediment production, remain high priority management goals.
- Continue to emphasize all watershed activities that provide protection, maintenance, and enhancement of the watershed resources.
- Continue to take an active role in control of nonpoint source pollution on BLM-administered lands. Non–point-source control projects will be implemented as funding and manpower allow.

Northeast RMP

Management objectives

- Specific objectives for water are generally lacking. General management objectives are to maintain or improve existing water quality.

Management decisions

- Protection of critical watersheds and floodplains will go into effect immediately.
- Modifications and developments within the 100-year floodplain must not interfere with the natural beneficial functions of the floodplain nor create hazards to life or property without proper mitigation.
- Impacts to water quality will be minimized by stipulations in project design. Preventative practices such as runoff control devices, proper logging practices, proper road location and design, maintenance of vegetative cover, and confinement and treatment of pollutants will be included to minimize potential pollution.
- Non-BLM vested water rights will be recognized, respected, and protected.
- Water rights to sources needed for BLM management purposes will be acquired according to Colorado water law.
- Water rights acquired by BLM and/or its licensees will not cause harm to other vested water rights.

3.2.5. Terrestrial Wildlife

Royal Gorge Resource Area RMP

Management objectives

- All BLM-administered lands will be considered for protection and enhancement of wildlife habitat values.
- Monitoring of the existing habitat management plans and critical big game winter range, birthing areas, and raptor sites will continue.
- Conflicts with other uses (e.g., livestock grazing, mineral development, etc.) will be resolved in favor of achieving vegetation management goals.
- Non-game wildlife will be managed consistently with *A Fish and Wildlife Plan for Colorado: Program for the Decade* (BLM 1990).

Management decisions

- Wildlife habitat will be managed to maintain and enhance habitat values. Conflicts with other uses (e.g., livestock grazing, mineral development, etc.) will be resolved in favor of achieving vegetation management goals.
- Big game birthing habitat will be limited as follows:
  - Closed to mineral entry[1]
  - Closed to mineral materials disposal
  - Excluded from major rights-of-way (ROWs)
  - Off-highway vehicle (OHV) use limited to designated roads and trails
- Major ROWs will avoid big game birthing and critical winter range.
- Identified use conflicts with big game critical winter range will be addressed through cooperative efforts with Federal and State agencies and private groups.
- Wildlife habitat will be available for fluid leasing with no surface occupancy (NSO) stipulations as follows:
  - Raptors (including golden eagle, osprey, all accipiters, buteos, owls, and falcons except kestrel) will have an NSO of 1/8-mile radius from nest site.
- Wildlife habitat will be available for fluid leasing with the following seasonal stipulations:
  - Big game critical winter range (12/1–4/30).
  - Big game birthing habitat
    - Elk calving (4/16–6/30)
    - Pronghorn antelope fawning (5/1–7/15)
    - Bighorn sheep lambing (5/1–7/15)

[1]Note that an RMP can recommend a withdrawal, but that is a decision process outside of the land use plan.

  - Wild turkey winter habitat (12/1–4/1)
- Wildlife habitat will be seasonally limited for mineral operations as follows:
  - Big game critical winter range (12/1–4/30)
  - Raptor nesting and fledgling habitat (3/1–7/31)
  - Wild turkey winter habitat (12/1–4/1)

Northeast RMP

Management objectives

- Maintain or improve habitat to meet the objective of the Colorado Parks and Wildlife (CPW) strategic plan (CPW 2002).
- Management may be provided through cooperative management agreements with an appropriate State or Federal wildlife agency or through the development of a habitat management plan.

Management decisions

- All BLM-administered surface estate is placed in one of the two following categories: important or general.
- The criteria used to determine important habitat are as follows:
  - Threatened or endangered species habitat
  - Crucial or important seasonal habitat for game species or Federal/State high-interest species
  - Important riparian habitat
- The BLM will specify project design features that will be developed during the environmental analysis process to maintain or improve important habitat.
- General habitat has no important wildlife values that are currently identified.
- Before any major action occurs on general habitat, the BLM will conduct inventories to determine whether any important values are present.
- General wildlife habitat will be protected by considering wildlife concerns in the EAs of proposed actions and incorporating stipulations and mitigation measures.
- Wildlife habitat that is available for fluid leasing may have the following seasonal stipulations:
  - Mule deer: 4/1–12/15
  - Bighorn sheep and mule deer: 7/1–12/15
  - Bighorn sheep and elk: 7/1–12/15
  - Wild turkey: 8/1–3/31

- Waterfowl: 7/1–3/31
- Raptors: 7/1–2/15
- Elk calving: 7/1–4/30

3.2.6. Aquatic Wildlife

Royal Gorge Resource Area RMP

Management objectives

- The BLM will maintain existing stream fisheries. Improvements in condition and stability will be accomplished through riparian, wildlife, forestry, grazing, and recreational programs where the potential exists.
- Supplemental releases and re-introduction of native fish species could be authorized by the area manager following environmental analysis.
- Sustain aquatic habitat quality, as any changes in fishery habitat quality could cause an increase or decrease in populations dependent on that habitat. A direct relationship exists between habitat quality and populations.

Management decisions

- Maintain all existing stream fisheries.
- Accomplish improvement in condition and stability through riparian, wildlife forestry, grazing and recreation programs where potential exists.
- Supplemental releases and reintroductions for native fish species could be authorized following environmental analysis.

See also Special Status Species (section 3.2.9), where pertinent to aquatic wildlife.

- Conflicts between fishery habitat and other values (e.g., livestock grazing, mineral development, etc.) will be resolved in favor of the fishery habitat.
- All streams will be protected through standard lease terms for fluid minerals; locatable mineral entry closures except for recreational placering; mineral material disposal closures; and limiting OHV use to designated roads and trails.
- All fishery habitat activity planning will be accomplished within IAPs.

See also Special Status Species (section 3.2.9), where pertinent to aquatic wildlife.

Northeast RMP

Management objectives

- Specific objectives for aquatic wildlife are generally lacking. Management objectives are general for aquatic wildlife and are under "Wildlife" in the Northeast RMP (issue No. 3), which states that important wildlife habitat will be protected and refers to important riparian habitat.

Management decisions

No specific decisions indicated.

3.2.7. Vegetation

Royal Gorge Resource Area RMP

Management objectives

- To attain a stable watershed and soil condition based on site potential. Vegetation manipulation practices or other techniques will also be used, if necessary.
- Noxious weeds will be managed consistently throughout the planning area according to the principles of integrated pest management (IPM) and the Colorado Noxious Weed Act (Colorado Revised Statutes, Title 35, Article 5.5).
- The BLM will develop cooperative efforts with county weed boards to control infestations. Chemical, cultural, mechanical, and biological control methods will be used.
- Noxious weed EAs will be linked to the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (BLM 2007c).

Management decisions

- Identify site-specific resource objectives, including specific desired plant community, in IAPs. In most cases, this will result in a reasonably diverse community of grasses, shrubs and trees.
- Monitor the overall trend, condition, and forage production of vegetation. These factors are expected to improve.
- Manage vegetation as follows: to accomplish other BLM initiatives (e.g., riparian, wildlife, etc.); improve forage conditions through cooperative efforts (e.g., Colorado Habitat Partnership Program); manage forest lands for enhancement of other values; develop desired plant condition objectives for all IAPs; and monitor vegetation on an interdisciplinary basis.
- No management decisions regarding noxious weeds are identified in the RMP.

Northeast RMP

Vegetation (including noxious weeds) not identified in the Northeast RMP.

3.2.8. Wetlands and Riparian Resources

Royal Gorge Resource Area RMP

Management objectives

- Manage riparian areas to maintain or achieve a properly functioning level.
- Inventory riparian areas on a priority basis.
- Continue to improve management with implementation of Bureau guidance to maintain and /or improve current conditions in riparian zones.
- Prior to implementation, assess all actions within riparian areas for the effects on the resource.
- Limit fluid mineral operations by conditions of approval in standard stipulations or controlled surface use.

Management decisions

- Continue to improve management with implementation of Bureau guidance to maintain and /or improve current conditions in riparian zones.
- Prior to implementation, assess all actions within riparian areas for the effects on the resource.
- Eliminate grazing on riparian habitat in poor condition.
- Limit fluid mineral operations in riparian areas by controlled surface use stipulations.
- Achieve properly functioning condition for 75 percent of all riparian areas by 1997.
- Close perennial riparian areas to locatable mineral entry except for recreational placering, close to mineral material disposal, and limit all OHV use to designated roads and trails.
- Complete riparian area inventories and map them as soon as possible.
- Emphasize interdisciplinary support for riparian restoration.
- Reflect riparian objectives in all IAPs.

Northeast RMP

Management objectives

- Specific objectives for riparian resources are generally lacking. Management objectives are general for aquatic wildlife and are covered under "Wildlife" (issue No. 3) in the Northeast RMP, which states that important wildlife habitat will be protected and refers to important riparian habitat.

Management decisions

No specific decisions indicated.

3.2.9. Special Status Species

Royal Gorge Resource Area RMP

Management objectives

- T&E and sensitive species and plant communities will be inventoried and monitored as necessary to provide information for proper management.
- Limitations on fluid minerals will be based on 2.5 million acres of subsurface, which includes the 653,000 acres of BLM-administered surface land. Other limitations will be based only on surface acres.
- Supplemental releases and reintroduction of Federal and State-listed endangered, threatened, candidate, and sensitive species will follow environmental analysis and consultation with FWS, CPW, and other affected parties.
- Federal agencies are directed by the Endangered Species Act (ESA) to avoid actions that further jeopardize listed and sensitive species and to enhance these species when possible.
- There will be full compliance with Section 7 of the ESA before invoking specific actions resulting from RMP decisions. This requires mandatory consultation and coordination with the FWS and clearance of lands inhabited by these species.
- Inventory analysis and monitoring will be done for special status animal species.
- Sensitive animal species habitat will be retained in public ownership.
- Clearance of special animal species will be completed for all proposed management actions.
- Intensive recreation management will be limited to protect existing and potential sensitive species habitat.

Management decisions

- Protection and enhancement of special status plants and animals will be continued by eliminating identified and verified land uses that conflict with these species.
- The relict plant community in high Mesa Grasslands and *Eutrema penlandii* habitat will be protected as follows:
  - ACEC designation
  - No surface occupancy
  - Closed to mineral entry
  - No disposal of mineral materials
  - OHV restrictions
- *Eriogonum brandegeei* will be managed in Droney Gulch and Garden Park through ACEC designation as follows:
  - Limit livestock grazing
  - No surface occupancy
  - Close to mineral management

  - No disposal of mineral materials
  - Limit OHV use to designated roads and trails
- Special status animal habitat will be available for fluid leasing in conformance with the ESA as follows:
  - Peregrine falcon nesting habitat
- Special status animal habitat will be available for fluid leasing with seasonal stipulations as follows:
  - Ferruginous hawk nesting and fledgling habitat (2/1–8/15)
  - Bald eagle winter roosting habitat (11/16–4/15)
  - Mexican spotted owl habitat (2/1–7/31)
  - Peregrine falcon habitat (3/16–7/31)
  - Mountain plover (4/10–7/10; South Park only)
  - Least tern/piping plover (4/1–7/31)
- Special status animal habitat will be closed to mineral entry and mineral material disposal as follows:
  - Peregrine falcon nesting habitat
  - Mexican spotted owl nesting habitat
- Special status animal habitat will be seasonally limited for mineral operations as follows:
  - Ferruginous hawk nesting and fledgling habitat (2/1–8/15)
  - Bald eagle winter roosting habitat (11/16–4/15)
  - Mexican spotted owl habitat (2/1–7/31)
  - Peregrine falcon habitat (3/16–7/31)
  - Mountain plover (4/10–7/10; South Park only)
  - Least tern/piping plover (4/1–7/31)
- Mexican spotted owl will have an NSO stipulation within 1/2-mile radius around core area.
- Canada lynx conservation measures found in Chapter 7 of *Canada Lynx Conservation Assessment and Strategy* (Interagency Lynx Biology Team 2013) will be incorporated in special status animal species management. Conservation measures will be applied to all resource management programs and activities within designated lynx habitats in lynx analysis units (LAUs).
- In regards to lesser prairie chicken and fluid mineral management, the following applies:
  - No surface occupancy within 0.60 mile of an active lek (active within the last three years)

- Timing limitation stipulation that prohibits fluid exploration and development activities and mineral operations from March 15–July 15, within 2.20 miles of an active lek (active within the last three years)

Northeast RMP

Management objectives

- Maintain or improve habitat to meet the objective of CPW's strategic plan (CPW 2002).
- Management may be provided through cooperative management agreements with an appropriate State or Federal wildlife agency or through the development of a habitat management plan.

Management decisions

- All BLM-administered surface estate will be placed in one of two categories: important or general.
  - Important habitat is defined as follows:
    - Threatened or endangered species habitat
    - Crucial or valuable seasonal habitat for game species or Federal/State high-interest species
    - Valuable riparian habitat
  - Specific project design to maintain or improve important habitat will be developed during the environmental analysis and will include appropriate BLM specifications.
  - General habitat is habitat that has no currently identified important wildlife values:
    - Before any major action occurs on general habitat, inventories will be done to determine if any important values are present.
    - General wildlife habitat will be protected by considering wildlife concerns in the EAs of proposed actions and incorporating stipulations and mitigation measures.
- Wildlife habitat that is available for fluid leasing may have the following timing limitation stipulations:
  - Bald eagle winter roosts (within one-half mile of roost site): 11/16–4/15
  - Bald eagle nesting (within one-half mile of nest site): 12/15–6/15
  - White pelican nesting and foraging: 3/16–9/30
  - Mexican spotted owl nesting and fledgling habitat: 2/1–7/31
  - Peregrine falcon cliff nesting complex (within one-half mile radius): 3/16–7/31
  - Ferruginous hawk nesting and fledgling habitat (within one-mile radius of nest site): 2/1–8/15
  - Osprey nesting and fledgling habitat (within one half-mile radius of nest site): 4/1–8/31

- Wildlife habitat available for fluid mineral leasing may have the following no surface occupancy stipulations:
  - NSO within one-quarter mile of bald eagle roost or nest site. The NSO applies to the essential feature of the winter roost complex. The NSO area may be altered depending on the active status of the roost or the geographical relationship of topographic barriers and vegetation screening. There are no exceptions for nest sites.
  - NSO within one quarter-mile radius of peregrine falcon cliff nesting complex.
  - NSO within one quarter-mile radius of Mexican spotted owl roost and nesting sites.
  - NSO in significant waterfowl and shorebird production areas.
  - NSO in habitat areas with special status plant species (federally listed, proposed, and candidate species)

3.2.10. Wildland Fire Ecology and Management

Royal Gorge Resource Area RMP

Management objectives

- The original RMP (BLM 1996) stated the following:
  - All BLM-administered lands in the resource planning area will be managed for total fire suppression.
  - No conditional suppression acres will be considered.
  - There will be no anticipated rotational use of prescribed fire within the planning area. Prescribed fire could be used as a management tool to enhance other resources.
- There was an amendment to the RMP for public land health (BLM 1997). This amendment changed the decisions to allow prescribed fire and prescribed natural fire to be used as management tools to enhance resources. This was to clarify that fire prescriptions may be written for natural ignitions also.

Management decisions

- The original 1996 RMP (BLM 1996) stated that all BLM-administered lands would be managed for total fire suppression. The 1997 amendment allowed prescribed fire or prescribed natural fire to be used as a management tool to enhance other resources. This was to clarify that fire prescriptions may be written for natural ignitions also.
- No rotational use of prescribed fire is anticipated (this was in the original RMP but changed with the amendment).
- The desired plant community will be described and fire projects will be initiated through IAPs prior to fire prescription.

- A specific burn plan will be prepared, including NEPA documentation, in advance of a prescribed burn.

Northeast RMP

Management objectives

- All BLM-administered surface estate will be placed in one of two categories, based on the type of wildfire protection needed.
- All acres will be in the "Open" category. Proposals for prescribed burning (11 A, B) will be reviewed through the EA process to determine acceptability and to design the burn project.

Management decisions

- The prevention and suppression of wildfire will be accomplished on 22,520 acres by either a memorandum of understanding or a cooperative agreement.
- Wildfire protection through a special cooperative agreement was historically not considered necessary for these acres of surface estate because of the rarity of fire occurrence. If a fire occurs, reimbursement may be provided to the appropriate suppression agencies.

3.2.11. Cultural Resources

Royal Gorge Resource Area RMP

Management objectives

- Maintain informational potential[2] of historic properties for as long as possible, through fostering avoidance, protection, and conservation.
- Actively manage historic properties through proactive inventory; interpretation; data recovery and recording; research; protection; and monitoring.

Management decisions

- Use the informational potential of historical resources for interpretation and scientific values and specific sites will be used for their interpretive values.
- Develop the informational potential of archaeological resources to the maximum extent possible through appropriate study.
- Enhance conservation of historical and archaeological resources through the following means:
    - Designate Browns Canyon and Arkansas Canyonlands as ACECs, with potential NRHP sites (Leadville Stage Road, Midland Railroad Railbed, and DeRemer Forts) leased for fluid minerals under standard leasing stipulations but closed to locatable mineral entry and mineral material development.
    - Limit OHV use to designated roads and trails.

[2]Informational potential is how much information it is still possible to retrieve from a site.

- Promote the informational potential of historical and archaeological resources through involvement with educational institutions.
- Develop active programs for interpretive scientific and recreational use of historic sites, within IAPs.

Northeast RMP

Management objectives

- Identify cultural resources on BLM land.
- Protect known sites.
- Protect sites from destruction by BLM undertakings using avoidance or physical measures.

Management decisions

- Protect all sites consistently with their designated significance.
- Make provisions for site protection during activity planning.
- Protect all significant sites from potential adverse effects by maintaining public control.

3.2.12. Native American Concerns

Royal Gorge Resource Area RMP

Not identified.

Northeast RMP

Not identified.

3.2.13. Paleontological Resources

Royal Gorge Resource Area RMP

Management objectives

- Manage paleontology in accordance with existing BLM manual guidance.
- Conduct cyclic inventories of Class I and some Class II paleontology areas. Update existing inventories as needed.
- Various educational programs using paleontological resources could be developed on a case-by-case basis.

Management decisions

- Manage paleontological resources in accordance with existing BLM manual and other guidance, requiring clearances (in Class I filtered areas) and necessary mitigation in Class I and other areas identified as having specific indications of scientifically significant fossils.
- Encourage use of fossil resources for educational, research, and other public uses—such as tourism—with special emphasis on the Garden Park Fossil Area.
- Encourage conservation of Class I paleontological resources with ACEC designation and manage as follows in the Garden Park Fossil Area ACEC: close to timber harvesting and wood gathering; no surface occupancy; close to mineral entry; close to mineral material disposal unless disposal will enhance paleontological values; retain in public ownership; limit livestock grazing; limit OHV use to designated roads and trails.
- Consider establishment of invertebrate collecting areas to provide fossil materials for public domain collections through IAPs.
- Establish a "discovery" center for the Garden Park Fossil Area in cooperation with the Garden Park Paleontological Society.

Northeast RMP

Management objectives

- Protect paleontological resources using project surveys conducted as part of the EA.

Management decisions

- A. Class Ia: areas where immediate detailed follow-up study is needed. Fossils of scientific interest are exposed on the surface, or are very likely to be discovered during detailed field work in the area. This classification is used for site-specific localities having scientifically significant fossils. As such sites are discovered, the following management practices will be implemented:
  - Preserve by avoidance or stabilization.
  - Collect and interpret through excavation by qualified paleontologists.
- B. Class Ib: other areas having a high potential for scientifically significant fossils. In these areas, a paleontological evaluation will be done by the geologist, on a case-by-case basis, prior to any surface-disturbing activity. These evaluations will change this classification to Class Ia, Class II, or Class III, as appropriate.
- C. Class II: areas with evidence of fossils, but the presence of fossils of scientific value has not been established and is not anticipated. Detailed study may be desirable in the future for the evaluation of all types of fossil collecting. This classification may identify recreational values in fossils.
- D. Class III: areas with little likelihood of finding fossils of use. No further consideration of fossils is necessary unless future discoveries require a change of classification.

3.2.14. Visual Resources

Royal Gorge Resource Area RMP

Management objectives

- Maintain high quality visual resources and sensitive scenic values on BLM-administered lands.

Management decisions

- Use existing visual resource management (VRM) classes to guide resource management actions on BLM-administered lands. Adherence to criteria will be according to respective class rating.
- Manage wilderness areas as VRM Class I.
- Protect VRM Class II areas by a CSU stipulation for oil and gas activities.
- Re-evaluate visual ratings in ACECs to ensure rating is appropriate to protect outstanding qualities.
- Require contrast rating forms for high impact projects or proposed projects in highly sensitive areas.
- Complete a brief narrative visual assessment for all projects that require an EA or EIS.
- Accomplish all activity planning for visual resources within IAPs.

Note that the Royal Gorge Resource Area RMP (BLM 1996) did not provide a summary of acreages under VRM Classes I, II, III, and IV.

Northeast RMP

Management objectives

- Protect scenic quality by identifying VRM classes for all public lands and incorporating the class standards into design of management actions during environmental analysis.

Management decisions

- Do not allocate any lands as VRM Class I.
- Allocate 13,970 acres as VRM Class II. Any management activity in VRM Class II should not be evident in the characteristic landscape. Although the activity may be seen, it should not attract attention.
- Allocate 12,600 acres as VRM Class III. Management activity in VRM Class III may be visible and attract some attention, but should remain subordinate to the surrounding landscape.
- Allocate 10,520 acres as VRM Class IV. Management activity in VRM Class IV may be the dominant feature in the landscape in terms of scale but should repeat the basic characteristics of the landscape.

3.2.15. Lands with Wilderness Characteristics

Royal Gorge Resource Area RMP

Not addressed in 1996 RMP (BLM 1996).

Northeast RMP

Not addressed in current RMP.

3.3. Resource Uses

3.3.1. Recreation

Royal Gorge Resource Area RMP

Management objectives

- Continue to provide intensive recreation management on lands along the Arkansas River and the Gold Belt Tour Area as special recreation management areas (SRMAs), and manage the remaining lands as an extensive recreation management area (ERMA).
- Continue a proactive approach in the use of volunteers, and pursue the development of partnerships in support of recreational opportunities throughout the planning area.
- Provide visitor safety and resource protection as necessary.

Management decisions

- Existing developed sites will be withdrawn from mineral entry; those recreation sites over 10 acres will be leased for fluid minerals with NSO stipulations, closed to livestock grazing if conflicts occur, excluded from major ROW/corridor development, and retained in public ownership.
- Recreation will be managed intensively in the Gold Belt (126,248 acres) and Arkansas River (109,063 acres) SRMAs, and regional tourism opportunities will be enhanced.
- The Royal Gorge ERMA will be managed non-intensively in all other subregions.
- Recreation will be managed to provide a variety of recreational opportunities and settings; to provide additional opportunities for mountain biking, hiking, OHV use, interpretation, and horseback riding; and to provide facilities to reduce user conflicts and to improve visitor health and safety.
- Various actions will occur to enhance recreation in all subunits except Badger Creek (subregion No. 3), Cucharas Canyon (subregion No. 9), and other lands (subregion No. 10). These actions include river corridor and upland recreational opportunities emphasizing a balance between resource protection and tourism; coordination with various volunteer user groups; monitoring and visitor contacts to ensure visitor safety, resource protection, and visitor information availability; provide for acquisitions or easements to enhance mountain biking, OHV use, hiking, horseback riding, hunting, and natural/cultural resource interpretation.
- Motorized OHV recreational opportunities will be enhanced
- Information materials for motorized OHV recreational opportunities will be developed, including incorporating public awareness of nation programs.

- Media, informational materials, and physical barriers will be used to encourage users to stay on roads and trails.
- Partnerships will be developed with local or regional OHV clubs/groups to assist in coordinating and enhancing OHV recreational opportunities.
- Trails and trailhead facilities for OHV use will be established to meet public demand.
- All activity planning for OHV use will be accomplished within IAPs.

Northeast RMP

Management objectives

- Use the extensive (dispersed) type for general management of recreational opportunities within the resource area. Identify and manage intensive or special recreation management areas according to a permit or site-specific plan.

Management decisions

- The planning area has five broad types of classes of recognized recreational opportunities ranging from largely natural and low use areas to highly developed and intensively used areas:
  - SPNM (Semiprimitive non-motorized)—Management techniques will maintain 360 acres characterized by a predominantly unmodified natural environment of a size or location that provides a good to moderate opportunity for isolation from the sights and sounds of man. The area is large enough to permit overnight foot travel within the area and presents opportunity for interaction with the natural environment with moderate challenge, risk, and use of a high level of outdoor skills.
  - SPM (Semiprimitive motorized)—Management techniques on these 10,780 acres include low-key on-site controls and regulations that effectively prevent resource damage by vehicle use. Some minimal facilities for user safety and protection of resource values are provided. Low to moderate intergroup contacts occur. Motorized use is permitted and provided by maintenance of primitive road or motorized trail systems. Some road/trail construction occurs to enhance recreational travel opportunity. Roads may be closed seasonally for the benefit of other resources. This class provides/maintains areas characterized by a predominantly unmodified natural environment in a location that provides good to moderate isolation from the sights and sounds of man, except for facilities/travel routes sufficient to support motorized recreational travel opportunities, which present at least moderate challenge, risk, and a high degree of skill testing.
  - RN (Roaded natural)—Management techniques on these 13,270 acres provide on-site controls and regimentation for security. Rustic facilities are provided for user convenience, safety, and resource protection. Management actions may include enhancement, site hardening, and other activities. Developed sites provide for moderate density. Other resource activities harmonize with the overall sense of natural surroundings. These areas are characterized by a predominantly natural environment with evidence of moderately permanent alteration of resources and resource use. Evidence of the sights and sounds of man is moderate, but in harmony with the natural environment. Opportunities exist for both social interaction and moderate isolation from the sights and sounds of man.

- R (Rural)—Management techniques on these 11,520 acres include extensive facilities, both public and private, designed for high density use. Facilities are geared toward specific activities and intensive motorized use and parking. High density use provides opportunity for social interaction, not for isolation. Visitor activities may frequently be restricted to prevent environmental or facility damage. This class provides/maintains areas characterized by a substantially modified natural environment. Sights and sounds of man are evident. Renewable resource modification and utilization practices enhance specific recreational activities or provide soil and vegetative cover protection.

- U (Urban)—These 1,160 acres are characterized by unnatural, highly modified, and highly modernized surroundings. Design is for intensive use and user comfort and convenience. Urban opportunities may occur as part of the support facilities for other intensive recreational development on BLM lands. However, development should be done by the private sector.

3.3.2. Livestock Grazing

Royal Gorge Resource Area RMP

Management objectives

- Adjustments in the actual animal unit months (AUMs; temporary increase or decrease) will be authorized and made when warranted by weather or other conditions.

- An environmental assessment (EA) will be needed before a term permit is issued for acquired land outside the existing allotment boundary. Temporary livestock grazing could be allowed, pending an EA on completion of acquisition of these lands.

- Traditionally, allotment management plans (AMPS) have been used to prescribe management objectives and achieve the grazing management programs. AMPS will continue to be used on an interim basis until replaced with integrated activity plans (IAPs).

- Monitoring studies will be continued or established depending on management category, which will determine monitoring intensity. The highest intensity monitoring studies will occur on the “Improve” category allotments. The specific type of studies will be determined by the IAP objectives.

- All grazing allotments in the planning area have been assigned to one of three management categories: Maintain, Improve, or Custodial. The Maintain category allotments generally will be managed to maintain current satisfactory resource conditions; Improve category allotments generally will be managed to improve resource conditions; and Custodial category allotments will receive custodial management to prevent resource deterioration. The management category for an allotment could be replaced through a range program summary (RPS) after the RMP/EIS is completed only if the category criteria status of the allotment and/or monitoring studies, plus an allotment evaluation, indicate a change is warranted.

- Based on monitoring studies, corrective action will be taken if IAP objectives are not being met. Livestock use adjustments will most often be made by changing one or more of the following: class of livestock, season of use, stocking rate, or the grazing management system. Although most livestock use adjustments will occur in me Improve category allotments, use

adjustments could occur in the Maintain and Custodial category allotments. Changes will be made through an EA or AMP revision.

- Grazing capacity accuracy on Custodial category allotments will be determined. Current poor condition allotments with ecological site inventory (ESI) data will be re-evaluated, and appropriateness of management levels of use to meet current objectives will be determined. An ESI will be conducted on allotments with conflicts, and stocking rates and season of use will be adjusted accordingly.

- Cattle drift from BLM-administered land onto uncontrolled adjacent private land will be controlled. Livestock grazing will be excluded in historical sites if a threat of damage exists, and in developed recreation sites.

- Current trends in livestock market conditions in the planning area will continue for the life of the plan. Livestock values will, therefore, fluctuate the same as at present. Assessments of impacts to vegetation are based on expectations of normal precipitation during the life of the plan. Long-term grazing use levels are based on the effectiveness of the AMP process, through evaluation of monitoring information (e.g., utilization studies and actual use data), and modifications of those use levels as the need occurs.

Management decisions

- Base livestock grazing management on the 1981 Royal Gorge Area Grazing EIS. Continue to use AMPs on an interim basis until replaced with IAPs.

- Authorize adjustments in the actual AUMs (temporary increase or decrease), and make these adjustments when warranted by weather or other conditions.

- Prepare an EA before a term permit is issued for acquired lands outside the existing allotment boundary. Temporary livestock grazing could be allowed, pending an EA on completion of acquisition of these lands.

- Continue with or establish monitoring studies, depending on management category.

- Determine the specific type of monitoring studies by considering the IAP objectives.

- Conduct an ESI on allotments with conflicts, and adjust stocking rates and season of use accordingly. Re-evaluate current poor condition allotments with ESI data and determine the appropriateness of management levels of use to meet current objectives. Based on monitoring studies and after an evaluation, corrective action will be taken if AMP or IAP objectives are not being met. Changes in livestock use will be made through an EA or AMP revision.

- Grazing systems will be implemented by an IAP. Plans will be prepared in consultation, cooperation, and coordination with the permittee and other affected parties to meet multiple use and land use plan objectives.

- Determine the grazing capacity accuracy on Custodial allotments.

- Continue to construct range improvement projects on an as-needed basis. Complete NEPA documentation on each project as needed.

- Continue with land treatments as a management practice. Complete NEPA documentation on each project as needed.

- Allocation of additional forage resulting from improved management or vegetation manipulation will be to livestock or wildlife or a combination of both on a case-by-case basis after consulting with State and Federal agencies and private groups and the affected grazing permittee.
- Adjustments in grazing use will be made by allotment on a case-by-case basis. Changes in number of livestock, season of use, duration of use, and class of livestock can be made based on monitoring studies and inventory data.
- The grazing treatment on Improve and Maintain category allotments will require a rest standard to allow a time period for forage species to recover from the last grazing period before the plants are re-grazed.
- Maximum allowable utilization on allotments with rotational grazing or dormant season grazing will be 80 percent of annual production on grass species and 60 percent of annual production on shrub species. These percentages may have to be reduced on specific allotments because of conflicts with wildlife, watershed conditions, or riparian habitat.
- On single pasture allotments with season-long spring/summer grazing, hold utilization to the 40–60 percent range on forage species in lieu of a rest standard. This requirement will be on high elevation allotments where deferment or dormant season use is impractical because of deep snow, and fencing the allotment into smaller units is uneconomical. On these allotments, make utilization estimates on a key species to prevent over-utilization of desirable species.
- Season of use and stocking rates will continue based on the grazing EIS and vegetation monitoring.
- Livestock grazing will be prioritized based on IAP resolution of conflicts with riparian, critical wildlife habitat, and ACECs.
- Grazing is authorized on 454 allotments.
- Grazing is excluded on Mosquito Pass ACEC (4,036 acres) and restricted on the High Mesa Grasslands portion (1,454 acres) of the Arkansas Canyonlands ACEC.
- Grazing is excluded on developed recreation sites and potential NRHP sites if conflicts occur.
- Livestock drift onto uncontrolled private land will be eliminated through BLM fencing, cooperative projects, or by eliminating grazing.
- Allotments are categorized as follows: Improve, Maintain, Custodial, or Unalloted.
- Grazing stocking rates and season of use will be adjusted on the Droney Gulch ACEC (705 acres).
- Grazing will be excluded on potential NRHP sites if conflicts occur.
- Grazing is excluded on a portion of the Beaver Creek ACEC (5,755 acres).
- Stocking rates and season of use will be adjusted in the Garden Park ACEC (2,728 acres).
- Season of use for grazing will be adjusted on two ACECs (subregion No. 7).

- Grazing will be excluded on the potential NRHP district if it becomes designated (subregion No. 9).

Northeast RMP

Management objectives

- All leases will be renewed annually on normal termination if appropriate until disposal or transfer of the land is made. Any new lease granted will be reviewed annually for renewal and leased on the agreement that cancellation may occur at any time as land tenure changes are completed.

Management decisions

- Leased (5A)—Currently 5,385 acres are leased for livestock grazing. Through custodial level management, provide for use up to the grazing capacity as determined by field examination with adjustments made if necessary after monitoring. Grazing on public land must occur in conjunction with the lessee's normal operation. Improvements must generally be operator initiated, developed, and maintained. Examples of improvements include, but are not limited to, fences and water developments such as stock water impoundments and spring developments. Monitoring of grazing use, range condition, and trend will provide indications of needed improvements or possible changes in grazing use.

- Open (5B)—Determine suitability of leasing for grazing through the EA process after application by a qualified livestock operator. The following criteria used in this determination could preclude grazing:

  - Slopes greater than 50 percent

  - Further than 4 miles to water on the plains; 1 mile in the Front Range

  - Soil surface factor (erosion susceptibility) greater than 60

  - Forage production requiring more than 32 acres per AUM

  - Land ownership or control for a logical lease unit conflicts with other resources

  - Application of these criteria may result in a decision that the land is either unsuitable or suitable for grazing. If unsuitable, the application would be rejected and the area reclassified to "Closed." If suitable, the lease would be granted and the area reclassified to "Leased."

- Closed (5C)—These lands are not available for grazing. They are either unsuitable using the criteria listed under "Open," have no potential, or have more value for other uses not compatible with grazing. Do not accept applications for grazing on these lands.

3.3.3. Farmlands Prime and Unique (Agricultural Use)

Royal Gorge Resource Area RMP

Farmlands (agricultural use) are not identified in the 1996 RMP (BLM 1996).

Northeast RMP

Management objectives

No management objectives are identified.

Management decisions

- Open (9A)—No public lands were found to be prime or unique according to the State's publication, *Important Farmlands of Colorado* (Heil and Anderson n.d.). Identify locally suitable agricultural crop production lands by comparing agricultural value to the other resources present. If the applied for area is found suitable, authorize use by lease or sale. Permit agricultural use on an annual basis with the stipulation that cancellation may be imposed at any time as tenure changes are worked out.
- Closed (9B)—These lands are not available for agricultural use. They are either unsuitable, lack potential, or are more valuable for other uses. Do not accept applications.

3.3.4. Forestry

Royal Gorge Resource Area RMP

Management objectives

- Forest and woodland management will be implemented on an extended rotation, even-age basis.
- Silvicultural and site preparation methods that result in natural regeneration will be the primary reforestation methods and will be the emphasis in sale design.
- Commercial forest and operable woodlands will be managed to enhance special status animal habitat. All others not slated for harvest will be available for retention, maintenance and/or re-establishment of old growth and mature forests.
- Appropriate timber stand harvest and improvement will be used to enhance most other resources. Rangeland resources will not be affected.
- Timber harvesting and wood gathering will occur in special status habitat only for enhancement of the protected species.
- New road construction will benefit management through reduction of transportation costs, which will reduce harvest costs.

Management decisions

- Forest and woodland management will be implemented on an extended rotation, even-age basis. Uneven-age management is not precluded but will not occur on significant acreage.
- Silvicultural and site preparation methods that result in natural regeneration will be the primary reforestation methods and will be the emphasis in sale design.
- Determine desired plant community in all disturbed sites.

- Manage commercial forest and operable woodlands to enhance special status animal habitat.
- Forest lands allocated for other resource values are available for retention, maintenance and/or re-establishment of old growth and mature forests.
- New road construction will benefit management through reduction of transportation costs, which will reduce harvest costs.
- Productive forested lands will be managed for sustained yield.
- A portion of the forested lands will be available for intensive management.

Northeast RMP

Management objectives

- Forest product sales will continue on areas identified for forest management to meet demand and maintain forest productivity. All BLM-administered surface estate will be classified in one of four categories based on timber production capability classification (TPCC) inventory and resource conflicts.
- For decision 4A lands: The forest management objective for these productive sites is to provide a sustainable timber harvest through the limits of a yearly allowable cut. Harvesting will be accomplished through controlled timber sales to commercial loggers and family firewood cutters. Cutting practices will be limited to those providing for natural regeneration of the timber stand and protection of site productivity.
- For decision 4B lands: The forest management objective is to protect these productive lands from fire, pests, and disease until local technology is available to include them for harvest in the yearly allowable cut. Forest management will include direct pest control, mortality salvage, fire control, and controlled harvest by firewood cutters.
- For ecision 4C lands: The forest management objective is to protect these unproductive, fragile lands from loss of forest cover. Forest management will be limited to direct pest control, mortality salvage, and limited and controlled harvest by firewood cutters.

Management decisions

- Available—There are 2,270 acres suitable as intensively managed commercial forest lands available for timber harvesting. These include two forest inventory classes: non-problem and restricted. Non-problem areas will be easily managed for timber production, and restricted areas will require special consideration for management.
- Unavailable—Currently 15,570 acres suitable as less intensively managed commercial forest lands are unavailable for general timber harvesting. These include two forest inventory classes: withdrawn-fragile gradient and adverse location. Withdrawn-fragile gradient lands have shallow, droughty, steep, and easily erodible soils. Adverse location results from small size, steep slopes, and fragile soils.
- Noncommercial—There are 800 acres suitable as less intensively managed noncommercial forest lands unavailable for general timber harvesting. These include the forest inventory class withdrawn-low site. These sites produce less than 20 cubic feet of wood per acre per year.

- Non-forest—There are 18,450 acres of land less than 10 percent stocked with commercial tree species. Generally, any management of trees will be for the purpose of improving or maintaining other resource values.

3.3.5. Fluid Minerals

Royal Gorge Resource Area RMP

Management objectives

- Determine which BLM-administered mineral estate within the 2.5 million acres of the planning area is available for fluid mineral leasing.
- Consider which, if any, additional mitigative measures or stipulations are necessary for protection of the environment and other resource values.

Management decisions

- Geophysical exploration operations will be subject to the same management decisions and subsequent effects as identified for fluid minerals leasing and development.
- Voluntary compliance by lessees and operators with the decisions of the RMP will be encouraged, if and when operations are conducted, even though existing fluid minerals leases will not be modified.
- Most mineral rights on BLM-administered lands identified for disposal will be retained.
- Lands with low-value minerals could be disposed of in some instances.
- BLM-administered mineral estate will be open to fluid minerals leasing, exploration and production subject to the lease terms and applicable lease stipulations as shown in Appendix A of the RMP/ROD.
- Fluid minerals leasing may occur on certain lands with an NSO stipulation to protect the following:
  - Raptor nesting/fledging habitat
  - Sensitive special status plant areas (High Mesa Grasslands/Mosquito Pass)
  - Chaffee County Landfill
  - Developed recreation sites
  - Reservoir ROWs
- Fluid minerals within BLM WSAs will not be leased pending a final designation by Congress. Any congressionally designated wilderness lands will be withdrawn from leasing. Lands not designated will return to multiple use management subject to the applicable ARMP/ROD decisions.
- Fluid mineral leasing may occur on certain lands with timing limitations to protect wildlife:

  - Elk calving / deer birthing habitat
  - Bighorn sheep lambing habitat
  - Big game critical winter habitat
  - Wild turkey winter habitat;
  - Mexican spotted owl habitat
  - Bald eagle winter roosting habitat
  - Peregrine falcon nesting habitat
  - Mexican spotted owl confirmed roosting and nesting sites
  - Ferruginous hawk nesting/fledging habitat
  - Lesser prairie chicken habitat
  - Least tern/piping plover nesting habitat
- Fluid mineral leasing may occur on certain lands with a controlled surface use stipulation to protect certain areas:
  - VRM Class II areas
  - Perennial riparian areas
- Fluid mineral leasing conditions of approval (COAs) will be applied to operational activities (geophysical notices of intent—NOIs, applications for permit to drill—APDs, and sundry notices) as determined necessary by the authorized officer to protect other resources and values within the terms, conditions, and stipulations of the lease. This list of the most common COAs is found in Appendix G of the 1996 Draft RMP/EIS. Activity planning will be accomplished within IAPs.
- Fluid mineral leasing may occur on certain lands with an NSO stipulation to protect the following:
  - Raptor nesting/fledging habitat
  - Sensitive special status plant areas:
  - High Mesa Grasslands/Mosquito Pass
  - Garden Park
  - Droney Gulch ACEC
  - Arkansas Canyonlands ACEC (High Mesa Grasslands portion)
  - Chaffee County Landfill
  - Developed recreation sites
  - Reservoir ROWs

- Park County Landfill
- Mexican Spotted Owl confirmed nesting sites
- Lesser prairie chicken leks

Northeast RMP

Management objectives

No management objectives indicated.

Management decisions

- The Northeast RMP categorized all BLM-administered surface and appropriate subsurface estate in one of five categories for oil and gas leasing:
  - Standard (21A)—These 210,410 acres of surface and subsurface may be leased and developed for oil and gas with the standard stipulations included in leases and other standard site-specific stipulations included in any use authorization. Existing contractual controls (lease form, operating regulations, operating orders, and notice to lessees) provide substantial latitude within which the Bureau may require modification to the siting, design, and timing of operations on leaseholds. Surface resources are protected by controlling surface disturbance and reclamation. Specific conditions generally relate to the location of drilling, vehicle use, and improvements. Protection of drainages, water bodies, springs, wildlife habitat, steep slopes, and fragile soils is required. Activities that may adversely affect these values will be suspended, modified, or restricted if and when necessary. Significant cultural resources must be evaluated and adverse impacts mitigated.
  - Seasonal (NSO) (21B)—All of the requirements listed above also apply to this category of land. However, in addition, these 83,830 acres of surface and subsurface have certain values identified that require drilling activities take place only during a certain portion of the year. These values include recreation and important wildlife habitat. Seasonal stipulations do not apply to maintenance or operation of producing wells. An annual exception may be specifically authorized in writing by the BLM district manager. In the RMP technical report for oil and gas, the numbers in Table 3.2 below are used to identify the permitted time periods for drilling operations and the reasons for the restrictions.
  - Year-long (NSO) (21C)—These 12,740 acres of surface and subsurface have resource values of sufficient importance to disallow any oil and gas activity, because the surface cannot be physically occupied (e.g., reservoirs). Such a lease may be issued for “drainage”; that is, a well adjacent to these lands may drain oil and/or gas from under the leased area. In unusual circumstances, a well may be slant-drilled from a location adjacent to the restricted area so the hole bottoms out at some point directly under the leased lands. Exceptions to this limitation may be approved by the BLM district manager, on a case-by case basis.
  - Open (21D)—These 57,180 acres of surface are open to lease application for a case-by-case review. When a lease application is received, these lands are considered for lease after a specific suitability determination is made. Then the lands are placed in one of the other categories. This procedure is necessary because of insufficient resource information or the necessity to coordinate with or obtain the consent of other Federal, State, or local agencies.

- Unsuitable (21E)—These 1,870 acres of surface and subsurface cannot be leased nor developed. Areas are designated for no leasing where subsidence due to the withdrawal of oil and gas may be a hazard to surface structures (such as large dams). Regulations in 43 CFR 3101.1-l(b)(3) prohibit leasing within incorporated cities, towns, and villages. Areas withdrawn from the mineral leasing laws by executive or congressional actions are also unsuitable. An application for lease on any of these lands will be rejected. If previously leased, development of the existing lease will be subject to necessary development stipulations to mitigate possible environmental damage and provide for safety of operations while still allowing development to proceed.

Table 3.2. Oil and Gas Timing Stipulations in the RGFO

Number	Permitted time period for development	Reason
1	4/11–12/15	Mule deer
2	7/1–12/15	Bighorn sheep and mule deer
3	7/1–12/15	Bighorn sheep and elk
4	8/1–3/31	Wild turkey
5	4/15–11/15	Bald eagle
6	10/1–3/15	White pelican
7	7/11–3/31	Waterfowl
8	7/15–3/28	Greater prairie chicken
9	7/1–2/15	Raptors
10	10/15–5/15	Recreation protection
11	7/1-4/30	Elk calving

3.3.6. Solid Minerals

Solid minerals include locatable minerals, saleable minerals, and solid leasables.

Royal Gorge Resource Area RMP

Management objectives

- BLM-administered lands respond mostly to changes in market prices over time, rather than to changes in land management plans. Price changes in minerals or the amount of minerals that can be produced in the future on these lands cannot be predicted. Thus, minerals are not valued for the trade-off analysis, but are considered during the decision-making process.

- Areas will be open to mineral entry and available for mineral material development; administered under existing regulations; limited by closure if necessary; and special mitigation will be developed to protect values on a case-by-case basis.

Management decisions

- Areas will be open to mineral entry and available for mineral material development under standard mineral operating practices.

- Areas will be open to mineral entry under timing limitations and available for mineral material development under a seasonal limitation through claimant/operator notification to protect the following (which apply in varying combinations to all subunits):

  - Big game critical winter habitat
  - Wild turkey winter habitat
  - Raptor nesting/fledging habitat
  - Mexican spotted owl habitat
  - Bald eagle winter roosting habitat
  - Peregrine falcon habitat
  - Ferruginous hawk nesting/fledging habitat
  - Lesser prairie chicken habitat
  - Least tern/piping plover nesting habitat
- Closures and limitations will be reviewed and necessary changes made within IAPs.
- An analysis will be done to locate and establish community mineral materials pits within IAPs.
- Class I paleontological areas and developed recreation sites will be closed to mineral entry.
- Disposal of mineral materials will not occur within WSAs.
- Perennial riparian areas will be closed to locatable mineral entry, except for recreational placering, and closed to mineral materials disposal.
- All withdrawals for water power/reservoir sites will be revoked in subunits 1 and 3.
- New withdrawals (i.e., areas closed to mineral entry and mineral material development) will be issued in order to protect the following (which apply in varying combinations to all subunits):
  - Perennial riparian areas
  - Big game birthing habitat
  - Fishery habitat
  - Special status plant habitat
  - Special status animal habitat
  - Portions of ACECs
  - Potential NRHP sites
  - VRM Class II within ACECs
  - Developed recreation sites
  - Arkansas River corridor (from Leadville to Pueblo Reservoir)
  - WSAs

Northeast RMP

Management objectives

These objectives apply to both locatable and salable minerals.

- Disposal of subsurface estate will be subject to site-specific study, analysis, review, and public input on a case-by-case application basis.
- Continued minerals management of subsurface estate by BLM.

Management decisions

Locatable minerals

- Available—Mining claims may be located on these 103,290 acres of surface and subsurface.
- Concern Area—These 141,140 acres of surface and subsurface are open to location of mining claims as noted above, but other important resource values have been identified
- Closed—These 105,850 acres of surface and subsurface are or should be closed or restricted from the location of mining claims. In Appendix B [of the Northeast RMP], "Closed" indicates lands that should be withdrawn from the location of mining claims for the protection of other resource values, which could be irreparably harmed by the development of locatable minerals.

Salable minerals

- Open—Mineral materials may be sold on application and after approval of an operating plan and an EA on 108,324 acres of surface and subsurface.
- Concern Area—These 138,160 acres of surface and subsurface are also "Open," but other important resource values have been identified. Site-specific stipulations will be required to protect these resource values. If impacts to these values caused by mineral material extraction cannot be satisfactorily mitigated, the application will be rejected.
- Closed—These 103,240 acres of surface and subsurface have other identified resource values that would suffer unacceptable and irreparable damage should mineral material extraction take place. Applications for these areas will not be accepted.

3.3.7. Coal

Royal Gorge Resource Area RMP

Management objectives

- Existing leases will be continued. In all disturbed areas, the desired plant community will be determined.
- The coal screening process will be used to determine areas to be further considered for leasing: Only areas with potential for development will be considered; areas that meet the 20 standard coal unsuitability criteria will be further considered; areas that pass the surface owner screen

will then be further considered. Areas acceptable for coal leasing will be prioritized for timely scheduling and completion of data collection.

Management decisions

- Determine desired plant community for all disturbed areas.
- Use the coal screening process to determine areas to be further considered for leasing: Only areas with potential for development will be considered; areas that meet the 20 standard coal unsuitability criteria will be further considered; areas that pass the surface owner screen will then be further considered.
- Prioritize for timely scheduling and completion of data collection areas acceptable for coal leasing.
- Areas will be identified for further consideration of future coal leasing; coal unsuitability criteria will provide protection of resource values.

Northeast RMP

Management objectives

- Determine which lands should remain available for further consideration for the leasing of coal. Determine what impact the leasing for coal exploration and development would have and what effect other management would have on coal availability.

Management decisions

- Suitable —There are areas that are within known recoverable coal resource areas (KRCRAs) or other areas that as the result of an application were assessed as suitable for coal leasing under the criteria found in 43 CFR 3461; lands are suitable if none of the 20 unsuitability criteria apply.
- Open—These are coal lands that are open to application for coal leasing, but have not been assessed in the manner described above. Lands applied for will be assessed under the 20 unsuitability criteria described above, and those areas found unsuitable will not be leased. Open areas are not within KRCRAs or other areas already assessed, but they may have some coal potential.
- Unsuitable—These are areas that are found to be unsuitable for coal leasing under the 20 criteria found in 43 CFR 3461.
- None—These are lands that do not contain coal beds of the Denver and/or Laramie Formations and are therefore closed to applications.

3.3.8. Renewable Energy

Royal Gorge Resource Area RMP

Management objectives

Not addressed.

Management decisions

Not addressed.

Northeast RMP

Management objectives

Not addressed.

Management decisions

Not addressed.

3.3.9. Travel and Transportation Management

Royal Gorge Resource Area RMP

Management objectives

- All BLM-administered lands in all eco-subregions will be formally designated in the Federal Register as open, limited, or closed.
- Comprehensive transportation planning will be maintained.

Management decisions

- The transportation system will be improved and maintained to facilitate public access and administrative monitoring.
- The following areas will be closed to OHV use: all WSAs (until congressional action occurs), Deer Haven Ranch, and 31 Mile Ranch.
- The following areas will be designated as open areas: Grand Canyon Hills, Reese Gulch, Texas Creek Gulch, Sand Gulch and Penrose Chaining Area. Note that these areas are currently designated as limited to OHV use. This designation was made through plan amendment.
- All other areas will be designated as limited to OHV use and will be limited to existing roads and trails until road designations are determined within activity level plans.
- Direct travel to a suitable parking site within 300 feet of an existing or designated road or trail will be authorized if damage to the land or streams will not occur.
- In all areas disturbed by OHV activities, the desired plant community will be determined and necessary actions taken to mitigate the impact.
- Roads and trails that are not maintained and not needed will be closed.

Northeast RMP

Management objectives

- All BLM roads and trails will be engineered for durability, safety, and expected use, and they will be designed to provide adequate drainage and minimize soil erosion.

Management decisions

- The entire resource area will be open to off-road vehicle (ORV) uses except for 132 acres just south of Ward (Unit No. 602, southern portion). Other areas may be limited to ORV use on a site-by-site basis when limitations are identified and the need arises.

3.3.10. Utility Corridors and Communication Sites

Royal Gorge Resource Area RMP

Management objectives

Utility corridors

- Corridors are the preferred location for future major ROWs (power lines greater than 115 kV and gas pipelines greater than 8 inches in diameter). Corridors outside exclusion and avoidance areas will be 3 miles wide.
- Public lands will be open to development of major utility facilities. Stipulations and mitigation measures will be developed on a project basis.
- Existing ROWs and the *Western Regional Corridor Study* (WRCS) (WUG 1993) will be considered when designating utility corridor locations.
- Avoidance areas for major ROWs are areas with values that could be adversely affected by new major ROWs. Major ROWs (i.e., reservoirs and communication sites) can be granted in avoidance areas only when a feasibly designated corridor is unavailable. Existing corridors along major facilities through avoidance areas recommended for designation by the WRCS will be only 1/2 mile in total width. New corridors proposed through avoidance areas will be diverted around the area if possible.
- Exclusion areas for major ROWs are areas with values that would be adversely affected by new major ROWs. Major ROWs will not be granted in exclusion areas unless mandated by law. WSAs will be treated as exclusion areas.

Communication sites

- Objectives for managing communication sites are not identified in the 1996 Royal Gorge Resource Area RMP (BLM 1996).

Management decisions

The BLM will adopt the WRCS (WUG 1993) recommendations for major ROW corridor designation.

3.3.11. Land Tenure

Royal Gorge Resource Area RMP

Management objectives

- Land ownership adjustment opportunities (by sale, exchange, or acquisition) will be used to improve BLM-administered public land patterns for management efficiency to enhance public values and to reduce potential for land use conflicts. The BLM will acquire land from willing sellers to meet priority needs for resource management. Suitability for disposal by specific authority will be determined on a case-by-case basis through NEPA compliance.

- In land ownership adjustments, it is desirable to avoid splitting surface and mineral estate, and it is also desirable to reunite split estate through acquisition or disposal when opportunities arise and appropriate regulatory requirements are met. High-potential mineral resources will be retained even if the estate is split. Developed recreational sites will be retained in public ownership.

- Land ownership adjustments (i.e., increases and/or decreases in BLM-administered public lands) will be made. Preference will be given to those adjustments that provide the most benefits to the public. Emphasis will be on increasing usable public resources (e.g., access or riparian zones). Various methods of land ownership adjustment will be considered and will be accomplished according to FLPMA. In all cases, fair market value will be received for lands sold, and lands or interests of equal value will be received in exchanges.

- All land adjustments identified will be completed during the life of the plan. The adjustments will block up BLM-administered public lands, and isolated BLM tracts will be available for disposal. WSAs, developed recreation sites, historic properties, and special status species plant and animal habitat (nesting/fledgling areas) will not be disposed of.

- A total of 183,041 acres were identified for possible disposal through sale or exchange under the 1996 Royal Gorge Resource Area RMP (BLM 1996).

Management decisions

- Retain and acquire public land that is accessible to the public and provides values for public use.

- Limit land ownership adjustments to the following:

  - Sales of Category I lands that have been identified as difficult/uneconomical land parcels with no significant resource values and are not within WSAs.

  - Exchanges of Category II lands that have not been identified for retention when the result would clearly be in the best interest of the public and BLM management will be improved.

  - Dispose of Category III lands through exchange, recreation and public purpose (R&PP) lease, or transfer, until identified as Category I or II.

- Use land ownership adjustment opportunities to improve patterns in BLM-administered land for management efficiency, to enhance public values, and to reduce potential for land use conflicts.

- Include the following land ownership adjustments:

  - Acres for disposal:

    - Subregion 1—1,999

    - Subregion 2—1,356
    - Subregion 3—324
    - Subregion 4—15,858
    - Subregion 5—18,076
    - Subregion 6—3,101
    - Subregion 7—739
    - Subregion 8—6,163
    - Subregion 9—0
    - Subregion 10—55,146
  - Acres for disposal through exchange, lease, or transfer:
    - Subregion 1—22,332
    - Subregion 2—1,065
    - Subregion 3—9,295
    - Subregion 4—41,923
    - Subregion 5—5,664
    - Subregions 6, 7, 8, 9, 10—0
  - Acres for retention or exchange:
    - Subregion 1—100,556
    - Subregion 2—53,948
    - Subregion 3—24,973
    - Subregion 4—12
    - Subregion 5—108,661
    - Subregion 6—67,044
    - Subregion 7—47,460
    - Subregion 8—56,541
    - Subregion 9—1,866
    - Subregion 10—6,453
- Ensure sales of BLM-administered public lands are consistent with the criteria established in Sec. 203 of FLPMA.

- Acquire land from willing sellers to meet priority needs for resource management.
- Determine suitability for disposal by specific authority on a case-by-case basis through NEPA compliance.
- Avoid splitting surface and mineral estate, and reunite split estate through acquisition or disposal when opportunities arise and appropriate regulatory requirements are met.
- Retain high-potential mineral resources even if the estate is split.
- Retain BLM developed recreational sites in public ownership.
- Receive fair market value for lands sold, and receive lands or interests of equal value in exchange.
- Complete all identified land adjustments during the life of the plan.
- Do not dispose of WSAs, historic properties, or special status species plant and animal habitat.

Royal Gorge Resource Area RMP South Park Amendment

Management objectives

- The Royal Gorge Resource Area RMP's South Park amendment (BLM 2009b) reduced the acreage identified for possible disposal through sale or exchange from the 57,781 acres identified under the Royal Gorge Resource Area RMP (BLM 1996) to 13,283 acres for the South Park subregion.

Northeast RMP

Management objectives

- Public lands will be administered to provide for or serve the present or future needs of the American people.
- A total of 17,104 acres were identified for possible disposal through sale or exchange under the Northeast RMP.
- The required criteria for land ownership adjustments will be considered by the BLM when preparing EAs for proposals to adjust land ownership.
- Lands with public value (retention or public disposal categories) may be exchanged for lands with public values of national interest. Changes may be made from the public (or retention) category to private disposal when an EA review determines that private values actually are predominant.

Management decisions

- Categorize BLM-administered public land by its ability to serve present or future public needs:
  - For retention—public values appear to be significant
  - For disposal—public and/or private interests are served

  - For specific review based on two main factors of national interest:
    - Location or relative scarcity of goods or services
    - Capacity for revenue production
- Prioritize land status adjustments through exchange, transfer, sale, or other available methods by considering the following:
  - Actions requiring minimal analysis and review
  - Present applications
  - Exchange opportunities
  - Public/private value situations involving coordination
  - Specific review areas
- Acquiring easements will be pursued if it becomes necessary to obtain access for a land status change or for a specific resource management need.

Actions requiring extensive analysis and review

The trend within the BLM is to make land tenure adjustments through land exchanges. Because land sales are generally avoided, with the exception of parcels located close to urban areas, it is unlikely that public lands will be sold in the near future.

3.3.12. Rights-of-Way and Land Use Authorizations

Royal Gorge Resource Area RMP

Management objectives

- Existing ROWs and the WRCS (WUG 1993) study will be considered when designating utility corridor locations.
- Corridors for major ROWs: The preferred location for future major ROWs (for power lines greater than 115,000 V and gas pipe lines greater than 8 inches in diameter). Corridors outside exclusion and avoidance areas will be 3 miles wide.
- Avoidance areas for major ROWs: Major ROWs and area sites (e.g., reservoirs and communication sites) could be granted only when a feasibly designated corridor is unavailable. Existing corridors along major facilities through avoidance areas recommended for designation by WRCS (WUG 1993) will be only 1/2 mile in total width. New corridors proposed through avoidance areas will be diverted around the area if possible.
- Exclusion areas for major ROWs: Major ROWs and area sites will not be granted, unless mandated by law. WSAs will be treated as exclusion areas.
- Minor ROWs: Local-purpose power lines, pipelines, communication lines and sites, and other types of ROWs will be allowed only when a clear need is demonstrated, and the beneficial

environmental effects outweigh the costs. Minor ROWs will be authorized on a case-by-case basis using criteria for ROW objectives in each specific eco-subregion.

- Concentrated areas with existing major utility facilities and proposed corridors of the WRCS (WUG 1993) will be established as designated utility corridors. Future major ROWs will be restricted to these corridors unless appropriate justification is provided to do otherwise. Avoidance areas will be designated where siting and construction are difficult and detailed analysis will be required to develop stipulations. Exclusion areas will be designated where siting is virtually impossible; only a thorough review and EIS analysis could justify locations in these areas, and significant stipulations would be necessary. Developed recreation sites (80 acres) and potential new developed sites will be avoidance areas in all eco-subregions.

Management decisions

- The WRCS (WUG 1993) recommendations for corridor designation will be adopted for major ROWs with the addition of existing transportation utility corridors. ROW corridors will be 3 miles wide.
- Minor ROWs will be authorized on an individual basis outside of exclusion areas and could be authorized in avoidance areas when stipulations are implemented to protect resource values.
- ROWs will be excluded from certain areas to protect the following:
  - Wilderness study areas (Subregions 1, 2, 5, 7)
  - Raptor nesting fledging areas (Subregions 1, 5, 6, 7, 8, 10)
  - Special status plants (Subregions 1, 2, 5)
  - Special status animals (Subregions 1, 2, 5, 10)
  - Potential National Register of Historic Places (NRHP) sites (Subregions 1, 3, 5, 7, 8)
- ROWs will be avoided in certain areas to protect the following:
  - Big game birthing habitat (Subregions 1, 2, 3, 4, 5, 6, 8, 10)
  - Big game critical winter habitat (Subregions 1, 2, 3, 4, 5, 6, 10)
  - VRM Class II areas within ACECs (Subregions 1, 2, 5, 7)
  - Developed recreation sites (Subregions 1, 5, 7)
- Corridors are the preferred location for future major ROWs.
- Corridors outside exclusion and avoidance areas will be 3 miles wide.
- Major ROWs and area sites will be granted in avoidance areas only when a feasibly designated corridor is unavailable.
- Existing corridors along major facilities through avoidance areas recommended for designation by WRCS (WUG 1993) will be 1/2 mile in total width.
- New corridors proposed through avoidance areas will be diverted around the area if possible.

- Major ROWs or area sites will not be granted in exclusion areas unless mandated by law.
- Local purpose power lines, pipelines, communication lines and sites, and other types of ROWs will be allowed only when a clear need is demonstrated, and the beneficial environmental effects outweigh the costs.
- Minor ROWs will be authorized on a case-by case basis, using criteria for ROW objectives in each specific eco-subregion.
- Subregional decisions will specify whether there are specifically designated ROW corridors and whether any additional areas are excluded from ROWs or other land use authorizations.

Northeast RMP

Below are excerpts from the Open Space (page 12), Road and Trail Standards (page 18), Use Applications (page 19), and Unauthorized Use (page 19) sections of the Northeast RMP (BLM 1986b).

Management objectives

- Authorizations to use the surface estate of public land will be administered based on the need to protect the open space value.
- All use applications will be processed and evaluated on an individual basis.
- Roads will be engineered for durability, safety, and expected use, and they will be designed to provide adequate drainage and minimize soil erosion.
- Unauthorized uses of public lands will be eliminated.

Management decisions

- Surface estate will be managed under two open space categories:
  - Important—applied in areas surrounded or encroached by residences or urban growth and managed to retain the natural appearance and to provide a park-like area.
  - General—protection not needed; projects will be acceptable that consider the surrounding land uses, State and local plans, and public preferences.
- Applications for various authorized uses will be processed on an individual basis. Each will be analyzed for the following:
  - Consistency with land uses
  - Adjoining land uses
  - Legal access
  - Conflicting resource values
  - Public need
  - Highest and best use of the land

  - Coordination with State and local agencies

- All applications will be handled in a timely manner

- Roads will be constructed to meet above engineering and design objectives, and counties will be consulted to ensure that their standards will be met or exceeded for permanent transportation system roads.

- Elimination of unauthorized use will follow the trespass action plan for detection, confirmation, and elimination of trespass:

  - First priority is to abate existing occupancy and use trespasses

  - Second priority is to dissuade reckless acts of trespass through public education

3.3.13. Withdrawals and Classifications

Royal Gorge Resource Area RMP

Management objectives

- All classifications and withdrawals will be reviewed periodically to determine whether they should be continued, modified, or revoked/terminated.

- Withdrawals to protect special values such as recreation and wildlife preclude settlement, sale, location, or entry under the general land laws, including the mining laws (30 U.S.C. Chapter 2).

- Withdrawals to protect water power/storage values preclude settlement, sale, location, or entry under the general land laws, including the mining laws. Mineral entry, however, will be permitted under the provisions of P.L. 359.

- Withdrawals for public water reserves will prevent any activities that disturb or destroy Federal interest in waters on BLM-administered public lands. These withdrawals are not open to non-metalliferous mineral entry. Most withdrawals for other agencies (approximately 158,000 acres) will be subject to periodic review.

- If withdrawals of BLM-administered public land are relinquished, these lands will be managed according to applicable management prescriptions described in the Royal Gorge Resource Area RMP (BLM 1996).

- Classifications for R&PP transfers (patents) will be allowed only on Category I lands as prescribed in the Land Ownership Adjustment section of the Royal Gorge Resource Area RMP.

- Classifications for R&PP leases will be allowed on Category I, II, and III lands as prescribed in the Land Ownership Adjustment section of the Royal Gorge Resource Area RMP.

- Classification and Multiple Use Act of 1964 classifications will be reviewed and replaced, as appropriate, by more recent authorities.

- Review of each withdrawal and classification will be completed following guidance of the RMP, and appropriate action will be taken to continue, modify, or revoke/terminate.

- Manage any proposed change in classification or withdrawal as a change in the planned land use for that particular area.
- Consider the impact of revoking or modifying a withdrawal or classification as a change in availability of the land for application of public land laws and mineral laws. In addition, protective withdrawals revoked or modified could adversely affect the resource targeted for protection by allowing conflicting use.
- Class I paleontological areas and developed recreational sites will be classified and segregated from public land laws and mining laws.

Management decisions

- Withdrawals and classifications will continue to be reviewed and initiated to protect values when needed.
- All water power and reservoir withdrawals will be revoked in Subregion 1; all other existing withdrawals will be continued.
- Existing withdrawals will be continued (Subregions 2, 3, 4, 5, 6, 7, 8, 9, 10)
- New withdrawals will be initiated for the following areas:
  - Perennial riparian areas (Subregions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
  - Big game birthing habitat (Subregions 1, 2, 3, 4, 6, 8, 10)
  - Fishery habitat (Subregions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
  - Special status plant habitat (Subregions 1, 2, 5)
  - Special status animal habitat (Subregions 1, 5, 10)
  - Potential NRHP sites (Subregions 1, 3, 5, 7, 9)
  - Portions of ACECs:
    - Subregion 1—5 ACECs
    - Subregion 2—2 ACECs
    - Subregion 5—Not specified in Royal Gorge Resource Area RMP (BLM 1996)
    - Subregion 6—1 ACEC
    - Subregion 7—2 ACECs
    - Subregion 9—1 ACEC
  - VRM Class II within ACECs (Subregions 1, 2, 5, 7)
  - Developed recreation sites (Subregions 1, 5, 7)
  - Arkansas River corridor (Subregion 1)

Northeast RMP

Management objectives

Objectives for managing withdrawals are not identified in the Northeast RMP.

Management decisions

Decisions on withdrawals and classifications are not identified in the Northeast RMP.

3.3.14. Water Power and Reservoir Resources

Royal Gorge Resource Area RMP

Management objectives

- Overall, management objectives are to manage and recommend water power/reservoir withdrawals in one of three categories: intensive, restricted, and unsuitable.

Management decisions

- Continue to locate and evaluate new water power storage sites and add them to the inventory.
- Complete, as needed, land acquisitions of desirable water power/storage sites.
- Specific to subunits: Arkansas River Valley Subunit:
  - Management of all existing water power/reservoir resources will be designated as unsuitable.
  - Initiate and forward recommendations for revocation of unsuitable water power/reservoir resources.

Northeast RMP

Water power and reservoir resources are not addressed in the Northeast RMP.

3.4. Special Designations

3.4.1. Areas of Critical Environmental Concern

Royal Gorge Resource Area RMP

Management objectives

- Develop individual activity plans (IAPs) for all designated areas of critical environmental concern (ACECs).
- All areas designated an ACEC will have all OHV travel limited to designated roads and trails.

- Visual rating will be re-evaluated to ensure the existing rating is appropriate to protect any outstanding scenic qualities of the area.

Management decisions

- Include all ACECs as part of an IAP, which will be completed during the early years of RMP plan implementation. This IAP will replace and supersede any multiple overlapping single use activity plans completed on the same area.
- Future areas may be nominated, screened and recommended. Prepare an EA/plan amendment for future designated areas.
- All or portions of Browns Canyon, Mosquito Pass, Grape Creek, and Arkansas Canyonlands are designated as ACECs and will be managed to protect and enhance their special values.
- These designated ACECs will receive special management as follows: -livestock grazing will be limited; -timber harvesting and wood gathering will be allowed only for enhancement of protected values; -fluid minerals leasing will occur on ,portions with an NSO stipulation; -mineral entry will not occur; -mineral materials development will not occur; -VRM class II areas will be avoided for major ROWs; -retention in public ownership; -OHV use will be limited to designated roads and trails.
- Fluid minerals leasing will occur on portions of Mosquito Pass and Arkansas Canyonlands with an NSO stipulation; locatable mineral entry will not occur; mineral material development will not occur; the areas will be closed to OHV use within the WSA portions of these ACECs.
- All or portions of Droney Gulch and the Arkansas Canyonlands are designated as ACECs and will be managed to protect and enhance their special values.
- All or portions of Garden Park, Phantom Canyon, and Beaver Creek are designated as ACECs and will be managed to protect and enhance their special values.
- Fluid minerals leasing will occur with an NSO stipulation in the Garden Park ACEC; -mineral materials development will not occur, except in Garden park where it will be allowed if it enhances fossil values; OHV use will be closed within the WSA portions of these ACECs.
- A portion of the Arkansas Canyonlands is designated as an ACEC and will be managed to protect and enhance its special values.
- Portions of Arkansas Canyonlands and Grape Creek are designated as ACECs and will be managed to protect and enhance their special values.
- All of Cucharas Canyon will be designated as an ACEC and will be managed to protect and enhance its special values.
- Cucharas Canyon ACEC will receive special management as follows: -locatable mineral entry will not occur; -mineral materials development will not occur; -retention in public ownership.

Northeast RMP

Management objectives

None identified.

Management decisions

None identified.

3.4.2. National Scenic Byways

Royal Gorge Resource Area RMP

Management objectives

- Objectives for managing scenic byways are not identified.
- Objectives for scenic byways that are within the RGFO can be found in each individual byway's corridor management plan.

Management decisions

- No decisions for managing scenic byways are identified.
- Management direction for scenic byways can be found in each individual byway's corridor management plan.

Northeast RMP

Management objectives

Not addressed.

Management decisions

Not addressed.

3.4.3. Wild and Scenic Rivers

Royal Gorge Resource Area RMP

Management objectives

- There are currently no designated segments of the National Wild and Scenic River System (NWSRS) within the Royal Gorge planning area. All potentially eligible stream segments were studied for eligibility for wild and scenic designation. As a part of the RMP [BLM 1996], two streams were analyzed for potential addition to the NWSRS. These streams were a 126-mile stretch of the Arkansas River from Leadville down river to the Royal Gorge Park and a 20-mile stretch on the main and east branches of Beaver Creek from below Skagway Dam downstream to the southern boundary of the Beaver Creek State Wildlife Area.

Management decisions

- Recommend 0 miles and acres for designation.

Northeast RMP

Management objectives

Not addressed

Management objectives

Not addressed.

3.4.4. Wilderness Areas and Wilderness Study Areas

Royal Gorge Resource Area RMP

Management objectives

- Manage all WSAs under BLM's *Interim Management Policy and Guidelines for Lands Under Wilderness Review* until Congress makes a decision on wilderness recommendations for the Cañon City District.

Management decisions

- Manage WSAs under the BLM's Interim Management Policy and Guidelines for Lands under Wilderness Review until Congress makes a decision on wilderness recommendations.
- Return WSAs not designated wilderness to other types of multiple-use management as prescribed in this land use plan.
- Desired plant community will be determined for WSAs returned to other types of multiple-use management.
- Manage any designated wilderness areas in accordance with BLM and Congressional directives.

Northeast RMP

Management objectives

None identified (none present).

Management objectives

None identified (none present).

3.5. Social and Economic Conditions

3.5.1. Abandoned Mine Lands, Hazardous Materials, and Public Safety

Royal Gorge Resource Area RMP

Management objectives

- All hazard sites/areas will be reviewed on a case-by-case basis, and management will be the same in all eco-subregions. Management of all other resources will always involve remediation/reclamation of known hazard sites/areas. Hazard management will be incorporated into all appropriate IAPs.

- Existing sites/areas from past mineral development considered to be potentially hazardous because of high side walls, deep pits, etc., will be reclaimed in coordination with the Colorado Mined Land Reclamation Board hazard abatement program. The goal of this long-term project is to eliminate the hazards of these sites/areas, and the BLM will continue to fully cooperate with this agency in this effort.

- Trespass dumping on BLM-administered lands will continue to be controlled through signing and monitoring these sites/areas and increasing public awareness.

- An area-wide hazard management activity plan will provide the details regarding on-site closures, signing, site reclamation needs, etc., to implement hazard abatement. Hazardous material emergencies will be handled according to the District emergency response plan

Management decisions

- Review all hazard sites/areas on a case-by-case basis.

- Incorporate hazard management into all appropriate IAPs.

- Reclaim existing sites/areas from past mineral development considered to be potentially hazardous because of high side walls, deep pits, etc., in coordination with the Colorado Mined Land Reclamation Board hazard abatement program.

- Handle hazardous material emergencies according to the District emergency response hazardous materials contingency plan.

- Chaffee County: R&PP lease for this landfill is listed on the Federal facilities docket. Preliminary assessment and site investigation have been completed. Site is currently slated for no further remedial action. This site will not be considered further for national priority list (Superfund).

- Park County: R&PP lease audited for lease compliance in 1990. Audit results show no known or suspected contamination.

Northeast RMP

Management objectives

- Determine where the geologic features and hazards are located and what actions will be taken. Determine what effect these actions will have and how the features and hazards will be affected by other management.

Management decisions

- Concern Area—The presence of significant geologic features or hazards is known or suspected. Management actions will be based on field investigations to develop surface protection requirements for preserving the scientific and scenic values of significant geologic features.

Field investigations and, possibly, detailed engineering studies will be made in order to avoid or mitigate problems due to geologic hazards. When management actions are considered for such an area, they will include protective stipulations.

- None—Occurrence of significant geologic features or hazards in the area is unknown. Field investigations during the environmental analysis and/or new information about features or hazards could change the classification to Concern Area.

3.5.2. Social and Economic Values

Royal Gorge Resource Area RMP

Management objectives

None stated.

Management decisions

None stated.

Northeast RMP

Management objectives

None stated.

Management decisions

- All public land is in the "General" category.
- All management decisions shall consider three economic perspectives:
  - Efficiency—The usefulness of inputs (costs) to produce outputs (benefits) shall be analyzed. Those actions with the higher efficiency rating shall be favored wherever possible.
  - Cost effective—When a goal or project has been identified, the most cost effective approach shall be favored wherever possible.
  - Local and regional effects—The magnitude and distribution of costs and benefits shall be identified. Those actions most beneficial to local and regional economics shall be favored wherever possible. Where feasible and appropriate, the implementation of management decisions that would mitigate adverse economic and fiscal impacts will be considered.
- All management decisions shall consider three major social perspectives:
  - Community capacity to absorb change
  - Social distribution of effects
  - Attitudes toward change

Chapter 4. Management Opportunities

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4.1. Introduction

This chapter analyzes the ability of current management decisions to achieve desired resource conditions and address resource demands. BLM specialists have identified potential opportunities to change management, which will serve to focus public scoping and assist in formulating alternatives for the RMP. The process of identifying management opportunities involves considering alternatives to and improvements in existing management in response to changing resource conditions and uses, new information, and deficiencies in current practices.

For each section in this chapter, the AMS does the following:

A. Current management direction

- Determines the ability of current management direction to achieve desired future conditions and address resource demands.

B. Potential new decisions for the RMP revision

- Identifies new decisions that will better reach desired conditions. Potential new decisions should be evaluated in an RMP alternative.

C. Areas of importance to guide land uses and management

- Identifies areas of importance to the resource or resource use.

4.2. Resources

4.2.1. Air Quality and Climate

A. Current management direction

Table 4.1 shows the ability of management to achieve desired future conditions for air quality.

Table 4.1. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Air Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Air quality degradation will be minimized through strict compliance with Federal, State, and local regulations and implementation plans.	Yes. The BLM is not an air quality regulatory agency and has no such authority. By providing for compliance with current regulation and providing project-specific mitigation where an appropriate analysis has	Incorporate the standard Chapter 2 language that has been included in other recent RMPs. The language and supporting documents outline BLM's adaptive management framework with respect to analyzing and mitigating air quality impacts from management actions.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
		determined a need, the BLM can ensure the continued timely execution of its core mandates.	
Northeast RMP	Could not find any decisions.	No.	Same as above.
Other relevant plans(South Park plan amendment, renewable energy EIS, geothermal EIS, fire management plan (FMP), etc.)	N/A	N/A	N/A

B. Potential new decisions for the RMP revision

- Incorporate the standard Chapter 2 language that has been included in other recent RMPs. The language and supporting documents outline BLM's adaptive management framework with respect to analyzing and mitigating air quality impacts from management actions.

C. Areas of relative ecological importance to guide land uses and management

To be determined partly by other resource concerns. Furthermore, the BLM must comply with the Clean Air Act General Conformity (40 CFR 93.153(b)) requirements for actions taking place within any area designated as either non-attainment or maintenance (with respect to the National Ambient Air Quality Standards) within the RGFO boundaries.

4.2.2. Soil Resources

A. Current management direction

Table 4.2 shows the ability of management to achieve desired future conditions for soil quality.

Table 4.2. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Soil Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Manage soil-disturbing activities to avoid soil erosion and loss of watershed values.	Yes; avoiding erosion and loss of watershed values is still responsive to current issues.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Standards with stipulations for other resource actions will decrease erosion and potentially enhance watershed characteristics.	Yes; applying stipulations to reduce erosion and enhance watershed characteristics is	Developing new stipulations that address new technologies and trends needs to be included. Setting measurable goals and objectives along with identifying

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
		still being done and would be expected in the future.	adaptive management strategies would allow for more responsive and defendable decisions in the future.
Northeast RMP	Projects will be designed and the implementation of best management practices will take place in order to prevent unacceptable soil loss, restore soil stability, and/or return soil productivity.	Yes; designing projects and applying BMPs to protect soils is currently being done and would be expected in the future.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.

B. Potential new decisions for the RMP revision

- Develop soil stipulations in the oil and gas leasing process to address current concerns.

- Conduct an inventory and assessment of, and maintenance program for, the numerous small earthen structures (including stock ponds, contour furrows, and check dams) in the RGFO, which would benefit soil resources. Many of these structures are actively eroding, adding excess sediment to local surface waters. Intensive management could improve the natural hydrologic function of small drainages that have been altered by structures. Invasive weed establishment is also an issue on many existing structures. There are several databases that identify some of the existing facilities, but additional ground inventory would be necessary for a comprehensive program.

- Continue preparing and implementing travel management plans, in which some existing routes are closed and rehabilitated, trail maintenance plans and public education programs (promoting ethics of responsible land use) are implemented, and allowed uses and seasonal restrictions (when conditions are excessively wet or droughty) are enforced. This would benefit soil resources across the RGFO.

- Many small, low-order drainages throughout the planning area discharge from public onto private lands—commonly farm or rangeland but occasionally residential developments. In planning for future management of these watersheds, the BLM should consider minimizing the potential for flooding by maintaining adequate watershed cover (vegetation and vegetation litter) and a healthy soil surface.

- The RGFO has some soils with low water-holding capacity and a high potential for impact from dry and drought conditions. During drought conditions, the BLM should modify land uses in these areas in order to minimize impacts to vegetation and soil surfaces and give these areas special consideration when monitoring for resources affected by drought.

C. Areas of relative ecological importance to guide land uses and management

- Easily eroded badland soils such as those at Castle Gardens and Droney Gulch.

4.2.3. Water Resources

A. Current management direction

Table 4.3 shows the ability of management to achieve desired future conditions for water resources.

Table 4.3. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Water Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Acquire water rights, in compliance with State law, in support of BLM programs.	Yes; water rights play an integral role in the management of several BLM programs. The management of existing water rights and acquisition of additional water rights is anticipated to be very important in the future.	In addition to acquiring new water rights, the management of existing water rights plays an important role in achieving BLM objectives.
	Continue to implement the Bureau water use inventory and water rights program in the area.	Yes; continuing to inventory water sources and manage water rights is integral to several programs.	In addition to continuing the water use inventory and obtaining water rights where appropriate, the long term maintenance of water rights is imperative.
	Maintain minimum State water quality standards for all activities.	Yes; maintaining water quality standards is required by the Clean Water Act.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Continue to maintain or improve water quality in accordance with State and Federal standards. BLM will consult with the appropriate State agencies.	Yes; the maintenance or improvement of water quality is sound practice. Consulting with other agencies is still appropriate.	In addition to consulting with State agencies, stakeholders in the water quality arena are diverse and include State, Federal, municipal, and non-governmental organizations. The BLM should coordinate activities affecting water quality with more than just State agencies.
	Design management actions on BLM-administered lands within designated municipal watersheds to protect water quality and quantity.	Yes; protection of water quality and quantity within municipal watersheds is still relevant as demonstrated by recent events such	The recognition and inclusion of recent source water protection plans throughout the planning area should be included in the future.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
		as large fires and long term drought.	
	Continue monitoring selected groundwater and surface water stations in cooperation with USGS.	Yes; several monitoring stations are still active in the planning area that benefit BLM programs.	The partners in monitoring groundwater and surface water have grown substantially beyond just the USGS and now include State agencies and local water districts.
	Integrate watershed activity planning with existing plans as appropriate.	Yes; integrating watershed planning with existing plans is still good practice.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Make watershed activity planning a component of IAPs in areas where livestock grazing plan adjustments do not fully correct any determined water quality problems.	Yes and no; watershed activity planning as a component of IAPs to address water quality problems is good practice no matter the cause of the water quality problem.	Very few IAPs have been developed, so the applicability of any decision concerning IAPs seems questionable. If IAPs are used in the future, the decision should be expanded beyond just grazing to cover any activity that is determined to cause water quality problems.
	Continue to make monitoring and evaluating water quality and quantity, as well as controlling erosion and sediment production, high priority management goals.	Yes; these are still high priority goals and are relevant today.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Emphasize continuing all watershed activities that provide protection, maintenance, and enhancement of the watershed resources.	Yes; these components are still emphasized currently and are relevant to future planning.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Continue to take an active role in control of nonpoint source pollution on BLM-administered lands. Nonpoint source control projects will be implemented as funding and manpower allow.	Yes; the BLM is taking an active role in the control of nonpoint source pollution on BLM lands and implementing projects to control it. This is still a high priority among many stakeholders in the planning area.	Abandoned mine lands and other point sources of pollution occur on BLM-administered lands, and projects are underway to control them. The inclusion of point source pollution should also be addressed in future decisions.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Northeast RMP	Protection of critical watersheds and floodplains will go into effect immediately.	Yes; this is sound practice and is also required by other laws depending on the circumstances.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Modifications and developments within the 100-year floodplain must not interfere with the natural beneficial functions of the floodplain or create hazards to life or property without proper mitigation.	Yes; this is sound practice and is also required by other laws depending on the circumstances	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Impacts to water quality will be minimized by stipulations in project design. Preventative practices such as runoff control devices, proper logging practices, proper road location and design, maintenance of vegetative cover, and confinement and treatment of pollutants will be included to minimize potential pollution.	Yes; minimizing impacts to water quality through project stipulations is still being done today and is still responsive to current issues.	Setting measurable goals, design criteria, and objectives along with identifying adaptive management strategies would allow for more responsive and defendable decisions in the future.
	Non-BLM vested water rights will be recognized, respected, and protected.	Yes; this is part of Colorado water law.	Since this is part of existing law, any changes would be outside the jurisdiction of the BLM.
	Water rights to sources needed for BLM management purposes will be acquired according to Colorado water law.	Yes; water rights are still an integral component of BLM management, and adhering to Colorado water law in BLM's acquisition and management is the law.	Since this is part of existing law, any changes would be outside the jurisdiction of the BLM.
	Water rights acquired by BLM and/or its licensees will not cause harm to other vested water rights.	Yes; water rights are managed under Colorado water law, and decisions must conform to it.	Since this is part of existing law, any changes would be outside the jurisdiction of the BLM.

B. Potential new decisions for the RMP revision

- Develop an RGFO-wide drought-management strategy, identifying both conditions that define drought and actions that will be implemented when drought conditions occur.
- Develop stipulations in the oil and gas leasing process that would further protect water quality.
- Develop and implement a strategy to inventory, assess, and routinely maintain stock ponds, springs, and wells. In addition to restored water storage capacity, maintenance should concentrate on minimizing sources of accelerated erosion (such as spillways) and controlling invasive weed establishment. Livestock water tank permits should be secured through the Colorado Division of Water Resources for all existing and future livestock ponds.

- With increasing water demand locally, statewide, and regionally (in the Arkansas River Basin), and potential climate changes, obtaining, maintaining, and protecting water rights needed to meet management objectives on public land will be increasingly important. Water rights or permits should be secured for all water sources on public lands, including livestock ponds, wells, seeps, and springs for wildlife (flora and fauna), livestock, fire suppression and recreation uses. It is essential to review the Colorado water court resume and oppose water right applications when necessary to protect water resources on public lands.

- As the region continues to grow, source water areas that provide domestic and municipal waters will become more common in the RGFO. As source water areas are assessed for potential pollution sources and protection plans developed, the RGFO must be a key player in collaborating with water users to ensure that public land management actions are compatible with source water area protection plans.

- Where streams or river flows are regulated in a manner that impairs the function or desired flow regime of the riverine environment (such as Grape Creek below Deweese Reservoir or the Cuchares River below Cuchares Reservoir), pursue collaborative projects with water users that simultaneously improve stream conditions while preserving water supply reliability and yield for water users.

C. Areas of relative ecological importance to guide land uses and management

Due to the relatively arid nature of the RGFO landscape, there are many springs and other water sources that are separated by long distances without water. In addition, perennial streams, such as Grape Creek, offer unique riparian settings in arid, low elevations.

4.2.4. Terrestrial Wildlife

A. Current management direction

Table 4.4 shows the ability of management to achieve desired future conditions for terrestrial wildlife (including migratory birds).

Table 4.4. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Terrestrial Wildlife Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Consider all BLM-administered lands for protection and enhancement of wildlife habitat values.	No. New and emerging disturbances and activities make it difficult to protect all wildlife or their habitats, especially for reproduction or winter survival. In some locations, protection is a secondary priority	An emphasis on conservation of key wildlife species and their habitats is needed. Protection of key wildlife habitats, such as reproductive or winter survival, could be more

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
		which cannot be achieved.	stringent in focused areas. Identification of which wildlife species, taxa or guilds to manage for would make efforts more effective. Clear direction on raptors, migratory birds, and rare or endemic species is needed.
	Continue monitoring existing habitat management plans and crucial big game winter range, birthing areas, and raptor sites until IAPs are prepared.	No; IAPs were never developed. Also, there is no reference to BLM priority migratory birds or local migratory birds of concern.	Monitoring of winter range and reproductive areas for big game and raptors should continue. Reproductive and winter habitats for BLM priority migratory birds and local migratory birds of concern also need to be monitored.
	Manage all other non-game wildlife consistent with Wildlife 2000 (Verner, Morrison, and Ralph 1986).	No; Wildlife 2000 is an outdated publication from 1986.	Science is ever-changing; management should be consistent with most current management or conservation plans and best available science and research.
	Determine desired plant community in all vegetation manipulation areas.	Yes.	Determining the desired plant assemblage in vegetation management areas is an important step in conserving important

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			habitats for key wildlife species. It is recommended this step be maintained in the RMP.
	Incorporate wildlife activity planning within IAPs.	No; IAPs were never developed, and the term "wildlife activity planning" is vague. IAPs may become outdated while new issues, technologies, and science develop.	Wildlife management, planning, and monitoring should be completed at the scale appropriate for the wildlife species of concern, with consideration given to their home range and the scale of the issues being considered.
	Manage wildlife habitat to maintain and enhance habitat values. Resolve conflicts with other uses—e.g., livestock grazing, mineral development, etc.— in favor of achieving vegetation management goals.	Yes, to a degree. Not all conflicts with wildlife and other uses can be resolved through vegetation of management, e.g. black bear-human conflicts in campgrounds, new trails in mule deer winter range, etc. It is not clear which wildlife species or habitats would be the focus of conflict resolution or vegetation management. Vegetation management goals may not be adequate to meet the habitat requirements of some wildlife species.	Identification of which wildlife species and which habitats to focus management efforts on is needed; e.g., reproductive habitats for keystone species, or winter range for mule deer. Stronger direction regarding where maintenance and enhancement efforts should be focused is needed. Stronger direction is needed when vegetation management goals do not resolve conflicts between

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			other uses and wildlife. Other conflict resolution methods are needed.
	Limit big game birthing habitat as follows: ● Closed to mineral entry ● Closed to mineral material disposal ● Excluded from major ROWs ● Off-highway vehicle (OHV) use limited to designated roads and trails	Yes, to a very limited degree. The following issues are not addressed: road or trail density, new road and trail proposals, the need big game species have for solitude during reproduction, and other new and emerging technologies and issues that result in short term disturbances during birthing events and long-term alterations to reproductive habitats. The decision was made in the Royal Gorge Resource Area RMP (BLM 1996) to recommend mineral withdrawal, but this was never completely implemented due to staffing and funding constraints. Note that the RMP can recommend a withdrawal, but that is a decision process outside of the land use plan.	There is a need to limit and manage activities in reproductive habitats that provide solitude for big game, for multiple uses, not just those listed. Seasonal occupancy closures should be considered for big game reproductive areas. Both long-term habitat alteration and disturbance during birthing events should be addressed.
	Avoid routing ROWs through big game birthing and critical winter range.	Yes, to a limited degree. It does not address new trails and roads proposed	There is a need to broaden this management direction to

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
		by user groups. It also does not emphasize the importance of severe, critical and concentration winter ranges for big game. Due to size of winter ranges, the current direction is unrealistic in many locations.	address multiple habitat-altering activities in these important big game habitats, especially new proposed roads and trails, new campgrounds, etc. There is a need to emphasize severe, critical, and concentration winter ranges as the priority.
	Address big game critical winter range with identified conflict through cooperative efforts with Federal and State agencies and private groups.	Yes, to a degree. Cooperative efforts do not always result in conservation of critical, severe and concentration winter ranges for big game species. Private conservation groups and private user groups may not be willing to cooperate to solve these issues. Also, within state agencies, there may be competing interests between uses and big game conservation..	Strong and clear direction is needed to emphasize big game critical, severe, and concentration winter ranges as the priority, and what restrictions would be in those locations. Cooperation with State and Federal agencies, and private groups needs to continue but not as the sole solution.
	Make wildlife habitat available for fluid leasing with no surface occupancy (NSO) stipulations as follows: ● Raptors (includes golden eagle, osprey, all accipiters, butteos, owls, and falcons except kestrel) have an NSO radius of 1/8-mile from nest site.	No; does not match standard stipulation guidelines recently developed by the BLM Colorado State Office.	Change buffer distance to match standard stipulation for raptors as stated in the most recent stipulations developed by the BLM Colorado State Office, or following best available

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			science with review from the State Office Deputy Director.
	Make wildlife habitat available for fluid leasing with the following seasonal stipulations: ● Big game critical winter range: 12/1–4/30 ○ Under mild winter conditions, the last 60 days of the seasonal limitation period may be suspended. ● Big game birthing habitat (when it is determined through a site-specific environmental analysis that specific actions would not interfere with critical habitat function or compromise animal condition within the project vicinity, the restriction may be altered or removed.) ○ Elk calving: 4/16–6/30 ○ Pronghorn antelope fawning: 5/1–7/15 ○ Bighorn sheep lambing: 5/1–7/15 ● Raptor nesting and fledgling areas (1/8-mile radius from nest site): 3/1–7/31 ● Wild turkey winter habitat: 12/1–4-1 ○ Snowfall may occur irregularly, so restrictions may be lifted temporarily as conditions dictate.	No; does not match standard stipulation guidelines recently developed by the BLM Colorado State Office.	Change stipulations to match standard stipulations as stated in the most recent stipulations developed by the BLM Colorado State Office, or following best available science with review from the State Office Deputy Director.
	Seasonally limit wildlife habitat to mineral operations as follows: ● Big game critical winter range: 12/1–4/30 ○ Under mild winter conditions, the last 60 days of the seasonal limitation period may be suspended. ● Raptor nesting and fledgling areas (1/8-mile radius from nest site): 3/1–7/31 ● Wild turkey winter habitat: 12/1–4/1 ○ Snowfall may occur irregularly, so restrictions may be lifted temporarily as conditions dictate.	No; does not match standard stipulation guidelines recently developed by the BLM Colorado State Office.	Change stipulations to match standard stipulations as stated in the most recent stipulations developed by the BLM Colorado State Office, or following best available science with review from the State Office Deputy Director.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Northeast RMP	Specific project design to maintain or improve important habitat will be developed during the environmental analysis process and will include appropriate BLM specifications.	Yes; provides opportunity for adaptive management yet at the same time, there is no management direction to conserve or protect key wildlife habitats, such as reproductive or winter habitats, when conflicts with uses arise.	There is a need to emphasize and define important wildlife habitats, i.e., reproductive habitats and winter ranges, as well as which species, taxa, or guilds are being referenced. Eliminate references to "all" wildlife species and "general" habitats.
	General habitat has no important wildlife values currently identified.	No; value of these lands may have changed, new science about wildlife species or their habitats may have changed, and new species of concern may have been identified.	Do not place definitive labels on public lands that describe wildlife values. Eliminate references to general habitat and general wildlife values.
	Before any major action occurs on general habitat, inventories will be done to determine if any important values are present.	No. Every piece of ground or air may be habitat to some wildlife species so this direction is vague. It is not realistic to inventory all lands prior to management actions to determine which wildlife species are present and the quality of their habitats present. Baseline inventory data and monitoring is important for key wildlife species across the entire RGFO.	There is a need to identify which wildlife species, taxa, or guilds need to be inventoried, and which of their habitats need to be inventoried, i.e., reproductive habitats. There is a need to classify management actions to determine which are considered major and rise to the need of inventory. Incorporate the need to collect baseline inventory and monitoring data

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			for key wildlife species and their reproductive and winter habitats across the entire RGFO. Eliminate references to "all" wildlife species and "general" habitat.
	General wildlife habitat will be protected by considering wildlife concerns in the environmental assessments (EAs) of proposed actions and incorporating stipulations and mitigation measures.	Yes, however protection may not be realistic whereas conservation may be more plausible. It is not realistic to address all wildlife habitats for all wildlife species. There is no reference to key wildlife species, such as raptors, migratory birds, rare or endemic species.	There is a need to identify which wildlife species and which of their habitats rise to the need for design criteria, conservation measures, or stipulations in project planning. There needs to be an emphasis on following best available science and applying adaptive management strategies in conservation of key wildlife species and their reproductive and winter habitats.
	Wildlife habitat that is available for fluid leasing may have the following seasonal stipulations: ● Big game crucial winter habitat: 12/1–4/30 ● Big game birthing areas: ○ Elk: 4/16–6/30 ○ Pronghorn antelope: 5/1–7/15 ○ Bighorn sheep: 5/1–7/15 ● Wild turkey habitat: 3/31–8/1	No; does not match standard stipulation guidelines recently developed by the BLM Colorado State Office.	Change stipulations to match standard stipulations as stated in the most recent stipulations developed by the BLM Colorado State Office, or following best available

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	• Waterfowl production area: 3/31–7/1 • Raptor nesting and fledgling areas (1/4-mile radius around nest site): 2/1–8/15 • Cherokee Park State Wildlife Area: 5/1–9-30 • Grouse production habitat: 3/28–7/15 • Grouse winter habitat: 12/16–3/15 • Greater sandhill crane nesting and staging habitat: 3/1–10/16		science with review from the State Office Deputy Director.
	Wildlife habitat that is available for fluid mineral leasing may have the following NSO stipulations: • An NSO for fluid mineral development to protect wildlife values near the reservoirs and rivers listed below: ○ South Platte River ○ Prewitt Reservoir ○ Julesburg Reservoir ○ Prospect Reservoir ○ Horsecreek Reservoir ○ Milton Reservoir ○ Lower Latham Reservoir ○ Riverside Reservoir • Empire Reservoir • Bijou Reservoir • Ft. Collins Reservoir • South Republican River • NSO within 1/4-mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek or the geographical relationship of topographical barriers and vegetation screening to the lek site. • NSO within 1/8-mile radius of raptor nest sites. The NSO area may be altered depending on the active status of the nest site or the geographical relationship of topographic barriers and vegetation screening to the nest site.	Yes and no. The NSO for the listed important riparian corridors and rivers remain adequate. The NSOs for leks and raptor nests do not match standard stipulations recently created by the BLM Colorado State Office.	Change stipulations to match the most recent stipulations developed by the BLM Colorado State Office, or following best available science with review from the State Office Deputy Director.

Management issues not adequately addressed

- A number of restrictions are necessary to adequately conserve or to protect key wildlife species and their important habitats, such as raptors, BLM priority migratory birds, migratory birds of local concern, cave bats, pollinators, game species, State species of concern, rare or endemic species, not all of which are specifically addressed in the current RMPs. Instead, many of these decisions are based on laws— the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act, or the precept that applicable measures are consistent with the overall intent of the RMP.

- Detailed desired future conditions, goals, objectives, management guidelines and standards are not part of the current RMPs for identified key wildlife species and their important habitats, i.e. reproductive habitats and winter range, so that the appropriate restrictions, stipulations, and conservation measures can be applied. References to "all" wildlife species and "general" wildlife habitats creates a management issue as it is not possible to manage for all species in all locations.

- The current RMPs do not address the need to inventory and monitor key wildlife species and their habitats across the entire RGFO to develop baseline data. Data on raptors, bats, BLM priority migratory birds, migratory birds of local concern, pollinators, rare and endemic species is currently inadequate to properly assess and conserve those species and their habitats.

- Prescribed seasonal restrictions for some species are inconsistent with some of CPW's recommended time frames and terminology. For instance, the BLM uses the term "crucial" winter range in reference to deer and elk habitats, while CPW uses other descriptors (such as "winter range," "severe winter range " ,and "winter concentration"). Because the RGFO bases its analysis, design criteria and conservation measures primarily on CPW and other partner data, there is a management inconsistency when applying habitat nomenclature in relation to partner data and terminology, when consistently provided.

- Prescribed measurable conditions under which wildlife and fisheries restrictions and stipulations may be waived, excepted, or modified, and when or where they would be consistently followed is lacking.

- Clearly defined desired future conditions with overarching goals (what the BLM wants to achieve overall), objectives (how the BLM plans to get there), and standards and guidelines (the specific actions the BLM will take to accomplish its objectives) in terms of key wildlife species, taxa or guilds and their important habitats with reference to specific locations, times, and management actions is lacking. The current RMP is vague in terms of which wildlife species to manage for, why, where and how. It is not possible to manage for all wildlife species in all locations, following best available science.

- Road and trail density in key wildlife habitats needs to be addressed.

- New and emerging technologies and issues as they relate to key wildlife species and their important habitats needs to be addressed.

- Attention and clear direction on managing key wildlife species, taxa or guilds and their important habitats, e.g. raptors, BLM priority migratory birds, migratory birds of local concern, cave bats, pollinators, game species, State species of concern, rare or endemic species, nesting areas, etc. is lacking.

- Conflicts between uses and wildlife that are not related to vegetation management solutions needs to be addressed.

- Neither RMP is user- or manager-friendly. Information must be searched out in multiple sections, and sometimes in obscure paragraphs. A quick reference should be created so that management prescriptions can be readily found for any application.

B. Potential new decisions for the RMP revision

- Clearly define wildlife specific desired future conditions with overarching goals (what the BLM wants to achieve overall), objectives (how the BLM plans to get there), and standards and guidelines (the specific actions the BLM will take to accomplish its objectives). Base these directions on the best and most current scientific information. Identify types of activities—based on timing, intensity, frequency, duration, and site context—that would likely be subject to stipulations. Consider direct, indirect, and residual impacts, and temporal and spatial factors. Be sure to consider new and emerging technologies, road and trail densities, new proposals, and a range of management issues beyond the current ones addressed.

- Make terminology consistent with sources and best available science as much as possible as it pertains to wildlife species and their habitats.

- Identify the specific circumstances under which exceptions or variances to seasonal, occupancy and other restrictions would be granted, if at all, and where or when they would be consistently followed. Include a prescription or protocol for handling exception and variance requests. Include a stated commitment to coordinate and consult with CPW for big game and, if necessary, other state or federal agencies for other species as appropriate (such as Colorado species of concern).

- State the priority to improve the BLM's baseline knowledge of key wildlife species, taxa and guilds and their important habitats, such as raptor nests and concentration areas, across the RGFO as part of an informed decision making process. Conduct follow-up monitoring of those species and their important habitats across the RGFO. Baseline data on raptors, bats, BLM priority migratory birds, migratory birds of local concern, pollinators, rare and endemic species needs to be prioritized.

- Perform raptor nest inventories in potential suitable habitat prior to project implementation. When possible, inventories would allow for a full nesting sequence for investigation prior to project implementation. Protect all active and inactive raptor nests with timing and/or occupancy restrictions, following best available science.

- Emphasize management efforts on raptors, bats, BLM priority migratory birds, migratory birds of local concern, pollinators, rare, endemic and game species and their important habitats. Refrain from references to “all” wildlife or “general” habitats. Emphasize best available science in management directions.

- In accordance with the MBTA and BLM Instruction Memorandum No. 2013-119 for Executive Order 13186, emphasize the need to inventory for BLM priority migratory birds, and migratory birds of local concern prior to project implementation. Describe relevant conservation measures with an emphasis on species specific habitat requirements and time frames, necessary such that RGFO remains in compliance with the MBTA. Apply adaptive management strategies into MBTA management directions.

- Define “routine maintenance” and identify triggers as they relate to key wildlife species and their important habitats. Standard conservation measures for feature maintenance should be considered in relation to the scale of the action and effect on key wildlife species and their habitats.

- Address conflicts between wildlife and other uses that do not pertain to vegetation management, or where vegetation management goals may not adequately meet the habitat requirements for key wildlife species of concern. Consider a range of wildlife-user conflicts, such as black

bear-human conflicts, mountain lion-human conflicts, use of caves and cliff sites where nesting or roosting occurs, new roads and trails in big game winter range or production areas, etc.

C. Areas of relative ecological importance to guide land uses and management

Areas of high ecological value—areas where management should focus most of its enhancement, maintenance, conservation and/or protection efforts in terms of terrestrial wildlife species of concern—include the following: riparian corridors and wetlands, pinyon-juniper stands, shrubs, raptor breeding habitats, and big game winter ranges and production areas, caves, BLM priority migratory bird nesting and wintering areas.

4.2.5. Aquatic Wildlife

A. Current management direction

Table 4.5 shows the ability of management to achieve desired future conditions for aquatic wildlife.

Table 4.5. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Aquatic Wildlife Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Maintain all existing stream fisheries	Only partly	Clarify "maintain" in light of other uses.
	Accomplish improvements in condition and stability through riparian, wildlife, forestry, grazing and recreation programs where potential exists.	Only partly	Include, then implement, programs such as realty that are needed for processing withdrawals and other protective orders.
	Supplemental releases and reintroductions for native fish species could be authorized following environmental analysis.	No	Expand this topic to include not only fish but other aquatic organisms. Clarify State authority and national policy.
	Conflicts between fishery habitat and other values, e.g., livestock grazing, mineral development, etc., will be resolved in favor of the fishery habitat.	No	Clarify level of conflict and make consistent with other programs.
	All streams will be protected through standard lease terms for fluid minerals, locatable mineral closures except for recreational placering, mineral material disposal closures, and OHV use limited to designated roads and trails.	No	Consider standard lease terms with the Colorado Oil and Gas Conservation Commission guidelines, BLM at the statewide level, or with the Northeast RMP. Withdrawals were not completed for locatable mineral entry. Recreational placering topic is too vague. OHV use is still not designated in much of the field office.
	All fishery habitat activity will be accomplished with IAPs.	No	IAP proved to be expensive and was not implemented, so fishery habitat activity has been conducted as needed. A

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			programmatic EA approach may be recommended to achieve relatively non-controversial habitat improvement work. Subsequent proposed could be evaluated through a DNA.
Northeast RMP	(In wildlife section; not a stand-alone decision). Important wildlife habitat will be protected with reference given to important riparian habitat.	Partly	Resources in the Northeast are largely not inventoried and have been up for disposal. Land retention needs to be clear, so habitat inventory can be conducted, where suitable, to effectively manage resources.
Both RMPs	CDOW (now CPW) cooperating agencies	Partly	Information, guidance, records, etc., for cooperating agencies is not centralized. Management intent, process, and responsibilities need to be identified in a new RMP.
Source water protection plans (similar to statewide water supply initiatives and the round tables)	Silent	No	Municipalities are expecting public land watersheds with source water interaction to be managed with caution. The new RMP needs to clarify acceptable land use within public drinking supply watersheds.
CPW wildlife strategy documents	Silent	No/partly	Consider other agencies' land use plans and directions for aquatic resources.
Recovery plans	Silent	No	Consider various species recovery plans and their goals and objectives, within the RMP.

Note that others to consider are the South Platte water depletion constraints, management of lands up for disposal/retention, and lands where new or expanding reservoirs are involved.

B. Potential new decisions for the RMP revision

- Grazing utilization decisions; the range, wildlife, and riparian/aquatic programs need to coordinate for these decisions.
- Decisions where aging infrastructure/conversion to evergreen, etc., create new factors for allotment management.
- Potentially removing from grazing those lands not used for years; e.g., Leadville area, high trespass allotments, Grape Creek and other allotments that are costly to manage. This also needs to be coordinated with range staff.
- Decisions and clarity are needed to explain to the public 1872 mining laws and the level of discretion to mitigate, bond potential claimants.
- Decisions for the long term management of fens, playas, isolated seeps and springs, to align with national policy.

- Decisions that are clearer for when drought triggers a management change.
- Incorporating the weed EA.
- Aquatic nuisance species management.
- Produced-water management related to oil and gas development will need consistent consideration of Colorado Oil and Gas Conservation Commission regulations and protection of public land water resources.

C. Areas of relative ecological importance to guide land uses and management

- Fens, playas, isolated seeps and springs, potential conservation areas, State wildlife areas, Grape Creek, Badger Creek, and Birdseye Gulch.

4.2.6. Vegetation

A. Current management direction

Table 4.6 shows the ability of management to achieve desired future conditions for vegetation.

Table 4.6. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Vegetation Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Identify site-specific resource objectives, including specific desired plant community, in IAPs. In most cases, this will result in a reasonable achievement of a diverse community of grasses, shrubs and trees.	No. IAPs are not currently used by this office and are not a bureau wide direction.	Do not bring forward to new RMP
	Monitor the overall trend, condition and forage production of vegetation. These factors are expected to improve.	Yes. The BLM still wants to monitor for desired plant community.	Refine monitoring strategies.
	Vegetation management will be as follows: vegetation will be managed to accomplish other BLM initiatives (e.g., riparian, wildlife, etc.); improved forage conditions will be distributed through cooperative efforts (i.e., Colorado Habitat Partnership Program); management of forest lands will be for enhancement of other values); desired plant condition objectives will be developed for all IAPs; and vegetation monitoring will be accomplished on an interdisciplinary basis.	Yes. Everything is still relevant except for "desired plant condition objectives will be developed for all IAPs." IAPs are not currently used by this office and are not a Bureau-wide direction.	Delete "desired plant condition objectives will be developed for all IAPs."
Northeast RMP	No management decisions identified in NE RMP.	N/A	All of field office will be included in the RMP.

B. Potential new decisions for the RMP revision

- Add success criteria for control of weeds during reclamation or other activity that generates weeds. Incorporate weed control responsibilities into each program that generates weeds so that projects include funding for long-term associated weed control.

C. Areas of relative ecological importance to guide land uses and management

- Droney Gulch ACEC
- Beaver Creek ACEC
- Grape Creek ACEC
- Browns Canyon ACEC
- Mosquito Pass ACEC
- Garden Park ACEC
- Phantom Canyon ACEC
- Arkansas Canyonlands ACEC
- Cucharas Canyon ACEC
- High Mesa Grasslands RNA

See also the discussion in section 4.3.2.

4.2.7. Wetlands and Riparian Resources

A. Current management direction

Table 4.7 shows the ability of management to achieve desired future conditions for wetlands and riparian resources.

Table 4.7. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Wetland and Riparian Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Continue to improve management with implementation of BLM guidance to maintain and/or improve current conditions in riparian zones.	Yes	A current "tally" of status should be presented in the RMP with discussion where improvement concerns remain.
	Prior to implementation, assess all actions within riparian areas for the effects on the resource.	Yes	Vegetation utilization needs much attention: clarity is lacking and previous thinking was focused on flash grazing systems that have proven not to work well, because

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			timing needs are too specific and impractical for Federal lands.
	Eliminate grazing on riparian habitat in poor condition.	Partly	This needs to be strengthened then made more suitable to explain various situations; e.g., unfenced C category, etc. Trespass needs to factor into this decision.
	Limit fluid mineral operations in riparian areas by controlled surface use (CSU) stipulations.	Partly	Needs to address statewide stipulations, Colorado Oil and Gas Conservation Commission stipulations.
	In all subunits: 75 percent of all riparian areas will be at properly functioning condition by 1997.	Partly	Needs update.
	Perennial riparian areas will be closed to locatable mineral entry—except for recreational placering, closed to mineral materials disposal, and all OHV use will be limited to designated roads and trails.	No	Decision was not implemented and still needs to be. OHV issues are still unresolved in the rest of the field office where there is no TMP.
	Riparian area inventories will be completed and mapped as soon as possible.	Partly	Acquisitions, etc., changed inventory locations. Staffing and number of riparian areas have kept a total inventory from being complete.
	Interdisciplinary support will be emphasized for riparian restoration.	Partly	Other programs are focused on their priorities, but mostly support riparian restoration. Riparian restoration has been mostly through the range and riparian programs only. Mining law and riparian management are areas of actual and potential resource conflict.
	All IAPs will reflect riparian objectives.	No	IAPs were never undertaken.
Northeast RMP	(In wildlife section; not a stand-alone decision). Important wildlife habitat will be protected with reference given to important riparian habitat.	Partly	Resources in the Northeast are largely not inventoried and have been up for disposal. Clarity is needed for land retention to determine if habitat inventory should be conducted; then protection strategy should be developed.
Other relevant plans (South Park plan amendment, renewable energy EIS, geothermal EIS, FMP, etc.)	South Park land tenure adjustment plan (BLM 2009b).	Only partly	Interim management for lands identified for disposal needs to be determined (if different from retention lands).

B. Potential new decisions for the RMP revision

- Cost/benefit and allocation decisions for some lands have been repeatedly discussed internally. Grazing allocation decisions seem to need clarification so there is agreement in the plan of what is available and what is unavailable; similarly, utilization needs clarification.
- Clear criteria are needed for land use plan recommendations for mineral withdrawal.
- Buffers and forestry/habitat actions need decisions so there is flexibility to do work where needed in the riparian areas.

C. Areas of relative ecological importance to guide land uses and management

- Management of fens needs decisions.
- Management of playas needs decisions.
- Oil and gas leasing of State wildlife areas needs decisions.

4.2.8. Special Status Species

A. Current management direction

Table 4.8 shows the ability of management to achieve desired future conditions for special status species (federally threatened, endangered, proposed, and BLM sensitive species.

Table 4.8. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Special Status Species Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Inventory and monitor, as necessary, threatened and endangered and sensitive species and plant communities to provide information for proper management.	Yes	Proposed species, designated critical habitat, and suitability of habitats for these species needs to be incorporated into the management direction. An emphasis on inventorying for these species prior to project implementation and/or NEPA decision needs to be added to this direction. If field inventories are not feasible, then it should be assumed that suitable habitat is present and that habitat is occupied, with the appropriate conservation measures in place following best available science.
	Manage uses in areas with special status plants in compliance with the ESA.	Yes	This is a requirement of ESA and does not need to be specified in the RMP. However, there is opportunity to apply best management practices and conservation measures beyond ESA into the RMP.
	Achieve any reintroduction of Federal or State listed endangered, threatened,	Yes	Generally, reintroduction of listed threatened, endangered, and

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	candidate, and sensitive species following environmental analysis and consultation with the U.S. Fish and Wildlife Service, Colorado Natural Areas Program, and other affected parties.		proposed species is not initiated by the BLM. Sensitive and candidate species are generally still present in the management area, and thus reintroducing those species is not applicable. Instead, this management direction should state that BLM needs to be proactive and involved in species reintroductions, including being a signatory to MOUs with Federal and State agencies on such matters.
	Avoid actions that further jeopardize listed and sensitive species and enhance these species when possible as directed by the ESA.	Yes	This is a requirement of ESA and does not need to be specified in the RMP. Instead, the emphasis should be on actively participating in conservation and recovery plan working groups, and developing conservation measures that protect reproduction and other factors necessary for the species conservation and recovery. Emphasis also needs to be placed on improving habitats for these species.
	Determine desired plant community in vegetation manipulation areas to enhance habitat for the species.	Yes	This is still an important step in the conservation of threatened, endangered, proposed, and sensitive plant and animal species conservation and should be continued in the RMP.
	In all cases, ensure full compliance with Section 7 of the ESA before invoking specific actions resulting from RMP decisions. This requires mandatory consultation and coordination with the U.S. Fish and Wildlife Service and clearance of lands inhabited by these species.	Yes, but misses the intent.	This is a requirement of ESA and does not need to be specified in the RMP. Instead, management actions should incorporate threatened, endangered, and proposed species recovery plan action items and best available science in maintaining special status species viability.
	Do inventory, analysis, and monitoring for special status plants/plant communities.	Yes, somewhat.	An emphasis on inventorying for these species prior to project implementation and/or NEPA decision needs to be clarified in this direction. If field inventories are not feasible, then it should be assumed that suitable habitat is present and that habitat is occupied, with the appropriate conservation measures in place following best available science.
	Limit intensive recreation development to protect existing and potential special status plant habitat.	Yes, to a degree.	A definition of "intensive recreation development" is needed, considering all types of existing, new, and emerging recreation

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			uses. Some recreational uses may not be "intensive" but may still have a profoundly negative effect on special status plants or their habitats.. Conservation measures that are appropriate for the existing, new, and emerging recreational uses should be defined, following best science available.
	Continue protection and enhancement of special status plants and animals by eliminating identified and verified land uses that conflict with these species.	Yes, to a degree	This does not consider land use practices that are beneficial for the overall environment but may have a negative effect on a particular special status species, e.g., herbicide application in occupied BLM sensitive plant habitat. Instead, when conflicts between land use practices and special status species emerge, there is opportunity to apply conservation measures and adaptive management in a manner that maintains the viability of the special status species. More emphasis on special status species habitat enhancement is needed.
	Protect special status plants and habitat through elimination of conflicting uses.	Yes	This does not consider land use practices that are beneficial for the overall environment but may have a negative effect on a particular special status species, e.g., herbicide application in occupied BLM sensitive plant habitat. Instead, when conflicts between land uses practices and special status species emerge, there is opportunity to apply conservation measures and adaptive management in a manner that maintains the viability of the special status species.
	Protect the relic plant community habitat through the following: ● ACEC designation ● Changes in livestock grazing ● No surface occupancy for fluid mineral leasing ● Closed to locatable mineral entry ● Closed to mineral material disposal	Yes, to a limited degree.	It is not clear to which relic plant assemblages this management direction refers. There are other management actions that are not included in this list that need to be addressed. These include but are not limited to herbicide application, insecticide application, new roads and trails, new campgrounds, other concentrated recreation uses, etc.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	● OHV restrictions		
	Accomplish all special status plant habitat actions within IAPs.	No; IAPs were never created.	Manage special status plant species to prevent degradation of habitat, maintain species viability, and prevent Federal listing. This includes inventorying new sites in suitable habitat prior to project implementation, monitoring known populations, applying adaptive management strategies, applying conservation measures and best management practices, conserving pollinators and their habitats, following recovery and conservation plans, and applying best available science. When field inventories are not feasible, it should be assumed that suitable habitat is present and that habitat is occupied, so the appropriate conservation measures can be applied.
	Protect the relict plant community in the High Mesa Grasslands and *Eutrema penlandii* habitat as follows: ● ACEC designation ● No surface occupancy ● Closed to mineral entry ● No disposal of mineral materials ● OHV restrictions	Yes	There are other management actions that are not included in this list that need to be addressed. These include but are not limited to: herbicide application, insecticide application, new roads and trails, new campgrounds, other concentrated recreational uses, livestock grazing, de-watering, etc.
	Manage *Eriogonum brandegeei* in Droney Gulch and Garden Park through ACEC designation as follows: ● Limit livestock grazing ● No surface occupancy ● Closed to mineral management ● No disposal of mineral materials ● OHV use limited to designated roads and trails	Yes	There are other management actions that are not included in this list that need to be addressed. These include but are not limited to herbicide application, insecticide application, new roads and trails, new campgrounds, and other concentrated recreational uses.
	Make the following special status animal habitat available for fluid leasing in conformance with the ESA:	No; American peregrine falcon is no longer an endangered species, but it is a local	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	● Peregrine falcon nesting habitat	migratory bird of concern and a BLM sensitive species.	by the BLM Colorado State Office Deputy Director.
	Protect special status animal species habitat through elimination of conflicting uses.	Yes	Emphasis should be placed on those habitats that are vital to species viability or recovery, such as reproductive habitats, foraging habitats, and features specifically identified as primary constituent elements.
	Make special status animal habitat available for fluid mineral leasing with seasonal stipulations as follows: ● Ferruginous hawk nesting and fledging habitat (2/1–8/15) ● Bald eagle winter roosting habitat (11/16–4/15) ● Mexican spotted owl habitat (2/1–7/31) ● Peregrine falcon habitat (3/16–7/31) ● Mountain plover (4/10–7/10; South Park only) ● Least tern/piping plover (4/1–7/31)	No; does not match standard stipulation guidelines recently developed by the BLM Colorado State Office.	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado State Office Deputy Director.
	Close the following special status animal habitat to mineral entry and mineral material disposal : ● Peregrine falcon nesting habitat ● Mexican spotted owl nesting habitat	No; does not match standard stipulation guidelines developed by the BLM Colorado State Office.	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado State Office Deputy Director.
	Seasonally limit special status animal habitat for mineral operations as follows: ● Ferruginous hawk nesting and fledging habitat (2/1–8/15) ● Bald eagle winter roosting habitat (11/16–4/15) ● Mexican spotted owl habitat (2/1–7/31) ● Peregrine falcon habitat (3/16–7/31) ● Mountain plover (4/10–7/10; South Park only)	No; does not match standard stipulation guidelines developed by the BLM Colorado State Office.	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado State Office Deputy Director.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	● Least tern/piping plover (4/1–7/31)		
	Make the NSO area for Mexican spotted owl 1/2–mile radius around core area.	No; does not match standard stipulation guidelines developed by the BLM Colorado State Office.	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado Office Deputy Director.
	Incorporate Canada lynx conservation measures found in Chapter 7 of the Canada Lynx Conservation Assessment and Strategy (LCAS) in the special status animal species management sections of the RMP. Apply conservation measures to all resource management programs and activities within designated lynx habitats in lynx analysis units.	No; LCAS was revised in 2013 (Interagency Lynx Biology Team 2013).	Adopt 2013 LCAS and the 2010 Lynx Screens into the RMP, following best available science, which includes mapping LAUs and identifying primary and secondary lynx habitats within LAUs.
	Apply the following to lesser prairie chicken (LEPC) and fluid mineral management: ● NSO within 0.60 mile of an active lek (active within the last three years) ● Timing limitation stipulation that prohibits fluid mineral exploration and development activities and mineral operations March 15–July 15, within 2.20 miles of an active lek (active within the last 3 years).	No; does not match standard stipulation guidelines developed by the BLM Colorado State Office. Also, does not follow the conservation measures identified in *Range-Wide Oil and Gas Industry Candidate Conservation Agreement with Assurances for the Lesser Prairie-Chicken* (FWS and WAFWA 2014) (LEPC CCAA).	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado Office Deputy Director, and/or adopt LEPC CCAA conservation measures (FWS and WAFWA 2014).
Northeast RMP	Specific project design to maintain or improve important habitat will be developed during the environmental analysis process and will include appropriate BLM specifications.	Yes	This is a requirement of ESA and BLM Manual 6840 (BLM 2008a), so it is not necessary to specify it in the RMP. Instead, emphasis should be on enhancing habitat for special status species, following best management practices.
	General habitat has no important wildlife values currently identified.	No; the value of these lands may have changed.	Do not place definitive labels on public lands that describe wildlife values. References to “general” habitat and “all” wildlife species should be eliminated.
	Before any major action occurs on general habitat, inventories will be	Yes	Inventory and monitoring of special status species and their habitats were addressed earlier and should be applicable to the entire

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	done to determine if any important values are present.		RGFO. The emphasis on inventory prior to implementation should be carried forward.
	General wildlife habitat will be protected by considering wildlife concerns in the EAs of proposed actions and incorporating stipulations and mitigation measures.	Yes	Emphasis for conservation and protection for special status species should be placed on those habitats or primary constituent elements necessary for species viability and recovery.
	Wildlife habitat that is available for fluid mineral leasing may have the following seasonal stipulations: ● Bald eagle winter roosts (within 1/2 mile of roost site): 11/16–4/15 ● Bald eagle nesting (within 1/2 mile of nest site): 12/15–6/15 ● White pelican nesting and foraging: 3/16–9/30 ● Mexican spotted owl nesting and fledging habitat: 2/1–7/31 ● Peregrine falcon cliff nesting complex (within 1/2-mile radius): 3/16–7/31 ● Ferruginous hawk nesting and fledging habitat (within 1-mile radius of nest site): 2/1–8/15 ● Osprey nesting and fledging habitat (within 1/2-mile radius of nest site): 4/1–8/31	No; does not match standard stipulation guidelines developed by the BLM Colorado State Office.	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado Office Deputy Director.
	Wildlife habitat available for fluid mineral leasing may have the following NSO stipulations: ● NSO within 1/4 mile of bald eagle roost or nest site. The NSO applies to the essential feature of the winter roost complex. The NSO area may be altered depending on the active status of the roost or the geographical relationship of topographic barriers and vegetation screening. There are no exceptions for nest sites.	No; does not match standard stipulation guidelines developed by the BLM Colorado State Office.	The stipulations recently developed by BLM Colorado State Office should be adopted, or best available science with review by the BLM Colorado Office Deputy Director.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	• NSO within 1/4-mile radius of peregrine falcon cliff nesting complex. • NSO within 1/4-mile radius of Mexican spotted owl roost and nesting sites. • NSO on significant waterfowl and shorebird production areas. • NSO on habitat areas with special status plant species (federally listed, proposed, and candidate species).		

Note: Refer to section 4.2.4 for additional management issues and proposed new decisions.

B. Potential new decisions for the RMP revision

- Adopt standard wildlife stipulations recently developed by the BLM Colorado State Office in regards to fluid mineral leasing and development, or follow best available science with review by the BLM Colorado State Office Deputy Director.
- Manage special status species in compliance with revised BLM Manual 6840 (BLM 2008a) with an emphasis on protecting reproductive habitats and enhancing habitats.
- Integrate conservation measures from conservation assessments and recovery plans into project design features on all lands with a Federal interest for all threatened, endangered, and proposed species, as they are developed or updated. Specifically, these include but are not limited to LCAS (Lynx Interagency Team 2013), LEPC CCAA (FWS AND WAFA 2014), and *Mexican Spotted Owl Recovery Plan* (FWS 2012).
- Integrate conservation measures from species assessments and conservation plans into project design features on all lands with a Federal interest for all BLM sensitive species, as they are developed or updated.
- For special status species for which there are no recovery or conservation plans in place, incorporate conservation measures into project design features to all lands with a Federal interest in a manner that follows best available science.
- Develop buffer distances to protect sensitive plant populations, following best available science, conservation plans, and FWS recommendations to maintain plant species viability.
- .Develop buffer distances to protect reproductive habitats for special status wildlife species, following best available science, and conservation and recovery plans.

C. Areas of relative ecological importance to guide land uses and management

Areas of high ecological value—where management should focus most of its enhancement, maintenance, and/or protection efforts—include the following sites:

- Engelmann spruce and other mesic forests with understory conifer trees or complex structure
- Riparian corridors, fens, wetlands, marshes, and water bodies including shorelines
- Sand sage
- Cliffs that support raptor nests
- Canyons that contain the primary constituent habitat elements for Mexican spotted owl
- Alpine tundra with snow willow
- Ponderosa pine woodlands with prairie gayfeather
- Mountain and prairie grasslands occupied by black-footed ferret, Gunnison's prairie dog, mountain plover, burrowing owl, and swift fox
- Large contiguous sagebrush patches
- Caves, rock crevices, and snags with signs of bats
- Potential habitat for rare, endemic and BLM sensitive plants, including those currently listed as well as future listings: *Eriogonum brandegeei, Eriogonum coloradense, Arabis crandallii (Boechera crandallii), Penstemon degeneri, Asclepias uncialis, Packera pauciflora (Packera degeneri,* or *Packera debilis), Mentzelia chrysantha (Nuttallia chrysantha), Sisyrinchium pallidum*, and *Aquilegia chrysantha var. rydbergii*
- All designated critical habitats, all reproductive habitats, and all other habitats identified as critical for the survival, viability or recovery of threatened, endangered, proposed, and sensitive species

4.2.9. Wildland Fire Ecology and Management

A. Current management direction

Table 4.9 shows the ability of management to achieve desired future conditions for wildland fire ecology and management.

Table 4.9. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Wildland Fire Ecology and Management Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Manage all BLM-administered lands for total fire suppression. The current planning decision allows for prescribed fire and prescribed natural fire to be used as a management tool to enhance other resources.	No	1997 RMP plan amendment clarified that prescribed natural fire could be used as a management tool. This change was also implemented from the analysis done with the EA for *Standards for Public Land Health and Guidelines for Livestock Grazing Management* (BLM 1997).
	No rotational use of prescribed fire is anticipated.	No	Prescribed fire is an important management tool to maintain treated areas. Fire is recognized as a natural and indispensable process in fire-adapted ecosystems and can also be used to achieve objectives for other resources. It is the best way to return a landscape to a desirable condition class.
	Describe desired plant community and initiate fire projects through IAPs prior to fire prescription.	Yes and no	The decision is still valid; however, the use of IAPs is outdated. Newer planning documents such as the FMP are better vehicles to meet the desired objectives.
	Prepare a specific burn plan, including NEPA documentation, in advance of a prescribed burn.	Yes	The preparation of a burn plan is standard procedure; however, since it is policy, the BLM may not need

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
			a specific decision stating this.
Northeast RMP	Wildfire: All BLM-administered surface estate is in one of two categories, based on the type of wildfire protection needed: ● Cooperative (10A)—The prevention and suppression of wildfire is accomplished on 22,520 acres by either a memorandum of understanding or a cooperative agreement, which will include the following: ○ Parties involved ○ Purpose authorities ○ Agreement items and responsibilities ○ A provision for annual review ○ A savings clause to cover funding changes or cancellation ○ Reimbursement clauses defined ○ Cooperative agreements for wildfire protection will be made immediately and followed until cancellation upon tenure change ● General (10B)—Wildfire protection through a special cooperative agreement is historically not considered necessary for these acres of surface estate because of the rarity of fire occurrence. If a fire occurs, reimbursement may be provided to the appropriate suppression agency(s). Prescribed burning: All acres are in the "Open" category. Proposals for prescribed burning (11A, B) will be reviewed through the EA process to determine acceptability and to design the burn project. Criteria used in this review include the following: ● Earlier beneficial successional stage of vegetation ● Necessary reduction of fuel hazard ● Necessary manipulation of species composition ● Achievable reduction of noxious weeds ● No threatened private property ● Less fire danger than or equal to Class III (moderate) ● Acceptable smoke dispersal and obtainable permit ● Full consideration of other resource values	No	Same as options for change in Royal Gorge Resource Area RMP (BLM 1996).

B. Potential new decisions for the RMP revision

Potential decisions for the RMP revision will be related to managing wildfires to achieve a balance between suppression, the protection of life, property, and natural resources, and the management of wildland fire for resource benefit, to regulate fuels, and maintain healthy ecosystems and vegetation conditions. In addition, vegetation treatments and prescribed fire projects to reduce fuels to lower the intensity and severity of wildfires on the landscape and to improve ecological conditions will also be considered..

C. Areas of relative ecological importance to guide land uses and management

Currently, with prescribed fire, mechanical treatment, and managed wildland fire, the 9-year average of acres treated on BLM through all of these methods annually is 2,039 acres. The rate at which historic fire occurred far outpaces the current treatments and wildland fire that are occurring within each of the fire regime groups on BLM lands. This, coupled with the fact that 74 percent of BLM lands within the planning area are in a VCC 2 (moderately departed) or VCC 3 (highly departed), poses a significant challenge to return the landscape to a more sustainable and resilient condition. If vegetation treatments (including managed fire, prescribed fire, and mechanical, chemical, and biological treatment) do not occur, there will continue to be more fires of undesired intensities. The risk of losing key ecological components and losing values at risk will increase.

4.2.10. Cultural Resources

A. Current management direction

Table 4.10 shows the ability of management to achieve desired future conditions for cultural resources.

Table 4.10. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Cultural Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Informational potential of historical resources will be used for interpretation and scientific values, and specific sites will be used for their interpretive values.	Yes, but the previous RMP incorrectly separated "historical" from "archaeological" sites.	Combine "historical" with "archaeological," and develop "cultural resources" for informational potential. Don't use "historic property," as that eliminates sites not eligible for the National Register of Historic Places (NRHP) that still might have information potential.
	Informational potential of archaeological resources will be developed to the maximum extent possible through appropriate study.	Yes, but the previous RMP incorrectly separated "historical" from "archaeological" sites.	Combine "historical" with "archaeological," and develop "cultural resources" for informational potential. Don't use "historic property," as that eliminates sites not eligible for the NRHP that still might have information potential.
	Conservation of historical and archaeological resources will be enhanced through the following:	Yes, but change the areas that are closed.	Replace the Leadville Stage Road, Midland RR Railbed, and DeRemer Forts with the following: Categories,

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	Designation of Browns Canyon and Arkansas Canyonlands as ACECs, with potential NRHP sites (Leadville Stage Road, Midland RR Railbed, and DeRemer Forts) being leased for fluid minerals under standard leasing stipulations and closed to locatable mineral entry and mineral materials development. OHV use limited to designated roads and trails	The previous RMP incorrectly separated "historical" from "archaeological" sites.	including Sacred Sites (5PA1300, 5PA718, 5FN2538); Prehistoric Landscapes (Eastern Plains canyon sites, 5FN2629/5FN2507/5CF2664); Historic Townsites (5CF1975/ 5LK2840, 5BL7358, 5LK1905, 5LK821, 5LK1984); Rare and Unique (5CF555) Combine "historical" with "archaeological," and develop "cultural resources" for informational potential.
	Informational potential of historical and archaeological resources will be promoted through involvement with educational institutions.	Yes, but the previous RMP incorrectly separated "historical" from "archaeological" sites.	Combine "historical" with "archaeological," and promote "cultural resources" for involvement with educational institutions.
	Active programs for interpretive scientific and recreational use of historic sites will be developed within IAPs.	No. Activity planning has never occurred and is prohibitively expensive.	Identify and prioritize sites that require proactive management annually as part of the Section 110 program.
Northeast RMP	All sites will be protected consistent with their designated significance.	No. Too vague.	Change the language to more specifically address management categories (e.g., sites eligible for the NRHP, sites eligible for the State Register, ineligible sites) and to describe management activities as more than "protect."
	Provisions for site protection will be made during activity planning.	No. Activity planning has never occurred and is prohibitively expensive.	Identify and prioritize sites that require proactive management annually as part of the Section 110 program.
	All significant sites will be protected from potential adverse effects by maintaining public control.	Yes, but the language is vague.	Consider the eligibility status and current management of sites when public control is threatened.

B. Potential new decisions for the RMP revision

Improvement of management activities:

- Limit activities (such as metal detecting) that are otherwise allowed, but that result in the destruction and looting of historic properties.
- Establish procedures for dealing with the issue of site boundaries and private land ownership.
- Continually monitor list of annually monitored sites, and set up criteria for a segregated monitoring schedule based on site sensitivity and levels of decline.

- Step up Archaeological Resources Protection Act activities, and focus on public exposure of successful cases.

- When culturally appropriate and feasible, evaluate sites in the context of aboriginal and historic landscapes, and develop and refine registration requirements that simplify future evaluations.

Native American coordination:

- Improve protection of and access to sacred sites.

- Establish procedures for sharing data with tribal historic preservation officers (THPOs).

- Allow for the establishment and management of repatriations on public land, pursuant to IM 2007-002 (BLM 2006).

Information management:

- Positively identify the State Historic Preservation Office as official repository for Colorado cultural resources digital data.

- Develop a cultural resource information management strategy that includes the following:

  - Procedures to remain current with technological advances that improve collection, organization, and curation of cultural resource data.

  - Migration procedures and schedule for curated data.

  - Geospatial and digital information database procedures that emphasize accuracy and completeness.

C. Areas of relative ecological importance to guide land uses and management

Develop and refine criteria for site membership in the following categories:

- Sacred Sites (5PA1300, 5PA718, 5FN2538);

- Prehistoric Landscapes (Eastern Plains canyon sites, 5FN2629/5FN2507/5CF2664);

- Historic Townsites/Landscapes (5CF1975/5LK2840, 5BL7358, 5LK1905, 5LK821, 5LK1984);

- Rare and Unique Sites (5CF555)

4.2.11. Native American Concerns

Table 4.11 shows the current management direction for Native American concerns.

Table 4.11. Evaluation of Current Management Direction for Native American Concerns

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
None	None	No	• Improve protection of and access to sacred sites. • Establish procedures for sharing data with THPOs. • Allow for the establishment and management of repatriations on public land, pursuant to IM 2007–002 (BLM 2006).

4.2.12. Paleontological Resources

A. Current management direction

Table 4.12 shows the ability of management to achieve desired future conditions for paleontological resources.

Table 4.12. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Paleontological Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Manage paleontological resources in accordance with existing BLM manual and other guidance, requiring clearances (in Class I filtered areas) and necessary mitigation in Class I and other areas identified as having specific indications of scientifically significant fossils.	Yes	Update language: Manage paleontological resources in accordance with existing BLM manual and other guidance, requiring clearances— potential fossil yield classification (PFYC) 4 and 5 filtered areas—and necessary mitigation in PFYC 4 and 5 and other areas identified as having specific indications of scientifically significant fossils.
	Use of fossil resources for educational, research, and other public uses, such as tourism, will be encouraged, with special emphasis on the Garden Park Fossil Area.	Yes	Update language: Use of fossil resources for educational, research, and other public uses, such as tourism, will be encouraged, with special emphasis on the Garden Park Fossil Area.
	Conservation of Class I paleontological resources will be encouraged with ACEC designation and managed as follows in the Garden Park Fossil Area ACEC: closed to timber harvesting and wood gathering, NSO, closed to mineral entry (withdrawal was not completed), closed to mineral material	Yes	Update language: Conservation of PFYC 4 and 5 paleontological resources will be encouraged with ACEC designation and managed as follows in the Garden Park Fossil Area ACEC: closed to timber harvesting and wood gathering, NSO, closed

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	disposal unless disposal will enhance paleontological values, retained in public ownership, limited livestock grazing, OHV use limited to designated roads and trails		to mineral entry (withdrawal was not completed), closed to mineral material disposal unless disposal will enhance paleontological values, retained in public ownership, livestock grazing limited, OHV use limited to designated roads and trails
	Establishment of some invertebrate collecting areas to provide fossil materials for public domain collections will be considered through IAPs (the BLM still needs an IAP for GPFA ACEC).	No	N/A
	A "discovery" center will be established for the Garden Park Fossil Area in cooperation with the Garden Park Paleontological Society (this was never completed]).	No	N/A
Northeast RMP	A. Class Ia: Immediate, detailed study follow-up is needed. Fossils of scientific interest are exposed on the surface, or are very likely to be discovered with detailed field work in the area. This classification is used for site-specific localities having scientifically significant fossils. As such sites are discovered, the following management practices will be implemented: 1. Preservation by avoidance or stabilization 2. Collecting and interpretation through excavation by qualified paleontologists	Yes	Update language: Change "A" to "PFYC 5" : Immediate, detailed study follow-up is needed. Fossils of scientific interest are exposed on the surface, or are very likely to be discovered with detailed field work in the area. This classification can be used for site-specific localities having scientifically significant fossils. As such sites are discovered, the following management practices will be implemented: 1. Preservation by avoidance or stabilization 2. Collection and interpretation through excavation by qualified paleontologists
	B. Class Ib: Other areas having a high potential for scientifically significant fossils. In these areas, a paleontological evaluation will be done by the geologist, on a case-by-case basis, prior to any surface-disturbing activity. These evaluations will change this classification to Class Ia, Class II, or Class III, as appropriate.	Yes	Update language: PFYC 4: Other areas having a high potential for scientifically significant fossils. In these areas, a paleontological evaluation will be done by a qualified paleontologist, on a case-by-case basis, prior to any surface-disturbing activity. These evaluations will change this classification to PFYC 5, 3, or 2 as appropriate.
	C. Class II: There is evidence of fossils, but the presence of fossils of scientific value has not been established, and is not anticipated. Detailed study may be desirable in the future for	Yes	Update language: PFYC 3: There may or may not be evidence of fossils , and the presence of fossils of scientific value has not been established,

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	the evaluation of all types of fossil collecting. This classification may identify recreational values in fossils.		nor has it necessarily been ruled out. Detailed study may be desirable in the future for the evaluation of all types of fossil collecting. This classification may identify recreational values in fossils.
	D. Class III: Little likelihood of finding fossils of use. No further consideration of fossils necessary, unless future discoveries require a change in classification.	Yes	Update language: PFYC 1 and 2: Little likelihood of finding fossils of use. No further consideration of fossils necessary, unless future discoveries require a change in classification.

B. Potential new decisions for the RMP revision

Paleontological resource preservation under the Omnibus Act of 2009 (P.L. 111-11, Title VI, Subtitle D, Sections 6301–6312, 123 Stat. 1172, 16 U.S.C. 470aaa) (OPLA-PRP) requires the Secretary of the Interior to manage and protect paleontological resources on Federal land using scientific principles and expertise. The act directs the Federal agencies to begin developing regulations, establish public awareness and education programs, and to inventory and monitor Federal lands. Although the BLM doesn't expect major changes to the current management of paleontological resources on public lands within the RGFO, at some point during the Eastern Colorado RMP revision, the BLM will likely see these regulations, and this will direct how the agency manages paleontological resources on public lands.

C. Areas of relative resource importance to guide land uses and management

- National natural landmark designation was expanded from 40 to 3,200 acres to include all of the significant paleontological resources in the area.
- Garden Park ACEC was supposed to have had an activity plan after the planning period was over, but this was not completed; this should be completed in order to align multiple uses, so that significant resources are not disturbed.
- OPLA-PRP mandates paleontological resource management using scientific principles; regulation development is in progress.
- Garden Park ACEC needs to be expanded to include the new National Natural Landmark boundary.

4.2.13. Visual Resources

A. Current management direction

Table 4.13 shows the ability of management to achieve desired future conditions for visual resources.

Table 4.13. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Visual Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Existing visual resource management (VRM) classes will be used to guide resource management actions on BLM-administered lands. Adherence to criteria will occur according to respective class rating.	No. VRM classes are out of date and need to be updated.	VRM classes could be revisited based on an updated visual resource inventory (VRI) and other land uses.
	Wilderness areas will be managed as VRM Class I	Yes. Although there is no designated Wilderness within the planning area, there are several wilderness study area (WSAs) that could be designated as Wilderness by Congress, and this VRM class objective would be appropriate.	N/A
	VRM Class II areas will be protected by a CSU stipulation for oil and gas activities.	Maybe. Additional mitigation measures may be necessary to adequately protect visually sensitive areas.	Additional mitigation measures could be considered to better protect visually sensitive areas.
	Visual ratings in ACECs will be re-evaluated to ensure rating is appropriate to protect outstanding qualities	Yes. This re-evaluation has not occurred and could be accomplished through an updated plan.	N/A
	Contrast rating forms are required for high impact projects or proposed projects in highly sensitive areas.	Yes. This continues to be the BLM's VRM policy.	N/A
	A brief narrative visual assessment will be completed for all projects that require an EA or EIS.	Yes. This continues to be the BLM's VRM policy.	N/A
	All activity planning for visual resources will be accomplished within IAPs Note: The 1996 Royal Gorge Resource Area RMP does not provide a summary of acreages under VRM Class I, II, III, IV.	Yes. This continues to be the BLM's VRM policy.	N/A

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Northeast RMP	No lands are allocated as VRM Class I	Maybe. VRM classes are out of date and need to be updated.	VRM classes could be re-visited based on an updated VRI and other land uses.
	Allocate 13,970 acres as VRM Class II. Any management activity in VRM Class II should not be evident in the characteristic landscape. Although the activity may be seen, it should not attract attention.	Maybe. VRM classes are out of date and need to be updated.	VRM classes could be re visited based on an updated VRI and other land uses.
	Allocate 12,600 acres as VRM Class III. Management activity in VRM Class III may be visible and attract some attention, but should remain subordinate to the surrounding landscape.	Maybe. VRM classes are out of date and need to be updated.	VRM classes could be re visited based on an updated VRI and other land uses.
	Allocate 10,520 acres as VRM Class IV. Management activity in VRM Class IV may be the dominant feature in the landscape in terms of scale but should repeat the basic characteristics of the landscape.	Maybe. VRM classes are out of date and need to be updated.	VRM classes could be re visited based on an updated VRI and other land uses.

B. Potential new decisions for the RMP revision

- Consider revising the VRM class objectives for the Royal Gorge Field Office based on an updated inventory and other resource objectives.
- Consider revising stipulations for oil and gas leasing to better meet VRM class objectives.
- VRM classes will need to correlate with recreation management objectives and prescriptions that have been set for recreation management zones in every special recreation management area (SRMA).
- The revised RMP will need to address BLM guidance, which requires that all WSAs be managed as VRM Class I areas

C. Areas of relative ecological importance to guide land uses and management

The Royal Gorge VRI, which is currently underway, will classify landscapes based on public sensitivity, scenic quality, and distance from key viewing areas to help guide land uses and management.

4.2.14. Lands Proposed for Protection of Wilderness Characteristics

A. Current management direction

The 1996 RMP did not address lands with wilderness characteristics.

B. Potential new decisions for the RMP revision

The BLM will evaluate lands with wilderness characteristics through the land use planning process. When such lands are present, the BLM will examine options for managing these lands and determine the most appropriate land use allocations for them. Considering wilderness characteristics in the land use planning process may result in several outcomes, including but not limited to 1) emphasizing other multiple uses as a priority over protecting wilderness characteristics; 2) emphasizing other multiple uses while applying management restrictions (conditions of use, mitigation measures) to reduce impacts to wilderness characteristics; and 3) the protection of wilderness characteristics as a priority over other multiple uses.

C. Areas of relative ecological importance to guide land uses and management

The BLM updated its inventory of lands with wilderness characteristics in 2013. This effort found that 40 parcels totaling 77,756.5 acres met the BLM's policy criteria for having wilderness characteristics. These 40 parcels would guide land use decisions relating to this resource.

4.3. Resource Uses

4.3.1. Recreation

A. Current management direction

Table 4.14 shows the ability of management to achieve desired future conditions for recreational resources.

Table 4.14. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Recreational Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Existing developed sites will be withdrawn from mineral entry, and those recreation sites over 10 acres will be leased for fluid mineral with NSO stipulations, closed to livestock grazing if conflicts occur, excluded from major ROW/corridor development, and retained in public ownership.	Yes and no. Decision is relevant for existing sites; however, it does not address future developed sites. Actions have been taken to fence developed sites and withdraw them from mineral entry.	Could include all developed sites, existing and future needs.
	Recreation will be managed intensively in the Gold Belt (126,248 acres) and Arkansas River (109,063 acres) SRMAs, and regional tourism opportunities will be enhanced.	Yes, most are applicable, and no, some areas need to be re-evaluated	Boundary adjustments on SRMA areas may be needed. Change some areas to SRMA or define with more intensive management. Specific zones would be established.
	Royal Gorge Extensive Recreation Management Area (ERMA) will be	Yes, most are applicable, and no,	Revisit areas that have increased visitation, potentially requiring

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	managed non-intensively in all other subregions.	some areas require more. Some areas may not fit within an RMA.	intensive management. Consider other areas for "no RMA" designation where recreation management does not occur.
	Recreation will be managed to provide for: a variety of recreational opportunities and settings; additional opportunities for mountain biking, hiking, OHV use, interpretation, and horseback riding; facility development will be accomplished to reduce user conflicts and to improve visitor health and safety.	No. Policy directs the BLM to manage according to desired outcomes and associated settings, moving away from activity-based planning.	Outcomes and settings would be established for each zone within RMAs.
	Various actions will occur to enhance recreation in all subunits except Badger Creek (subregion No. 3) and Cucharas Canyon (subregion No. 9) and other lands (subregion No. 10). These actions include river corridor and upland recreation opportunities emphasizing a balance between resource protection and tourism; coordination with various volunteer user groups; monitoring and visitor contacts to ensure visitor safety, resource protection, and visitor information availability; provide for acquisitions or easements to enhance mountain biking, OHV use, hiking, horseback riding, hunting, and natural/cultural resource interpretation.	No. Policy directs the BLM to manage according to desired outcomes and associated settings, moving away from activity-based planning.	Outcomes and settings would be established for each zone within RMAs.
	Motorized recreational OHV opportunities will be enhanced	Yes and no; it is responsive but should be identified through outcomes and settings for each RMA.	Enhancement of recreational opportunities would be directed through subsequent planning efforts (travel management plan, recreation area management plans) as identified for each RMA.
	Information materials for motorized OHV recreational opportunities will be developed, including incorporating public awareness of national programs.	Yes and no; it is responsive but should be identified through outcomes and settings for each RMA.	Dissemination of information materials would be directed through subsequent planning efforts (travel management plan, recreation area management plans) as identified for each RMA.
Northeast RMP	The planning area is broken out by six broad types of classes of recreational opportunities, recognized on a continuum or spectrum ranging from largely natural and low-use areas to highly developed and intensively used areas.	No; updated policy directs BLM to outcome-based management.	Evaluate planning area under outcome-based recreation management and consider option of "no RMA."

B. Potential new decisions for the RMP revision

The current RMP is activity-based. The RMP revision should include outcome-based management. Shifting to outcome-based management defines the types of settings expected when visiting an area. This includes re-visiting RMA boundaries and identifying management prescriptions for discrete zones within SRMAs. This would also address demands for special recreation permits.

C. Areas of relative ecological importance to guide land uses and management

Both the Gold Belt and Arkansas River SRMAs are important for recreational resources.

4.3.2. Livestock Grazing

A. Current management direction

Table 4.15 shows the ability of management to achieve desired future conditions for livestock grazing.

Table 4.15. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Livestock Grazing Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Base livestock grazing management on the 1981 Royal Gorge Area Grazing EIS. Continue to use allotment management plans (AMPs) on an interim basis until replaced with IAPs.	No; 1981 Royal Gorge Area Grazing EIS is outdated.	Do not bring forward to new RMP.
	Authorize adjustments in the actual AUMs (temporary increase or decrease), and make these adjustments when warranted by weather or other conditions.	Yes	None
	Prepare an EA before a term permit is issued for acquired lands outside the existing allotment boundary. Temporary livestock grazing could be allowed, pending an EA on completion of acquisition of these lands.	Yes	None
	Continue with or establish monitoring studies depending on management category.	Yes	None
	Determine the specific type of monitoring studies by the IAP objectives.	No. IAPs are not currently used by this office and are not a BLM-wide direction.	Do not bring forward to new RMP.
	Conduct ESI on allotments with conflicts, and adjust stocking rates and season of use accordingly. Re-evaluate current poor-condition allotments with ESI data, and determine the appropriateness of management levels of use to meet current objectives. Based on monitoring studies and after	No; this is not applicable. Should use other monitoring methods.	Do not bring forward to new RMP.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	an evaluation, corrective action will be taken if AMP or IAP objectives are not being met. Changes in livestock use will be made through an EA or AMP revision.		
	Grazing systems will be implemented by an IAP. Plans will be prepared in consultation, cooperation, and coordination with the permittee and other affected parties to meet multiple use and land use plan objectives.	No. IAPs are not currently used by this office and are not a bureau wide direction.	Keep decision but change IAPs to EAs or other planning documents.
	Determine the grazing capacity accuracy on custodial allotments.	No. Most of the custodial allotments have already had grazing capacity calculated Most of the custodial allotments have already had grazing capacity calculated.	Do not bring forward to new RMP.
	Continue to construct range improvement projects on an as-needed basis. Complete NEPA documentation on each project as needed.	No. Will be captured in the new proposed adaptive management decision.	Do not bring forward to new RMP.
	Continue with land treatments as a management practice. Complete NEPA documentation on each project as needed.	Yes. Still meets current management practices and is helping to achieve land health standards.	None
	Allocation of additional forage resulting from improved management or vegetation manipulation will be to livestock or wildlife or a combination of both on a case-by-case basis after consulting with State and Federal agencies, private groups, and the affected grazing permittee.	Yes. Still meets current management practices and is helping to achieve land health standards.	None
	Adjustments in grazing use will be made by allotment on a case-by-case basis. Changes in number of livestock, season-of-use, duration-of-use, and class of livestock can be made based on monitoring studies and inventory data.	No. Will be captured in the new proposed adaptive management decision.	Do not bring forward to new RMP.
	The grazing treatment on Improve and Maintain category allotments will require a rest standard to allow a time period for forage species to recover	Yes. Still meets current management practices and	None

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	from the last grazing period before the plants are re-grazed.	is helping to achieve land health standards.	
	Maximum allowable utilization on allotments with rotational grazing or dormant season grazing will be 80 percent annual production on grass species and 60 percent of annual production on shrub species. These percentages may have to be reduced on specific allotments because of conflicts with wildlife, watershed conditions, or riparian habitat.	No. Current direction from State Office is to not include utilization levels in RMP to allow for more flexibility on a case-by-case basis.	Do not bring forward to new RMP.
	On single pasture allotments with season-long spring/summer grazing, utilization will be held to the 40–60 percent range on forage species in lieu of a rest standard. This requirement will be on high-elevation allotments where deferment or dormant season use is impractical because of deep snow, and fencing the allotment into smaller units is uneconomical. On these allotments, utilization estimates will be made on a key species to prevent overuse of desirable species.	No. Current direction from State Office is to not include utilization levels in RMP to allow for more flexibility on a case-by-case basis.	Do not bring forward to new RMP.
	Season of use and stocking rates will continue based on the grazing EIS and vegetation monitoring.	No. 1981 Royal Gorge Area Grazing EIS is outdated.	Do not bring forward to new RMP.
	Livestock grazing will be prioritized based on IAP resolution of conflicts with riparian, critical wildlife habitat, and ACECs.	No. IAPs are not currently used by this office and are not a BLM-wide direction.	Do not bring forward to new RMP.
	Grazing is authorized on 454 allotments.	No. Current allotment numbers will be adjusted prior to completion of RMP.	The BLM will keep this decision with updated number of allotments. Current allotment numbers will be adjusted prior to completion of RMP.
	Grazing is excluded on Mosquito Pass ACEC (4,036 acre~) and restricted on the High Mesa Grasslands portion (1,454 acres) of the Arkansas Canyonlands ACEC.	Yes; still applicable.	None
	Grazing is excluded on developed recreation sites and potential NRHP sites if conflicts occur.	No. decision of grazing use will be analyzed by the interdisciplinary team. Individual decisions will be made on a case-by-case basis.	Do not bring forward to new RMP.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	Livestock drift onto uncontrolled private land will be eliminated through BLM fencing, cooperative projects, or by eliminating grazing.	No. Colorado State fencing law dictates that private land owners are responsible for keeping livestock off their land.	Do not bring forward to new RMP.
	Allotments are categorized as follows: Improve, Maintain, Custodial, or Unallotted.	Yes; still applicable to current management classification.	None
	Grazing stocking rates and season-of-use will be adjusted on the Droney Gulch ACEC (705 acres).	Yes; its within the Mt. Shavano allotment.	None
	Grazing will be excluded on potential NRHP sites if conflicts occur.	No; redundant.	Do not bring forward to new RMP.
	Grazing is excluded on a portion of Beaver Creek ACEC (5,755 acres).	No. Grazing exclusion on the ACEC is still applicable with the exception of trailing through the ACEC.	Change to allow trailing through Beaver Creek ACEC and allow for prescriptive grazing to meet management objectives.
	Stocking rates and season-of-use will be adjusted in Garden Park ACEC (2,728 acres).	No; adjustment has already occurred.	Do not bring forward to new RMP.
	Season-of-use for grazing will be adjusted on two ACECs. (Subregion No. 7). Grazing will be excluded on the potential NRHP district if it becomes designated. (Subregion No. 9)	No; new RMP will not include subregions.	Do not bring forward to new RMP.
	The Royal Gorge RMP is amended to include the standards for public land health and guidelines for livestock grazing management, dated November 1996. Existing RMP decisions are modified or replaced by adoption of standards for public land health and guidelines for livestock grazing management.	No. This was an amendment to the existing RMP. The BLM wants to keep but modify the wording for the new RMP.	Eliminate "amendment" wording for standards for public land health and guidelines for livestock grazing management in Colorado. Colorado's rangeland health standards were developed to assess and protect ecological communities and their associated values. Standards are descriptions of the desired condition of biological and physical components and characteristics of rangelands that are applied to management of all public land resources and uses. Guidelines are management approaches, methods, and practices intended to achieve established standards.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Northeast RMP	Leased (5A)—Currently, 5,385 acres are leased for livestock grazing. Custodial-level management provides for use up to the grazing capacity as determined by field examination, with adjustments made if necessary after monitoring. Grazing on public land occurs in conjunction with the lessee's normal operation. Improvements are generally operator initiated, developed, and maintained. Examples of improvements include, but are not limited to, fences and water developments such as stock water impoundments and spring developments. Monitoring of grazing use, range condition, and trend will provide indications of needed improvements or possible changes in grazing use.	No. This is not a decision, and custodials are already covered.	Do not bring forward to new RMP.
	Open (5B)—Suitability of leasing for grazing is determined through the EA process after application by a qualified livestock operator. The following criteria used in this determination could preclude grazing: ● Slopes greater than 50 percent ● Further than 4 miles to water on the plains; 1 mile in the Front Range ● Soil surface factor (erosion susceptibility) greater than 60 ● Forage production requiring more than 32 acres per animal unit month ● Land ownership or control for a logical lease unit conflicts with other resources Application of these criteria may result in a decision that the land is either unsuitable or suitable for grazing. If unsuitable, the application would be rejected and the area reclassified to "Closed." If suitable, the lease would be granted and the area reclassified to "Leased."	No. Much of this language is not a decision. The BLM will not have subregions in the new RMP.	Do not bring forward to new RMP.
	Closed (5C) - These lands are not available for grazing. They are either unsuitable using the criteria listed under "Open," have no potential, or have more value for other uses not	No. The BLM will not have subregions in the new RMP.	Do not bring forward to new RMP.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	compatible with grazing. Applications for grazing on these lands will not be accepted.		

B. Potential new decisions for the RMP revision

Since the existing RMPs were approved, many changes have occurred inside and outside of the range program. These changes warrant updating the livestock grazing portion of the range program in the revised RMP. The update will direct appropriate livestock grazing management strategies in the future. Possible changes include but are not limited to the following recommendations:

- Administrative access for maintaining range improvements should be acknowledged and maintained. Authorized off-road travel could occur on a case-by-case basis.
- Livestock grazing will continue at current forage allocation levels and seasons of use, unless studies determine adjustments are needed.
- Use will be addressed through allotment-specific planning documents.
- Range staff and grazing permittees should be informed about forestry and fuel activities and time frames.
- Adaptive management options:
  - Adaptive management is defined as a process where land managers implement management practices that are designed to achieve an acceptable resource condition in a timely manner. In addition, practices could be implemented when unforeseen circumstances occur such as drought and/or fire or climate change. All adaptive actions will be within the scope of effects in this document, or a supplemental NEPA document (DNA—determination of NEPA adequacy) will be prepared. Table 4.16 below provides a list of potential adaptive grazing management actions that can be applied as necessary.
- Conflict between grazing and other uses such as recreation will be alleviated through interpretive signage to inform the public about other uses in the area.

Table 4.16. Adaptive Grazing Management Actions (Tool Box)

1. Change season of use—do not exceed permitted AUMs.
2. Change animal numbers—do not exceed permitted AUMs.
3. Change animal class from cattle to yearlings or vice versa—do not exceed permitted AUMs.
4. Adjust permitted AUMs based on the 3-year average obtained through appropriate monitoring.
5. Defer livestock turn-on/off date.
6. Rest from livestock grazing for one or more seasons.
7. Construct permanent fencing to control livestock distribution patterns, or exclude livestock from areas of concern (riparian, wetlands, springs).
8. Construct temporary electrical fencing to control livestock distribution patterns.
9. Remove permanent fencing and temporary fencing.
10. Construct livestock water developments (springs, infiltrators, pipelines, tanks, windmill, sediment traps, wells, stock dams, submersible pumps, solar).

11. Remove existing water developments (springs, infiltrators, pipelines, tanks, windmill, sediment traps, wells, stock dams, submersible pumps, solar).
12. Authorize trailing of livestock across the allotment.

C. Areas of relative ecological importance to guide land uses and management

- ACECs and WSAs where livestock grazing occurs.
- Areas within the RGFO that are experiencing increasingly denser canopies of pinyon-juniper woodlands, and these woodlands have begun to encroach on many of the open grassland parks and meadows. As this continues over time, many areas are characterized by decreasing amounts of herbaceous plant cover and higher amounts of bare ground. The productivity, vigor, and diversity of the site decreases. These areas begin to retain less moisture during precipitation events and allow higher levels of soil movement. Allocated livestock forage on allotments decreases, resulting in overused areas and poor livestock distribution. The denser pinyon-juniper canopies and encroachment also results in poor habitat for wildlife and tends to force deer and elk off public lands onto adjacent private lands. These areas are not meeting the public land health standards.
- Cooperative vegetation treatment efforts between public agencies including the BLM, Colorado Parks and Wildlife, the Habitat Partnership Program (HPP), and Colorado State Land Board should be continued with the following objectives:
  - Promote herbaceous plant diversity and reduce soil erosion.
  - Enhance forest health and diversity.
  - Reduce wildlife conflicts on adjacent private lands.
  - Promote forage production on public lands for both wildlife and permitted livestock.

4.3.3. Farmlands—Prime and Unique (Agricultural Use)

Table 4.17 below shows current management direction for prime and unique farmlands.

Table 4.17. Ability of Current Management Direction to Achieve Desired Future Conditions for Prime and Unique Farmlands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	No decisions made.	Yes	The plan should address prime and unique farmlands to some extent even though it is very rare to encounter them.
Northeast RMP	Some areas of prime and unique farmlands would be closed.	Yes	The plan should continue to address them; however, given new technologies and other management considerations, closures may be unwarranted.

4.3.4. Forestry

A. Current management direction

Table 4.18 shows the ability of management to achieve desired future conditions for forest resources.

Table 4.18. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Forest Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Vegetation shall be managed to accomplish other BLM initiatives (i.e., riparian, wildlife, etc.).	Yes; besides improving forest health, many other RGFO program objectives are being met through forestry treatments.	Continue current management.
	Productive forest lands will be managed for sustained yield.	Yes; current forest product markets and forestry manpower limit overcutting.	Continue current management.
	A portion of the forested lands will be available for intensive management.	Yes; only a small portion of the forested lands are suitable for mechanical treatments.	Continue current management.
	Implement forest and woodland management on an extended rotation, even-aged basis. Uneven-age management is not precluded but will not occur on significant acreage.	No	Implement scientifically sound silvicultural practices based on the tree species characteristics and historic disturbance regimes.
	Silvicultural and site-preparation methods that result in natural regeneration will be the primary reforestation methods and will be the emphasis in sale design.	Yes, but reword?	Design projects and implement silvicultural treatments that will result in natural regeneration.
	Determine desired plant communities in all disturbed areas	Yes	All forests in the RGFO have been disturbed. All forestry treatments move the area towards a desired plant community based on species present and on species present prior to historic timber harvests.
	Manage commercial forests and operable woodlands to enhance special status animal habit.	Partly	Include management prescriptions that address or enhance special status species requirements.
	Forest lands allocated for other resource values (not subject to planned timber harvests) are available for retention, maintenance, and/or	Maybe	The BLM cannot rely on returning natural fires as the primary means for restoring RGFO forests. The BLM should guide ecological

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	reestablishment of old growth and mature forests.		processes to return them to a reasonable semblance of historic conditions.
	New road construction will benefit management through reduction of transportation costs, which will reduce harvest costs.	No	This is only applicable to new roads that will not be open to the public. New roads will be permanently closed or gated for administrative access.
Northeast RMP	Forest product sales will continue on areas identified for forest management to meet demand and maintain forest productivity.	Yes	Areas will be identified through the NEPA process.

B. Potential new decisions for the RMP revision

The primary emphasis of BLM's forests and woodlands program is offering a scientifically sound, environmentally responsible level of timber sales, as well as forest and woodland health-restoration treatments.

C. Areas of relative ecological importance to guide land uses and management

- There is loss of quaking aspen throughout the RGFO due to age, conifer encroachment, drought, and the number of ungulates on the landscape.
- There is deforestation from recent megafires throughout the RGFO.
- The average number of trees per acre is unsustainable at current levels.
- Shade-tolerant species are replacing desired shade-intolerant species.
- There is a lack of forest age-class diversity.
- A large number of forested acres are at moderate to high risk of bark beetle attack.
- A majority of forested acres in the planning area are at moderate to high risk from catastrophic wildfire because they are overly dense, have ladder fuels, and have standing dead trees resulting from beetle kill.

4.3.5. Fluid Minerals

A. Current management direction

Table 4.19 shows the ability of management to achieve desired future conditions for fluid mineral resources (oil and gas, coal bed methane, geothermal).

Table 4.19. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Fluid Mineral Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Geophysical exploration operations will be subject to the same management decisions and subsequent effects as identified for fluid mineral leasing and development.	Yes	Can be changed if needed.
	Encourage voluntary compliance by lessees and operators with the decisions of the RMP, if and when operations are conducted, even though existing fluid mineral leases will not be modified.	Yes	None; updates of RMP will not change the terms and conditions of existing leases issued under previous plans.
	Retain most mineral rights on BLM-administered lands identified for disposal.	Yes	None; it is common for BLM to retain mineral rights on land disposal.
	Disposal of lands with low-value minerals could occur in some instances.	Yes	None; current BLM policy allows for disposal.
	BLM-administered mineral estate will be open to fluid mineral leasing, exploration, and production subject to the lease terms and applicable lease stipulations as shown in Appendix A of the 1996 ROD/Approved RMP (BLM 1996).	Yes, but should be updated to incorporate applicable new stipulations.	Update available stipulation list.
	Fluid mineral leasing may occur on certain lands with an NSO stipulation to protect the following: ● Raptor nesting/fledging habitat ● Sensitive special status plant areas (High Mesa Grasslands/Mosquito Pass) ● Chaffee County Landfill ● Developed recreation sites ● Reservoir rights-of-way	Yes, but may need to include other areas that require NSO protection.	NSO stipulations may be used to protect other resources if needed.
	Fluid minerals within BLM WSAs will not be leased pending a final designation by Congress. Any congressionally designated wilderness lands will be withdrawn from leasing, while lands not designated will return to multiple-use management subject to the applicable ROD/Approved RMP decisions.	Yes	43 CFR 3100.0–3 specifies this, except for lands designated by Congress as wilderness study areas, where oil and gas leasing is specifically allowed to continue by the statute designating the study area.
	Fluid mineral leasing may occur on certain lands with timing limitations to protect the following: ● Big game severe winter habitat ● Big game birthing areas ● Mexican spotted owl ● Bald eagle	Yes, but the list of stipulations should be updated.	Update list of stipulations.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	● Peregrine falcon ● Lesser prairie chicken ● Least tern and piping plover ● Wild turkey Some of these are subject to exceptions.		
	Fluid mineral leasing may occur on certain lands with a CSU stipulation to protect the following: ● VRM Class II areas ● Perennial riparian areas ● Coal mines Subject to exceptions.	Yes, but the list of stipulations should be updated.	Update list of stipulations.
	Fluid mineral leasing conditions of approval (COAs) will be applied to operational activities: geophysical notices of intent (NOIs), applications for permit to drill (APDs), and sundry notices) as determined necessary by the authorized officer to protect other resources and values within the terms, conditions, and stipulations of the lease. This list of the most common COAs is found in Appendix G of the Draft RMP/EIS. Activity planning will be accomplished within IAPs.	Yes	If there is a list of common COAs in the new RMP, it should be updated.
	Fluid mineral leasing may occur on certain lands with an NSO stipulation to protect the following: ● Lake DeWeese Recreation Area R&PP ● St. Scholastica R&PP site ● Deer Mountain Fire Station R&PP ● Odd Fellows Lodge R&PP ● Developed recreation sites ● Reservoir rights of way ● Garden Park ACEC ● Mosquito Pass ACEC ● High Mesa Grasslands ACEC ● Droney Gulch ACEC ● Chaffee County Landfill R&PP ● Park County Landfill R&PP ● Raptor nests (1/8 mile from nest)	Yes, but the list of stipulations should be updated.	Update stipulations.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	• Mexican spotted owl (1/2 mile from confirmed roost or nest) • Lesser prairie chicken (1/4 mile from lek site) • Coal mines Some of these are subject to exceptions.		
Northeast RMP	Standard (21A)—These 210,410 acres of surface and subsurface may be leased and developed for oil and gas with the standard stipulations included in leases and other standard site-specific stipulations included in any use authorization. Existing contractual controls (lease form, operating regulations, operating orders, and notice to lessees) provide substantial latitude within which the Bureau may require modification to the siting, design, and timing of operations on leaseholds. Surface resources are protected by controlling surface disturbance and reclamation. Specific conditions generally relate to the location of drilling, vehicle use, and improvements. Protection of drainages, water bodies, springs, wildlife habitat, steep slopes, and fragile soils is required. Activities that may adversely affect these values will be suspended, modified, or restricted if and when necessary. Significant cultural resources must be evaluated and adverse impacts mitigated.	Yes, but the list of stipulations should be updated.	Update stipulations, and acreage figure, if needed; apply necessary stipulations at the lease stage.
	Seasonal (NSO) (21B)—All of the requirements listed above also apply to this category of land. However, in addition, these 83,830 acres of surface and subsurface have certain values identified that require drilling activities take place only during a certain portion of the year. These values include recreation and important wildlife habitat. Seasonal stipulations do not apply to maintenance or operation of producing wells. An annual exception may be specifically authorized in writing by the BLM district manager. The numbers shown in Table 3.2 in section 3.3.5 in this AMS are used to identify the permitted time period for drilling operations and the rationale for the restriction (see BLM 1986b; BLM 1991c).	Yes, but the list of stipulations should be updated.	Update stipulations and acreage figure, if needed; apply necessary stipulations at the lease stage.
	Year-long (NSO) (21C)—These 12,740 acres of surface and subsurface have resource values of sufficient importance to disallow any oil and gas activity, because the surface cannot be physically occupied (e.g., reservoirs). Such a lease may be issued for "drainage"; i.e., a well adjacent to these lands may drain oil and/or gas from under the leased area. In unusual circumstances, a well may be slant-drilled from a location adjacent to the restricted area so the hole bottoms out at some point directly under the leased lands. Exceptions	Yes, but the list of stipulations should be updated.	Update stipulations and acreage figure, if needed; apply necessary stipulations at the lease stage.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	to this limitation may be approved by the BLM district manager, on a case-by-case basis.		
	Open (21D)—These 57,180 acres of surface are open to lease application for a case-by-case review. When a lease application is received, these lands are considered for lease after a specific suitability determination is made. Then the lands will be placed in one of the other categories. This procedure is necessary because of insufficient resource information or the necessity to coordinate with or obtain the consent of other Federal, State, or local agencies.	Yes, but the list of stipulations should be updated.	Update stipulations and acreage figure, if needed; apply necessary stipulations at the lease stage.
	Unsuitable (21E)—These 1,870 acres of surface and subsurface cannot be leased nor developed. Areas are designated for no leasing where subsidence due to the withdrawal of oil and gas may be a hazard to surface structures (such as large dams). Regulations in 43 CFR 3101.1-l(b)(3) prohibit leasing within incorporated cities, towns, and villages. Areas withdrawn from the mineral leasing laws by executive or congressional actions are also unsuitable. An application for lease on any of these lands will be rejected. If previously leased, development of the existing lease will be subject to necessary development stipulations to mitigate possible environmental damage and provide for safety of operations while still allowing development to proceed.	Yes, but list and acreages should be updated.	Updates needed.
Oil and gas plan amendment to the Northeast RMP	600,000 acres of BLM-administered mineral estate within the Northeast planning area are open to oil and gas leasing and development, subject to the lease terms and (as applicable) lease stipulations noted in Appendix A of the amendment (BLM 1991c).	Yes, may need to update acre figures and update stipulations.	Update stipulations.
	NSO stipulations will be used to protect the following: ● Coal mines ● Grouse ● Raptors ● Bald eagle ● Peregrine falcon ● Mexican spotted owl ● Waterfowl and shorebird ● Special status plant species ● 1-70 corridor	Yes, but the list of stipulations should be updated.	Update stipulations.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	● State, county, and city parks ● Reservoir and railroad rights-of-way ● Reservoir and river riparian areas Some of these are subject to exceptions.		
	Timing limitation stipulations will be used to protect the following: ● Big game crucial winter habitat ● Big game birthing areas ● Grouse ● Greater sandhill crane ● White pelican ● Raptors ● Mexican spotted owl ● Bald eagle ● Peregrine falcon ● North Sterling Reservoir developed recreation lands ● Cherokee Park State Wildlife Area Some of these are subject to exceptions.	Yes, but the list of stipulations should be updated.	Update stipulations.
	CSU stipulations will be used to protect: coal mines. Subject to exceptions.	Yes, but the list of stipulations should be updated.	Update stipulations.
	Lease notices will be used to alert lessees to special requirements for —paleontological areas, sage grouse nesting areas and air force cable areas.	Yes, but the list of stipulations should be updated.	Update lease notices.
	Conditions of approval will be applied to operational approvals (applications for permit to drill; geophysical notices of intent) as determined necessary by the authorized officer to protect other resources and values within the terms, conditions, and stipulations of the lease contract. A list of the most common conditions of approval is found in Appendices D and F of the final plan amendment/EIS (BLM 1991c).	Yes; COAs will be applied to operational approvals as necessary.	Update list if it is necessary to have a list.

B. Potential new decisions for the RMP revision

Since these last plans were approved, new lease stipulations have been developed and adopted by the BLM Colorado State Office in conjunction with field offices in Colorado. These stipulations should be reviewed, and any necessary stipulations required to protect resources in the RGFO should be incorporated into this RMP revision. Existing stipulations should be reviewed to make sure they are still applicable, and if so, carried forward and incorporated in the new plan. The BLM should also do the following:

- Develop new stipulations, if necessary, to protect resources in RGFO.
- Use information from the 2012 RFD (Stillwell, Elser, and Davis-Lawrence 2012) to help guide the decision-making process in the RMP, as applicable.
- Develop a master leasing plan for South Park.

C. Areas of relative ecological importance to guide land uses and management

- South Park, air quality non-attainment zones (the boundaries of which could change), riparian areas, and other areas critical for wildlife habitat.

4.3.6. Solid Minerals

A. Current management direction

Table 4.20 shows the ability of management to achieve desired future conditions for solid mineral resources (including locatable, salable, and solid leasables).

Table 4.20. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Solid Mineral Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Perennial riparian areas will be closed to locatable mineral entry, except for recreational placering, and closed to mineral materials disposal.	No	There are provisions within 43 CFR 3809 to not allow for unnecessary undue degradation. In addition, if the operator proposed to impact fisheries and/or wildlife habitat, there is a requirement to rehabilitate fisheries and wildlife habitat during reclamation. As these practices would be incorporated into the reclamation, the reclamation bond collected prior to the activities being initiated would have to account for this rehabilitation effort. Areas to be closed to locatable mineral entry should be judicially selected, as 43 CFR 3809 regulations already account for management of this resource.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
			If the intention is to also close these areas to mineral material disposal, the term "perennial riparian area" needs to be better defined and much more specific. Otherwise, this call could be made on a case-by-case basis when a mineral material application is received in a questionable area, as these decisions are discretionary.
	All withdrawals for water power/reservoir sites will be revoked in subunits 1 and 3.	Yes, but it has not been implemented.	This decision should be re-assessed and possibly implemented, in concert with all other similar type of withdrawals and reservations.
	New withdrawals (i.e., areas that will be closed to mineral entry and mineral material development) will be issued in order to protect the following (which apply in varying combinations to all subunits): ● Perennial riparian areas ● Big game birthing habitat ● Fishery habitat ● Special status plant habitat ● Special status animal habitat ● Portions of ACECs ● Potential NRHP sites ● VRM Class II within ACECs ● Developed recreation sites ● Arkansas River corridor (from Leadville to Pueblo Reservoir) ● WSAs	No, but it has not been implemented.	Areas to be closed to locatable mineral entry should be more judicially selected, as 43 CFR 3809 regulations already account for management of this resource. In addition, WSAs cannot be withdrawn at the field office level due to the legislation that already implements these designations and follow-on process. If the intention is to also close these areas to mineral materials disposal, all of these terms will need to be better defined and much more specific. Otherwise, this call could be made on a case-by-case basis when a mineral materials application is received in a questionable area, as these decisions are discretionary.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Northeast RMP	Locatable Minerals: Available (18A)—Mining claims may be located on these 103,290 acres of surface and subsurface.	N/A	N/A
	Locatable Minerals: Concern Area (18B)—These 141,140 acres of surface and subsurface are open to location of mining claims as noted above, but other important resource values have been identified.	N/A	N/A
	Locatable Minerals: Closed (18C)—These 105,850 acres of surface and subsurface are or should be closed or restricted from the location of mining claims. In Appendix B of the Northeast RMP (BLM 1986b), "Closed" indicates lands that should be withdrawn from the location of mining claims for the protection of other resource values, which could be irreparably harmed by the development of locatable minerals.	N/A	N/A
	Locatable Minerals: Closed may indicate acquired surface estate where normally locatable minerals must be leased according to regulations found in 43 CFR 3500.	Yes, but 43 CFR 3500 includes more than just acquired surface estate.	Update language to include leasing of solid minerals other than coal and oil shale.
	Salable Minerals: Open (19A)—Mineral materials may be sold on application and after approval of an operating plan and an EA on 108,324 acres of surface and subsurface.	Yes, with text edit.	Just a correction to the language; per regulations and guidance, an EA is NOT always a requirement, as sometimes a categorical exclusion is adequate if the proposal is small enough.
	Salable Minerals: Concern Area (19B)—These 138,160 acres of surface and subsurface are also "Open," but other important resource values have been identified. Site-specific stipulations will be required to protect these resource values. If impacts to these values caused by mineral material extraction cannot be satisfactorily mitigated, the application will be rejected.	Yes	N/A
	Salable Minerals: Closed (19C)—These 103,240 acres of surface and subsurface have other identified resource values that would suffer unacceptable and irreparable damage should mineral material extraction take place. Applications for these areas will not be accepted.	No	These areas need to be re-assessed relative to current management objectives and goals.

B. Potential new decisions for the RMP revision

- None of the previous RMP management decisions were made in an effort to manage solid minerals and their development within the regulatory framework already existing. The extent of all decisions previously made only involved opening or closing areas to mineral development.

- Take conveyance of mineral interests for minerals into consideration when the BLM starts looking at the "sell/retain" realty aspect.

- Take split estate for minerals into consideration when the BLM starts looking at the "sell/retain" realty aspect.

- Address existing ACECs to understand mineral potential and where or if withdrawals are needed. Do not treat these as one big block.

- Make sure that determination of opening/not opening minerals under the mining law for all minerals reserved in realty transactions is conducted under the following authorities:

  - Small Tracts Act sale

  - Recreation and public purpose (R&PP) sale

  - Federal Land Policy and Management Act (FLPMA) sale

  - FLPMA exchange

C. Areas of relative resource importance to guide land uses and management

- Per 30 U.S.C. Sec. 1602 (01/03/2012), the Congress declares that it is the continuing policy of the United States to promote an adequate and stable supply of materials necessary to maintain national security, economic well-being, and industrial production, with appropriate attention to a long-term balance between resource production, energy use, a healthy environment, natural resources conservation, and social needs.

- The Congress declares that implementation of this policy requires that the President shall, through the Executive Office of the President, coordinate the responsible departments and agencies to, among other measures, 1) identify material needs and assist in the pursuit of measures that would assure the availability of materials critical to commerce, the economy, and national security; and 2) encourage Federal agencies to facilitate availability and development of domestic resources to meet critical material needs.

- It is BLM policy to make mineral materials available in accordance with the Mineral Materials Act, provided adequate measures are taken to protect public land resources and the environment and that damage to public health and safety is minimized (43 CFR 3601.6). Since disposal of mineral materials is discretionary on the part of BLM, no disposals will be made if it is determined by the authorized officer that the aggregate damage to public lands and resources would exceed the public benefits that BLM expects from the proposed disposal.

- The mineral potential report identifies areas of mineral potential throughout the RGFO that need to be taken into consideration when making determinations to sell, exchange, withdraw, etc.

- Although mining districts harbor patchy land/mineral patterns, these areas also have a high potential for locatable minerals.

- Sand and gravel resources are slowly being built over and zoned out of production. Special focus should be given to areas that would provide good resources for construction materials, especially for counties.

4.3.7. Coal

A. Current management direction

Table 4.21 shows the ability of management to achieve desired future conditions for coal resources.

Table 4.21. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Coal Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	Determine desired plant community for all disturbed areas.	Yes	Yes; however, this may be determined on a case-by-case basis.
	Use the coal screening process to determine areas to be further considered for leasing. Only areas with potential for development will be considered; areas that meet the 20 standard coal unsuitability criteria will be further considered; areas that pass the surface owner screen will then further be considered.	Yes	Update these areas based on changes in land tenure and mineral potential.
	Prioritize for timely scheduling and completion of data collection areas acceptable for coal leasing.	No	Same as above. This language is in the regulations, so it is not necessary in the RMP.
	Areas will be identified for further consideration of future coal leasing; coal unsuitability criteria will provide protection of resource values.	No	Not necessary; this is included in the results of coal screening process.
Northeast RMP	Suitable—These areas are within known recoverable coal resource areas (KRCRAs) or other areas that as the result of an application were assessed as suitable for coal leasing under the criteria found in 43 CFR 3461. Lands are suitable if none of the 20 unsuitability criteria apply.	Yes	Update these areas based on changes in land tenure and mineral potential; also, consolidate with Royal Gorge Resource Area RMP.
	Open—Coal lands that are open to application for coal leasing, but have not been assessed in the manner of A. Lands that have been applied for will be assessed under the 20 unsuitability criteria described above, and those areas found unsuitable will not be leased. These areas are not within KRCRAs or other areas already	Yes	Update these areas based on changes in land tenure and mineral potential; also, consolidate with Royal Gorge Resource Area RMP.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
	assessed, but may have some coal potential.		
	Unsuitable—These areas were found to be unsuitable for coal leasing under the 20 criteria found in 43 CFR 3461.	Yes	Update these areas based on changes in land tenure and mineral potential; also, consolidate with Royal Gorge Resource Area RMP.
	None—These lands do not contain coal beds of the Denver and/or Laramie Formations and are therefore closed to application.	Yes	Yes; however, this is included at the onset of the unsuitability analysis.

B. Potential new decisions for the RMP revision

N/A

C. Areas of relative resource importance to guide land uses and management

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) mandates that the Secretary of the Interior review all Federal lands for unsuitability and that citizens be allowed to petition for and against designation of lands as unsuitable. Consequently, under SMCRA, the Department of the Interior has procedures to apply unsuitability criteria as part of a comprehensive Federal land review and as part of a petition process.

4.3.8. Renewable Energy

A. Current management direction

Table 4.22 shows the ability of management to achieve desired future conditions for renewable energy resources.

Table 4.22. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Renewable Energy Resource Demands

Relevant plans/laws/policies	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
• FLPMA • Energy Policy Act of 2005 • Solar PEIS (BLM and DOE 2012) • Wind PEIS (BLM and DOE 2005) • Royal Gorge Resource Area RMP, pages 3–9 (BLM 1996) • Public Land Order No. 7818 (Withdrawal of Public	The solar PEIS ROD (BLM and DOE 2012) amended the Royal Gorge Resource Area RMP (BLM 1996). Lands in the planning area were identified as exclusion lands or lands suitable for development on a case-by-case basis under a variance land screening process.	Yes. The solar PEIS amended the 1996 Royal Gorge Resource Area RMP and defined exclusions for environmental concerns as well as a process for considering solar energy development in variance areas, depending on	The solar PEIS clarifies options for RMP revision to further specify exclusion lands. The solar PEIS also provides options for planning-level actions to identify solar development focus area alternatives to direct any future solar applicant to lands with the least resource conflict and/or with transmission infrastructure. The RMP revision may further define lands suitable for renewable energy development.

Relevant plans/laws/policies	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Lands for the Protection and Preservation of Solar Energy Zones for Future Energy Development; Arizona, California, Colorado, Nevada, New Mexico, and Utah) ● IM 2011-003, *Solar Energy Development Policy* (BLM 2010) ● Supplement to the solar PEIS (BLM and DOE 2012) ● IM 2009-043, *Wind Energy Development Policy* (BLM 2008c) ● Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management ● Executive Order 13212, Actions To Expedite Energy-Related Projects ● Secretarial Order 3285, Renewable Energy Development by the Department of the Interior ● 2010 Colorado Community Solar Gardens Act		environmental concerns, on a case-by-case basis. The solar PEIS also provided a screening process for designation of new solar energy zones (SEZs).	
	No provisions for development of renewable energy were included in the Royal Gorge Resource Area RMP (BLM 1996). The 2005 wind PEIS (BLM and DOE 2005) identified lands with moderate to high wind energy potential and possible development, but refinement may be needed.	Yes. Wind PEIS amended the Royal Gorge Resource Area RMP to allow wind energy development in variance lands on a case-by-case basis.	Lands may also be considered for wind energy development focus under the wind PEIS.
	No locations for renewable energy projects have been identified.	No	Identify appropriate locations for potential SEZs, as new ones may be needed based on the following: ● Size of available parcels (>200 acres for 20-MW facility minimum) ● Availability of power lines or potential power line routes/corridors ● Reasonable access by highway or railway ● Land status and history, such as inclusion in the BLM's system of national conservation lands (NLCS). ● Lack of conflict with other resource values, such as cultural, wildlife, visual resources, and traditional uses.
	No preferred technologies for renewable energy within the RGFO have been determined.	No	Determine which technologies would be appropriate for a given location in variance lands based on items such as the following: ● Visual resources

Relevant plans/laws/policies	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
			• Land area available (able to fit >20–MW development for potential SEZ or < 20 MW for solar garden) • Water use (wet versus dry cooling, and concentrating versus photovoltaic) • Cultural and biological considerations • Military airspace needs
	No identification of disturbed lands within the RGFO suitable for renewable energy development has been undertaken.	No	Identify disturbed lands that might be suitable for development of renewable energy projects: • Abandoned mining lands • Abandoned quarries • Depleted farm lands • Brownfields, etc. • Eroded lands needing restoration
	The Royal Gorge Resource Area RMP (BLM 1996) does not currently identify lands *not* suitable for renewable energy development, exclude from renewable energy use, or otherwise make lands off-limits to solar and wind energy. With the exception of programmatic-level RMP amendments, the current plan does not specifically consider visual, cultural, wildlife corridors, winter range, sage grouse, recreation, transmission, or other resource values, functions, or condition in allocating lands for renewable energy.	No	Identify disturbed lands that might be suitable for development of renewable energy projects: • Abandoned mining lands • Abandoned quarries • Depleted farm lands • Brownfields, etc. • Eroded lands needing restoration
	The Royal Gorge Resource Area RMP (BLM 1996) does	No	Identify/designate preferred transmission routes or corridors within the field office boundaries:

Relevant plans/laws/policies	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	not currently identify transmission projects for renewable energy projects.		• Require the use of existing routes/corridors • Determine carrying capacity of existing lines and • Indicate feasibility of new routes if existing lines are upgraded (if a line is not feasible at 69 kV but would be at 115, etc.) • Identify locations where new transmission lines would not be allowed due to resource conflicts or public opposition

B. Potential new decisions for the RMP revision

- Incorporate solar PEIS language in RMP
- Incorporate wind PEIS language in RMP
- Identify appropriate locations for potential SEZs (commercial scale solar >20 MW) as new ones are needed, based on the following:
  - Available parcels suitable for SEZ designation (greater than 200 acres for 20-MW commercial facility minimum)
  - Available power lines or potential power line routes/corridors reasonably close to potential SEZs
  - Reasonable access by highway/railway
  - Land status and history, such as NLCS inclusion, prior rights and authorizations—especially minerals, compatible ACECs, areas with notices of staking, etc.
  - Proximity to load centers
  - Areas where hybrid power projects (solar/geothermal, wind/geothermal, etc.) might be possible
- Identify variance areas and their suitability for solar energy projects of less than 20 MW, or non-commercial-scale renewable energy projects (e.g., solar gardens, as in the 2010 Colorado Community Solar Gardens Act), using the same criteria as for SEZs, except for smaller parcels suitable for projects <20 MW.
- Determine which technologies would be appropriate for a given location, including variance lands, on the basis of factors such as the following:
  - Visual resources

- Land area available (able to fit >20-MW commercial scale solar development for potential SEZ or <20 MW for solar garden)
- Water use (wet versus dry cooling, and concentrating versus photovoltaic)
- Lack of conflict with other resource values such as cultural, wildlife, visual resources, or traditional uses
- Military airspace needs and/or restrictions for solar power tower, wind turbines, or other technical issues (e.g., glare)

- Identify disturbed lands that might be suitable for developing renewable energy projects:
  - Abandoned mine lands
  - Abandoned quarries
  - Depleted farmland
  - Brownfields, landfills, etc.
  - Eroded lands needing restoration
  - Areas adjacent to renewable resources that have the potential for private development
- Specifically identify lands not suitable for renewable energy development and make these off-limits on the basis of factors such as areas with notices of staking, visual resources, cultural resources, wildlife corridors, winter range, sage grouse, public concerns, recreation, other resource conflicts, local land use plans, etc.
- Identify/designate preferred transmission routes or corridors within the field office boundaries:
  - Identify and require the use of existing routes/corridors (per Western Area Power Administration, etc.).
  - Determine carrying capacity of existing lines and indicate feasibility of new routes if existing lines are upgraded (if a line is not feasible at 69 kV but would be at 115 kV, etc.).
  - Identify locations where new transmission lines would not be allowed due to resource conflicts or public opposition.

C. Areas of importance for wind and solar project development

Specially designated areas and lands with wilderness characteristics

These lands could be significantly affected through direct and indirect impacts (e.g., visual impacts, reduced access, noise, and fugitive dust) during both the construction and operation phases. Similar impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process. Design features could effectively avoid or minimize many impacts.

Rangeland resources

Some livestock grazing allotments may be affected by renewable energy development through reductions in acreage and/or loss of AUMs. Wild horses and burros could also be affected, with animals displaced from the development area; the number of wild horse and burro herd management areas overlapping with or in the vicinity of lands available for ROW application. These impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process.

Recreation

Recreational uses would be precluded within lands used for solar energy development and limited within lands used for wind energy projects. Recreational experiences could be adversely affected in areas proximate to renewable energy projects and related transmission lines and other infrastructure. These impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process.

Soil resources and geological hazards

Development of large tracts of land up to several thousand acres for renewable energy facilities and related infrastructure would result in impacts on soil resources in terms of soil compaction and erosion, although these impacts could be effectively avoided, minimized and/or mitigated. Impacts on biological soil crusts would be long term and possibly irreversible. These impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process.

Mineral resources

Mineral development within the project footprint for renewable energy development would generally be an incompatible use; however, some resources underlying the project area might be developable (e.g., directional drilling for oil and gas or geothermal resources; underground mining). These impacts could be potentially dispersed across the variance areas; however, impacts would be minimized due to the required variance process. Lands within existing SEZs have been withdrawn from mineral entry for 20 years.

Water resources

Solar thermal projects with wet-cooling systems require large volumes of water, with potentially significant environmental impacts. Solar thermal projects with dry-cooling systems need less than one-tenth of the amount of water required for wet-cooling systems. Projects would necessarily be limited to locations with sufficient groundwater supplies where water rights and the approval of water authorities could be obtained.

All solar energy facilities require smaller volumes of water for mirror or panel washing and potable water uses, which would result in relatively minor impacts on water supplies. Other potential impacts, including modification of surface and groundwater flow systems, water contamination resulting from chemical leaks or spills, and water quality degradation by runoff or excessive withdrawals, can be effectively avoided, minimized and/or mitigated.

Wind projects require considerable water for construction, with limited amounts of domestic water for maintenance/operations and eventual removal and reclamation.

Vegetation

Renewable energy development will typically require the total removal of vegetation at most but not all facilities, which could result in significant direct impacts in terms of increased risk of invasive species introduction, changes in species composition and distribution, habitat loss (e.g., dune or riparian areas), and damage to biological soil crusts. Indirect impacts are also likely in terms of dust deposition, altered drainage patterns, runoff, and sedimentation.

Wildlife and aquatic biota

Numerous wildlife species would be adversely affected by loss of habitat, disturbance, loss of food and prey species, loss of breeding areas, effects on movement and migration, introduction of new species, habitat fragmentation, and changes in water availability. Careful consideration of potential violations of the ESA, the Bald Eagle Protection Act , MBTA, or applicable State laws might be required. The BLM should consider collision hazards with turbines, power lines, solar towers as well as intense heat from solar-collecting mirrors. The BLM should consider electrocution hazards, especially for birds, for all facilities and power lines, and State requirements for reduction/prevention. Exclusion from solar and wind development of ACECs, research natural areas, big game migration corridors, critical winter range, and lands with seasonal restrictions in land use plans would avoid or minimize impacts on wildlife in specific areas.

Special status species

Special status species and critical habitats would be protected in accordance with ESA requirements either through avoidance, translocation (plants), or acquisition and protection of compensatory habitat. Impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process. Design features could effectively avoid or minimize many impacts. Critical habitat designated or proposed by the FWS would be excluded. All ACECs designated for habitat would be excluded along with other areas where the BLM has made a commitment to protect sensitive species.

Air quality and climate change

Air quality during construction activities would be adversely affected locally and temporarily by fugitive dust and vehicle emissions, although impacts would be relatively minor and could be mitigated (e.g., dust control measures, emission control devices, and vehicle maintenance). Operations would result in few air quality impacts. Impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process. Design features could effectively avoid or minimize many impacts.

Relatively minor CO_2 emissions would be generated by the use of heavy equipment, vehicles, and backup generators. Overall, CO_2 emissions could be reduced if renewable energy production avoids/reduces fossil fuel energy production.

Visual resources

Renewable energy projects and associated infrastructure introduce strong contrasts in form, line, colors, and textures of the existing landscape, which may have negative visual impacts. Suitable development areas for solar sites are typically located in basin flats surrounded by elevated lands where sensitive viewing locations exist. Wind energy typically favors high ridges or valley entrances where winds are strongest or more concentrated, which often makes them highly visible. Impacts could potentially be dispersed across the variance areas.

Various potentially sensitive visual resource areas, including national historic and scenic trails, national historic landmarks and natural landmarks, properties designated eligible for the NRHP, and areas with important cultural resources that possess historical vistas may be affected. All NLCS lands and ACECs are excluded from solar development.

Acoustic environment

Construction-related noise could adversely affect nearby residents and/or wildlife and would be greatest for solar power projects requiring construction of power generation facilities. Wind energy projects also have well-documented acoustic impacts, although many of these projects are in somewhat remote locations. Noise impacts related to operations would generally be less significant than construction-related noise impacts but could still be significant for some receptors located near power block and/or other primary facilities, especially those with cooling towers, power-generating turbines, or similar equipment. Impacts could potentially be dispersed across variance areas; however, impacts would be minimized due to the required variance process.

Paleontological resources

Paleontological resources could be lost during construction, but impacts would also be possible during operations. Impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process.

Cultural resources and Native American concerns

All provisions of Section 106 of the National Historic Preservation Act would be followed. Cultural resources could be lost during construction, but impacts could also be possible during operations. Impacts could potentially be dispersed across the variance areas; however, impacts would be minimized due to the required variance process.

ACECs designated for cultural resource values, national historic trails and national scenic trails, national historic landmarks and national natural landmarks, properties designated or eligible for the NRHP, and areas with important cultural and archaeological resources would be excluded.

Transportation

Local road systems and traffic flow could be adversely affected during construction. Impacts during operations would be minor. Impacts could potentially be dispersed across variance areas; however, impacts would be minimized due to the required variance process. Requiring design features such as the proper timing of deliveries of large components could effectively avoid or minimize many adverse impacts.

Fire

Increased human activity and facility operations and maintenance associated with renewable energy development also increase the potential for fires. Consideration should be given to how large commercial projects might need to be considered in the FMP and what requirements (stipulations) might be needed in the authorizations to prevent wildfires developing from project activities and to protect the projects from fire. Towers and wind turbines used in meteorological testing are often not fenced, with wind turbine towers being accessible but locked to prevent entry. Vegetation management is a key factor in protecting these facilities from fire. The BLM should consider requirements/recommendations for leaving vegetation in place under solar facilities for

small mammals, birds, and other small animal species such as lizards, snakes, etc. Planning and requirements for vegetation management within wind farms might be considered in the FMP.

Public safety

Potential public safety hazards during the site monitoring and testing phase (wind) are minimal. During construction, operation, and decommissioning of a renewable energy development project, the hazards are greater, but they can be effectively mitigated. These hazards include risks associated with major construction sites, rare tower failures (wind or solar), human-caused fire, electromagnetic field exposure (power lines), aviation safety interference, electromagnetic interference, low-frequency sound, and shadow flicker (wind).

Other plans

The BLM should determine the relationship of the upcoming revised RMP to existing land use planning/zoning by local governments and give considerations to those plans whenever appropriate.

4.3.9. Geothermal

A. Current management direction

Table 4.23 shows the ability of management to achieve desired future conditions for geothermal resources.

Table 4.23. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Geothermal Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP and Northeast RMP	Current plans did not include geothermal resources; however, both the RGFO and Northeast RMPs were amended by the 2008 PEIS, *Record of Decision and Resource Management Plan Amendments for Geothermal Leasing in the Western United States* (BLM 2008b).	Yes	Update areas that are open/closed to geothermal leasing; adopt more site/region-specific stipulations.

B. Potential new decisions for the RMP revision

- Current plans did not include geothermal resources; however, both the RGFO and Northeast RMPs were amended by the 2008 PEIS (BLM 2008b).
- Decisions in the 2008 PEIS made it possible to lease geothermal resources in the field office.
- The RGFO may modify open/closed leasing areas based on more detailed resource analysis provided in the updated mineral potential report or align open/closed lease areas with other fluid mineral lease areas.
- The 2008 PEIS also adopted a comprehensive list of stipulations and procedures; RGFO will likely want the ability to use more site-specific stipulations

C. Areas of relative resource importance to guide land uses and management

Mount Princeton is the most likely geothermal resource to be used for electrical power generation and has been receiving Governor's Energy Office grants in support of developing the resource there.

4.3.10. Travel and Transportation Management

A. Current management direction

Table 4.24 shows the ability of management to achieve desired future conditions for travel and transportation management.

Table 4.24. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Travel and Transportation Management Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	The transportation system will be improved and maintained to facilitate public access and administrative monitoring.	Yes. This decision is still relevant.	N/A
	The following areas will be closed to OHV use: all WSAs (until congressional action occurs), Deer Haven Ranch, and 31 Mile Ranch.	Partially. Changes in public demand and administrative use needs may warrant changes.	The closure of WSAs to OHV use continues to be a responsive decision. Activity-level planning could direct OHV use at Deer Haven Ranch and 31 Mile Ranch.
	The following areas will be designated as open areas: Grand Canyon Hills, Reese Gulch, Texas Creek Gulch, Sand Gulch, and Penrose Chaining Area. Note: These areas are currently designated as limited to OHV use. This designation was made through plan amendment.	No. Subsequent RMP plan amendments responded to issues and modified this decision.	N/A
	All other areas are designated as limited to OHV use and will be limited to existing roads and trails until road designations are determined within activity level plans.	Partially. Several activity-level plans have been developed, and this continues to be a responsive decision to issues.	A decision could be made limiting travel to administrative-use-only on parcels that do not have any public motorized access.
	Direct travel to a suitable parking site within 300 feet of an existing or designated road or trail will be authorized if damage to the land or streams will not occur.	No. Activity-level plans found that this limit was not adequate and reduced the distance to 100 feet.	This decision could be re visited to provide consistent direction throughout the field office. Other similar travel-related issues could also be addressed, including changes in technology/trends such as UTVs (side-by-sides) and snowmobiles.
	In all areas disturbed by OHV activities, the desired plant community	Yes. Activity level planning considers	N/A

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	will be determined and necessary actions taken to mitigate the impact.	this issue, including identification of actions.	
	Roads and trails that are not needed and not maintained will be closed or reclaimed.	Yes. Activity level planning considers this issue.	N/A
Northeast RMP	The entire resource area is open to off-road vehicle (ORV) use, except for 132 acres just south of Ward (Unit No. 602, southern portion).	No. Open OHV use is not responsive to current issues.	Changes in designation could be considered.
	Other areas may be limited to ORV use on a site-by-site basis when limitations are identified and the need arises.	No. Open OHV use is not responsive to current issues.	Based on the potential for designation changes, this decision could be revisited.
South Park plan amendment	An OHV-limited designation will be placed on designated roads and trails and/or seasonally to protect the following: ● Perennial riparian areas ● Fishery habitat ● Big game birthing habitat ● Big game critical winter habitat ● Special status animal habitat ● Mountain plover nesting habitat ● Fen wetlands ● Class 5 paleontological resources	Yes; this decision is still relevant.	N/A

B. Potential new decisions for the RMP revision

- The plan will need to provide general direction for designating routes in areas where travel is limited to designated routes only and that are not covered under an existing travel management plan. This general direction will follow BLM's travel management planning policy.
- The BLM will need to revisit or confirm travel management designations for lands managed under the Northeast RMP that are currently open, as well as Deer Haven Ranch and 31 Mile Mountain, which are designated as closed under the 1996 Royal Gorge Resource Area RMP.
- The plan revision could consider designating routes for administrative use only for lands that have no legal public motorized access.
- The revised plan could consider providing consistent guidance throughout the field office for motorized vehicles, including distance the public is allowed to park off a designated route, policy for travel over snow, and definitions for various types of motorized vehicles such as side-by-side UTVs and emerging technology.

C. Areas of relative resource importance to guide land uses and management

N/A

4.3.11. Utility Corridors and Communication Sites

A. Current management direction

Table 4.25 shows the ability of management to achieve desired future conditions for utility corridors and communication sites.

Table 4.25. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Utility Corridor and Communication Site Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	The *Western Regional Corridor Study* (WUG 1993) for corridor designation will be adopted for major rights-of-way with addition of existing transportation corridors.	No. This fails to provide criteria for designating additional utility corridors and siting communication sites.	Consider corridor restrictions in specially designated areas. Develop criteria for siting and co-locating communication sites.

Management issues not adequately addressed:

Neither RMP identifies management objectives for communication sites.

B. Potential new decisions for the RMP revision

Utility corridors

- Map, highlight, or note the designated utility corridors from *Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* (BLM 2009a).
- Consider designating additional areas for potential future utility corridors.
- Use the following as a default decision statement for the various management units: The majority of the public lands will be open to development for utility corridors; stipulations and mitigation measures will be developed on an individual, site-specific basis. Applicants will be encouraged to locate new facilities within existing corridors to the extent possible.

Communication sites

- Address and incorporate generally recommended criteria for authorization of communication sites within the overall planning area. Consider including the following:
  - Applicants should co-locate equipment within available space on existing towers.
  - If a new tower is needed, to the extent possible, applicants should co-locate new towers at sites with existing towers.
  - All towers shall be self-supporting. Guyed towers will only be considered, on an individual basis, if proven to be necessary.

- All towers shall be left unpainted if they are dull, galvanized steel, unless painting is required per Federal Aviation Administration guidelines. All above-ground equipment (not subject to safety requirements), including antennas and buildings, shall be painted a dull, non-glare color that blends with the environment and is approved by the BLM.

- Towers will be designed to meet site-specific wind and ice conditions.

- Anti-climb devices or removable steps will be used on towers to discourage unauthorized climbing.

- To avoid possible impacts to birds or bats, applicants should adhere to current Fish and Wildlife Service guidelines on siting, construction, operation, and decommissioning of towers: http://migratorybirds.fws.gov/issues/towers/comtow.html.

- Applicants should ensure all antennas and communication equipment meet American National Standards Institute, Federal Communications Commission, and BLM regulations, guidelines and standards concerning radiation and safety requirements.

- All new facilities shall comply with *Standards and Guidelines for Communication Sites* (Motorola 2005), or the equivalent.

C. Areas of relative resource importance to guide land uses and management

Not applicable.

4.3.12. Land Tenure

A. Current management direction

Table 4.26 shows the ability of management to achieve desired future conditions for land tenure.

Table 4.26. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Land Tenure Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Land ownership adjustments will be made with the following guidance: ● Parcels considered difficult and uneconomical to manage with no significant resource values will be identified for sale. ● Exchange could be used when the result is clearly in the best interest of the public and management will be improved. ● Parcels identified for acquisition or retention will provide values for public use and have access.	Yes; it establishes criteria for evaluating lands for disposal.	Include a decision describing current management focus until lands are disposed of; state that no unnecessary funds will be spent on parcels identified for disposal; express the desire to avoid split estate if lands are disposed of.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	• All uses will be equally considered in analyzing proposals.		
	Land ownership adjustments include the following: • Acres for disposal: ○ Subregion 1: 1,999 acres ○ Subregion 2: 1,356 acres ○ Subregion 3: 324 acres ○ Subregion 4: 15,858 acres ○ Subregion 5: 18,076 acres ○ Subregion 6: 3,101 acres ○ Subregion 7: 739 acres ○ Subregion 8: 6,163 acres ○ Subregion 9: 0 acres ○ Subregion 10: 55,146 acres • Acres for disposal through exchange, lease, or transfer: ○ Subregion 1: 22,332 acres ○ Subregion 2: 1,065 acres ○ Subregion 3: 9,295 acres ○ Subregion 4: 41,923 acres ○ Subregion 5: 5,664 acres • Acres for disposal through exchange, lease, or transfer (cont'd): ○ Subregion 6: 0 acres ○ Subregion 7: 0 acres ○ Subregion 8: 0 acres ○ Subregion 9: 0 acres ○ Subregion 10: 0 acres • Acres for retention or exchange: ○ Subregion 1: 100,556 acres ○ Subregion 2: 53,948 acres ○ Subregion 3: 24,973 acres ○ Subregion 4: 12 acres ○ Subregion 5: 108,661 acres ○ Subregion 6: 67,044 acres ○ Subregion 7: 47,460 acres ○ Subregion 8: 56,541 acres ○ Subregion 9: 1,866 acres ○ Subregion 10: 6,453 acres	Yes; it allows for disposal, retention, and exchange of land.	Allow for disposal of lands, especially isolated tracts, that are not significant or needed in protecting resource values. Allow for acquisition of land through donation.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Northeast RMP	● Dispose of approximately 17,100 acres of public lands through sales, exchanges, or any other title transfer means.	Yes; it allows for disposal, retention, and exchange of land, and it allows for disposal of lands that are not significant or necessary to protect resource values.	Include a decision describing current management focus until lands are disposed; state that no unnecessary funds will be spent on parcels identified for disposal; express the desire to avoid split estate if lands are disposed of.
	Implementation Priorities: ● Actions requiring minimal analysis and review ● Present applications ● Exchange opportunities ● Public/private-value situations involving coordination ● Specific review areas	Yes; it provides guidance for establishing priorities to dispose of land.	

B. Potential new decisions for the RMP revision

- Generally recommended criteria for land tenure within the overall planning area will be addressed and incorporated.
- Acquisition of lands will be considered on an individual basis when opportunities for resource improvements and management will be enhanced.
- Disposal of lands will be considered on an individual basis. The intent is to retain lands in public ownership; however, disposal that would enhance management goals and serve public interest may be considered. Disposal of isolated, hard to manage tracts, or lands within urban interface areas could best be achieved through land exchanges.

C. Areas of relative resource importance to guide land uses and management

N/A

4.3.13. Rights-of-Way and Land Use Authorizations

The 1996 Royal Gorge Resource Area RMP did not have any decisions regarding land use authorizations. The new RMP should specifically address these. Table 4.27 shows the ability of management to achieve desired future conditions for rights-of-way (ROWs) and land use authorizations.

Table 4.27. Ability of Current Management Direction to Achieve Desired Future Conditions and Address ROW and Land Use Authorization Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Minor rights-of-way will be authorized on a case-by-case basis on proposals outside of exclusion areas and could be authorized in avoidance areas only when stipulations will protect values.	Yes; provides necessary protections for sensitive resources.	N/A
	Areas will be excluded from rights-of-way to protect the following: ● Wilderness study areas (Subregions 1, 2, 5, 7) ● Raptor nesting and fledging areas (Subregions 1, 5, 6, 7, 8, 10) ● Special status plants (Subregions 1, 2, 5) ● Special status animals (Subregions 1, 2, 5, 10) ● Potential NRHP sites (Subregions 1, 3, 5, 7, 8)	Yes; provides protection to special areas.	Land use authorizations will be allowed when there is a clear and significant public need, when they will result in minimal adverse impacts, or when they will be beneficial to other resources. All projects would be analyzed on an individual site-specific basis; stipulations and mitigation measures would be developed as appropriate.
	Areas will be excluded from rights-of-way to protect the following: ● Wilderness study areas (Subregions 1, 2, 5, 7) ● Raptor nesting and fledging areas (Subregions 1, 5, 6, 7, 8, 10) ● Special status plants (Subregions 1, 2, 5) ● Special status animals (Subregions 1, 2, 5, 10) ● Potential NRHP sites (Subregions 1, 3, 5, 7, 8)	Yes; allows for flexibility in future decisions while providing some protection to special areas.	Stipulations and mitigation measures would be developed as appropriate.
	Right-of-way corridors are designated	Yes; indicates a preferred location for future actions.	Designate contingency corridors to guide future expansion.
Northeast RMP	Applications for various authorized uses will be processed on an individual basis. Each will be analyzed for the following:	Yes; allows for flexibility in future decisions.	Land use authorizations will be allowed. All projects would be analyzed on an individual site-specific basis; stipulations

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	● Consistency with land uses ● Adjoining land uses ● Legal access ● Conflicting resource values ● Public need ● Highest and best use of the land ● Coordination with State and local agencies		and mitigation measures would be developed as appropriate.

B. Potential new decisions for the RMP revision

- The potential to permit or deny land use authorizations (such as rights-of-way) should be specifically addressed in the RMP. General determinations should be discussed as to restrictions, special stipulations, or mitigation measures that would typically be required to protect the natural resources of the unit.
- Use the following as a default decision statement for the planning area:
  - The majority of public lands will be open to land use authorizations (such as rights-of-way). Stipulations and mitigation measures will be applied on an individual, site-specific basis. The intended outcome is to ensure the compatibility of multiple land uses with the protection and sustainability of natural resources.

C. Areas of relative resource importance to guide land uses and management

N/A

4.3.14. Withdrawals and Classifications

Table 4.28 shows current management direction for withdrawals and classifications.

Table 4.28. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Resource Demands for Withdrawals and Classifications

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Withdrawals and classifications will continue to be reviewed and initiated to protect values when needed.	Yes; sets the stage for periodic change.	New and existing withdrawals will be administered in accordance with FLPMA on an individual, site-specific basis.
	All water power and reservoir withdrawals will be revoked. All other existing withdrawals will be continued (Subregion 1).	Not sure	New and existing withdrawals will be administered in accordance with FLPMA on an individual, site-specific basis.
	Existing withdrawals will be continued (all Subregions).	Maybe; does not allow for periodic review.	Existing withdrawals may be continued and will be administered in accordance with FLPMA on an individual, site-specific basis.
	New withdrawals will be initiated for the following: ● Perennial riparian areas (Subregions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10) ● Big game birthing habitat (Subregions 1, 2, 3, 4, 6, 8, 10) ● Fishery habitat (Subregions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10) ● Special status plant habitat (Subregions 1, 2, 5) ● Special status animal habitat (Subregions 1, 5, 10) ● Potential NRHP sites (Subregions 1, 3, 5, 7, 9)	Yes; establishes resource specific protections.	Provide maps with specific area to be withdrawn layered over resources to be protected.
	Portions of ACECs	Yes; protection of ACEC.	New and existing withdrawals will be administered in accordance with FLPMA on an individual, site-specific basis.
	VRM Class II within ACECs (Subregions 1, 2, 5, 7)	Yes; protection of resources. Protection of resources.	New and existing withdrawals will be administered in accordance with FLPMA on an

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
			individual, site-specific basis.
	Developed recreation sites (Subregions 1, 5, 7)	Yes; protection of resources.	New and existing withdrawals will be administered in accordance with FLPMA on an individual, site-specific basis.
	Arkansas River corridor (Subregion 1)	Yes; protection of resources.	New and existing withdrawals will be administered in accordance with FLPMA on an individual, site-specific basis.
Northeast RMP	Decisions on withdrawals have not been identified in the Northeast RMP (BLM 1986b).	N/A	N/A

Management issues not adequately addressed

- The new plan should include a management objective essentially stating that the lands and realty program will continue to administer both existing and new withdrawals in accordance with FLPMA regulations on an individual, site-specific basis.
- Where applicable, authorize ROWs, leases, permits, or cooperative agreements instead of withdrawals. If existing withdrawals were revoked, the lands would be managed in accordance with the surrounding lands.

B. Potential new decisions for the RMP revision

- New withdrawals will be processed on an individual, site-specific basis using current guidance provided by FLMPA. Where applicable, authorize ROWs, leases, permits or cooperative agreements instead of withdrawals.
- Withdrawals on developed recreation sites and facilities would be considered.
- If existing withdrawals are modified or revoked, the lands will be managed in accordance with the surrounding lands and objectives.

C. Areas of relative resource importance to guide land uses and management

None identified.

4.4. Special Designations

4.4.1. Areas of Critical Environmental Concern

A. Current management direction

Table 4.29 shows the ability of management to achieve desired future conditions for ACECs.

Table 4.29. Ability of Current Management Direction to Achieve Desired Future Conditions and Address ACEC Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Portions of Browns Canyon (11,697 acres), Mosquito Pass (4,036 acres), Droney Gulch (705 acres), Grape Creek (15,978 acres), Garden Park (2,728 acres), Phantom Canyon (6,096 acres), Beaver Creek (12,081 acres), Cucharas Canyon 1,866 acres), and Arkansas Canyonlands (23,921) will be designated as ACECs to protect and enhance special values.	Yes and no. The BLM may want to keep all the current ACECs and their current boundaries and the values that were assigned to them, or it may want to add new ones or adjust boundaries of the current ones or remove current ones.	N/A
	Livestock grazing will be excluded in some areas and adjusted on other areas.	No	Should re-evaluate the exclusion areas to see if they are still valid or need adjustment.
	Fluid mineral leasing will occur on portions of Mosquito Pass and Arkansas Canyonlands, with NSO stipulations.	No; may not be valid.	May want to revisit those portions of Mosquito Pass and Arkansas Canyonlands ACECs where NSO stipulations apply to determine if they still reflect current management goals and/or if other ACECs should be considered for NSO stipulations.
	Locatable mineral entry will not occur.	Yes; still valid. The decision was made to recommend mineral withdrawals, but this was never completely implemented due to staffing and funding constraints. Note that the RMP can recommend a withdrawal, but that is a decision process outside of the land use plan.	N/A
	Mineral materials development will not occur.	Yes; still valid.	N/A
	VRM Class II areas within ACECs will be avoided for major rights-of-way.	Yes; still valid.	N/A
	OHV use will be limited to designated roads and trails.	Yes; still valid.	N/A
	OHV use will be closed within the WSA portions of these ACECs.	Yes; still valid.	N/A

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	ACECs will remain in public ownership.	Yes; retain in public ownership.	N/A
	Timber harvesting and wood gathering will be allowed only for enhancement of protected values.	Yes; this is still valid.	N/A
Northeast RMP	None identified	N/A	N/A

B. Potential new decisions for the RMP revision

There could be recommendations from BLM staff members, other agencies, local government , or the public requesting new ACECs, adjustments to existing ACEC boundaries, or removal of existing ones.

C. Areas of relative resource importance to guide land uses and management

N/A

4.4.2. National Scenic Byways

A. Current management direction

Table 4.30 shows the ability of management to achieve desired future conditions for national scenic byways.

Table 4.30. Ability of Current Management Direction to Achieve Desired Future Conditions and Address National Scenic Byway Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	The Gold Belt Tour is managed as part of the Gold Belt SRMA.	The RMP makes no decisions in regards to the scenic byway.	It is not expected that there would be any changes to the Gold Belt Scenic Byway.
	The RMP is silent in regards to the management of all other scenic byways within the Royal Gorge planning area.	No decisions were made within the RMP for any of the other scenic byways.	Determine if there any other byways that the BLM should assist in managing.
Northeast RMP	The RMP is silent in regards to any scenic byway decisions.	No	Determine if there are any additional roads that should be identified as a scenic byway.

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Gold Belt Tour Corridor Management Plan	This document sets the direction for the management of the scenic byway. The Gold Belt Tour Scenic Byway committee ensures the plan is being followed. The BLM is a member of the committee.	The RMP does not provide any decisions in regards to the management of the byway.	Any management changes would occur in future updates to the Corridor Management Plan.
Collegiate Peaks Scenic Byway Corridor Management Plan	This document sets the direction for the management of the scenic byway. The Collegiate Peaks Scenic Byway committee ensures the plan is being followed. The BLM is a member of the committee.	The RMP does not provide any decisions in regards to the management of the byway.	Any management changes would occur in any future updates to the Corridor Management Plan.

B. Potential new decisions for the RMP revision

No new scenic byways are expected to be designated through the RMP process.

C. Areas of relative resource importance to guide land uses and management

N/A

4.4.3. Wild and Scenic Rivers

A. Current management direction

Table 4.31 shows the ability of management to achieve desired future conditions for wild and scenic rivers.

Table 4.31. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Wild and Scenic River Resource Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Recommended 0 miles and acres for designation.	No	The wild and scenic river study will be revisited and updated.
Northeast RMP	No wild and scenic study was completed.	No	Wild and scenic river study will be completed.
Other relevant plans (South Park plan amendment, renewable energy EIS, geothermal EIS, fire management plan, etc.)	These plans did not address wild and scenic rivers	There are no wild and scenic decisions that were made in any other planning documents.	There are no plans for changing any of existing plans to address wild and scenic river designations.

B. Potential new decisions for the RMP revision

The RMP will re-evaluate all streams in the planning area for eligibility and suitability. If any stream segments are found to be suitable, the land use plan will implement interim management procedures to maintain the ORVs, water quality, classification, and free-flowing conditions found in the river segment. For example, the plan may contain management prescriptions and land use authorization stipulations necessary to maintain the river-related values.

C. Areas of relative resource importance to guide land uses and management

N/A

4.4.4. Wilderness Areas and Wilderness Study Areas

A. Current management direction

Table 4.32 shows the ability of management to achieve desired future conditions for wilderness and WSAs.

Table 4.32. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Wilderness and Wilderness Study Area Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	(C-165) Manage WSAs in accordance with BLM Manual 6330 (BLM 2012e) until Congress makes a decision on wilderness recommendations.	Yes	Continue to manage under the interim management policy.
	(C-166) Return WSAs not designated as wilderness to other types of multiple-use management as prescribed in this land use plan.	Yes	This is up to Congress to decide.
	(C-167) Desired plant community will be determined for WSAs returned to other types of multiple-use management.	Yes	N/A
	(1-168) Manage any designated wilderness areas in accordance with BLM and congressional directives.	Yes	N/A
Northeast RMP	None identified	N/A	N/A
Other relevant plans (South Park plan amendment, renewable energy EIS, geothermal EIS, fire management plan, etc.)	None identified	N/A	N/A

B. Potential new decisions for the RMP revision

No new decisions regarding WSAs are expected.

C. Areas of relative ecological importance to guide land uses and management

Refer to the Citizen's Wilderness Proposal for areas of relative ecological importance (http://www.canyoncountrywilderness.org/history.htm).

4.4.5. National Recreation Areas

A. Current management direction

Table 4.33 shows the ability of management to achieve desired future conditions for national recreation areas (NRAs).

Table 4.33. Ability of Current Management Direction to Achieve Desired Future Conditions and Address National Recreation Area Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)	Options for change
Royal Gorge Resource Area RMP	River corridor recreation values will be managed as guided in any congressional act to establish an NRA.	Yes	No
	Recommend to Congress that the Arkansas River corridor from Leadville to Pueblo Reservoir be designated and managed as an NRA to include the following: revocation of existing water power/reservoir withdrawals, initiation of protective withdrawals on the corridor.	Yes	Do not recommend the Arkansas River to Congress for NRA designation.
	Develop a community-based NRA proposal for the river corridor to be sent forward to Congress	Yes	Do not prepare a community-based NRA proposal.
Northeast RMP	No decisions	N/A	N/A
Other relevant plans - (South Park plan amendment, renewable energy EIS, geothermal EIS, FMP, etc.)	No decisions	N/A	N/A

B Potential new decisions for the RMP revision

No new NRA designations are expected. The BLM needs to make a decision to remove or keep the NRA designation in the RMP.

C. Areas of relative resource importance to guide land uses and management

N/A

4.4.6. National Scenic and Historic Trails

A. Current management direction

Table 4.34 shows the ability of management to achieve desired future conditions for national scenic and historic trails.

Table 4.34. Ability of Current Management Direction to Achieve Desired Future Conditions and Address National Scenic and Historic Trail Demands

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	The RMP is silent in regard to any decisions involving national scenic and historic trails.	Yes	Scope the public to see if they recommend or want to nominate a national scenic and historic trail.
Northeast RMP	The RMP is silent in regards to any decisions involving national scenic and historic trails.	No	Determine if there are any national scenic and historic trails in this area, and if so, determine if BLM should manage any of them.
Other relevant plans (South Park plan amendment, renewable energy EIS, geothermal EIS, FMP, etc.)	There are no decisions relevant to national scenic and historic trails in any other plan.	Yes	These plans contain no reference to national scenic or historic trails.

b. Potential new decisions for the RMP revision

The BLM does not expect to make any new decisions.

C. Areas of relative resource importance to guide land uses and management

N/A

4.5. Social and Economic Conditions

4.5.1. Abandoned Mine Lands, Hazardous Materials, and Public Safety

A. Current management direction

Table 4.35 shows the ability of management to achieve desired future conditions for abandoned mine lands, hazardous materials, and public safety.

Table 4.35. Ability of Current Management Direction to Achieve Desired Future Conditions and Address Abandoned Mine Lands, Hazardous Materials, and Public Safety

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
Royal Gorge Resource Area RMP	Review all hazard sites/areas on a case-by-case basis.	Yes	N/A
	Incorporate hazard management into all appropriate IAPs.	Yes	Need to update language to reflect current management plans and language.
	Reclaim existing sites/areas from past mineral development considered to be potentially hazardous because of high side walls, deep pits, etc., in coordination with the Colorado Mined Land Reclamation Board hazard abatement program.	Yes, but it needs to be reworded.	Need to say the following: "Reclaim existing sites/areas from legacy mineral development considered to be potentially hazardous because of high side walls, deep pits, environmental contamination, etc., in coordination with the Colorado Division of Reclamation, Mining and Safety Inactive Mine Reclamation Program."
	Handle hazardous material emergencies according to the District emergency response hazardous materials contingency plan.	Yes	N/A
	Chaffee County: R&PP lease for this landfill is listed on the Federal Facilities docket. Preliminary assessment and site investigation have been completed. Site is currently slated for no further remedial action. This site will not be considered further for national priority list (Superfund).	No	Doesn't need to be mentioned in an R&PP.
	Park County: R&PP lease audited for lease compliance in 1990. Audit results show no known or suspected contamination.	No	Doesn't need to be mentioned in an R&PP.
Northeast RMP	Concern Area—presence of significant geological features or hazards is known or suspected. Management actions will be based on field investigations to develop surface protection requirements for preserving the scientific and scenic values of significant geologic features. Field investigations and possible detailed engineering studies will be made in order to avoid or mitigate problems due to geologic hazards. When management actions are considered for such an area, they will include protective stipulations.	Yes, although this may be determined on more of a case-by-case basis during the NEPA process.	N/A
	None—Occurrence of significant geological features or hazards in the area is unknown. Field investigations	Yes; although this may be determined on more of a	N/A

Relevant plan	Current planning decision	Is decision responsive to current issues (rationale)?	Options for change
	during the environmental analysis process and/or new information about features or hazards could change the classification to ”Concern Area” above.	case-by-case basis during the NEPA process.	

B. Potential new decisions for the RMP revision

No new decisions needed; however the language contained in the decisions needs to be updated to reflect current conditions.

C. Areas of relative resource importance to guide land uses and management

Not applicable.

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Chapter 5. Consistency with Other Plans and Cooperating Agencies

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5.1. Introduction

According to guidance found in 43 CFR 1610, the BLM's RMPs and amendments must be consistent, to the extent practical, with officially approved or adopted resource-related plans of State and local governments, other Federal agencies, and tribal governments, so long as the guidance and RMPs are also consistent.

The BLM's RMPs must also be consistent with the purposes, policies, and programs of Federal Land Policy and Management Act (FLPMA) and other Federal laws and regulations applicable to public lands, including Federal and State pollution control laws (see 43 CFR 1610.3-2 (a)).

If these other entities do not have officially approved or adopted resource-related plans, then BLM RMPs must, to the extent practical, be consistent with their officially approved and adopted resource-related policies and programs. This consistency will be achieved so long as BLM RMPs incorporate the policies, programs, and provisions of public land laws and regulations and Federal and State pollution control laws (see 43 CFR 1610.3-2 (b)).

Before the BLM approves the Proposed RMP decisions, the Governor of Colorado has sixty days in which to identify inconsistencies between the proposed plan and State plans and programs, and to provide written comments to the BLM State Director. The BLM and the State may mutually agree on a shorter review period satisfactory to both. If the Governor does not respond within this period, it is assumed that the Proposed RMP decisions are consistent.

If the Governor recommends changes in the proposed plan that were not raised during the public participation process, the BLM State Director shall provide the public with an opportunity to comment on the recommendations (per 43 CFR 1610.3-2 (e)). This public comment opportunity will be offered for thirty days, and may coincide with the thirty-day comment period for the notice of significant change. If the BLM State Director does not accept the Governor's recommendations, then the Governor has thirty days to appeal in writing to the Director of the BLM (per 43 CFR 1610.3-2(e)).

County, town, and State agency plans, and other Federal agency plans for neighboring areas or cross-jurisdictional purposes are further discussed in the following sections. Plans listed or discussed in the following sections should be consulted as applicable during development of the RMP.

5.2. County and City Plans

Boulder County parks and open space plan(s)

Lake County open space plan(s)

Eastern Fremont County trails and open space plan(s)

Chaffee County trails master plan(s)

South Park National Heritage Area Management Plan and Categorical Exclusion (Balough and Duvic 2013)

5.3. State Agency Plans

Colorado Oil and Gas Conservation Commission strategic plan(s)

Colorado State preservation plan(s)

Arkansas River management plan(s)

Colorado Water Conservation Board Statewide Water Supply Initiative (http://cwcb.state.co.us/water-management/water-supply-planning/pages/swsi2010.aspx)

Colorado Statewide Comprehensive Outdoor Recreation Plan (http://cpw.state.co.us/aboutus/Pages/SCORP.aspx)

Colorado Department of Natural Resources Colorado water plan (http://cwcb.state.co.us/Pages/CWCBHome.aspx)

5.4. Other Federal Agency Plans

Pike and San Isabel National Forest plan (http://www.fs.usda.gov/main/psicc/landmanagement/planning)

Arapahoe-Roosevelt National Forest plan (http://www.fs.usda.gov/detail/arp/landmanagement/planning/?cid=fsm91_058285)

Pawnee National Grassland plan (http://www.fs.usda.gov/detail/arp/landmanagement/planning/?cid=fsm91_058285)

Cimarron-Comanche National Grassland plan (http://www.fs.usda.gov/main/psicc/landmanagement/planning)

BLM San Luis Valley Field Office RMP (http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/archived/san_luis.html)

U.S. Fish and Wildlife Service plans

National Park Service plans

Department of Defense plans

Army Corps of Engineers plans (John Martin Reservoir)

Bureau of Reclamation plans

Fire management plans associated with the above plans

5.5. Potential Cooperating Agencies

The BLM will invite all eligible Federal agencies, State and local governments, and federally recognized Indian tribes to participate as cooperating agencies in the development of the Eastern Colorado RMP. Agencies with jurisdiction by law or agencies with special expertise are eligible to be cooperating agencies. Cooperating agencies assist the BLM at nearly every stage of the land

use planning process, such as identifying issues that need to be addressed, collecting inventory data, or developing management alternatives. Below is a preliminary list of agencies that the BLM has determined to be eligible for cooperating agency status for the Eastern Colorado RMP. The BLM may identify additional eligible cooperating agencies during scoping or subsequent steps of the land use planning process.

5.5.1. Potential Federal Agency Cooperators

Agencies
Bureau of Reclamation, Eastern Colorado Area Office
National Park Service, Intermountain Regional Office
Department of Defense, U.S. Army Environmental Center
U.S. Forest Service, Arapahoe-Roosevelt National Forest/Pawnee National Grasslands
U.S. Forest Service, Pike–San Isabel National Forest/Comanche and Cimarron National Grasslands
U.S. Fish and Wildlife Service, Mountain-Prairie Region Office
Western Area Power Administration, Rocky Mountain Region
U.S. Department of Transportation

5.5.2. Potential State Agency Cooperators

Agencies
History Colorado, Office of Archaeology & Historic Preservation
Colorado Department of Public Health and Environment
Colorado Department of Natural Resources

5.5.3. Potential County Cooperators

Counties		
Adams County	El Paso County	Morgan County
Arapahoe County	Elbert County	Otero County
Baca County	Fremont County	Park County
Bent County	Gilpin County	Phillips County
Boulder County	Huerfano County	Prowers County
Broomfield County	Jefferson County	Pueblo County
Chaffee County	Kiowa County	Saguache County
Cheyenne County	Kit Carson County	Sedgwick County
Clear Creek County	Lake County	Teller County
Crowley County	Larimer County	Washington County
Custer County	Las Animas County	Weld County
Denver County	Lincoln County	Yuma County
Douglas County	Logan County	

5.5.4. Potential Community Cooperators

A considerable number of cities and towns exist in the planning area. The following is a list of incorporated communities that have either BLM surface estate or Federal mineral estate within their boundaries:

Communities
City of Black Hawk
Town of Buena Vista
City of Cañon City

City of Central City
City of Cripple Creek
Town of Fairplay
Town of La Veta
City of Leadville
Town of Poncha Springs
City of Salida
Town of Silver Cliff

The following municipalities have participated in past planning efforts and could bring special expertise to the RMP revision:

Communities
Aurora Water
Colorado Springs Utilities
Denver Water Board
Pueblo Board of Water Works

5.5.5. Potential Tribal Cooperators

Tribal Entities
Apache Tribe of Oklahoma
Cheyenne and Arapaho Tribes of Oklahoma
Cheyenne River Lakota Tribe
Comanche Tribe of Oklahoma
Crow Creek Sioux
Eastern Shoshone Tribe
Jicarilla Apache Nation
Kiowa Tribe of Oklahoma
Northern Arapaho Tribe
Northern Cheyenne Tribe
Oglala Sioux Tribe
Pawnee Nation of Oklahoma
Rosebud Sioux Tribe
Southern Ute Tribe
Standing Rock Sioux Tribe
Ute Mountain Ute Tribe
Ute Tribe (Northern Ute)

5.5.6. Other Potential Cooperators

Water Conservancy Districts
Arkansas River Water Conservancy District
Center of Colorado Water Conservancy District
Central Colorado Water Conservancy District
Huerfano County Water Conservancy District
Lower Arkansas Valley Water Conservancy District
Northern Colorado Water Conservation District
Purgatoire River Water Conservancy District
Southeastern Colorado Water Conservancy District
Upper Arkansas Water Conservancy District
Upper South Platte Water Conservancy District

5.6. Government to Government Consultation

The Eastern Colorado planning area is not contiguous with any tribal lands, and no trust assets are present. There are no programmatic agreements, memoranda of understanding, or plans that are co-signed between the BLM and the tribes.

The RGFO will invite the Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Nation of Oklahoma, Crow Creek Sioux, Eastern Shoshone, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, the Ute Tribe, Oglala Sioux Tribe, Pawnee Tribe, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Lakota Tribe, and the Ute Mountain Ute Tribe to become cooperating agencies for the RMP revision process.

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Chapter 6. Specific Mandates

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6.1. Introduction

The foundation of public land management is the mandates and authorities provided in laws, regulations, and Executive orders. The BLM planning process (as described in 43 CFR 1600) is authorized and mandated through two important laws: the Federal Land Policy and Management Act of 1976 (FLPMA) and the National Environmental Policy Act of 1969 (NEPA). In addition to these acts, several other acts, instructional memoranda, manuals, and handbooks give direction and authority to the BLM. This chapter lists some of the documents that direct the management of public lands and resources in the Eastern Colorado RMP planning area, and it consists of five sections:

- Laws, Regulations, and Orders
- Instruction Memoranda, Information Bulletins, Manuals, Handbooks, and Notes
- Applicable Colorado State Laws and Regulations
- Memoranda and Agreements
- Applicable Planning Documents

6.2. Laws, Regulations, and Orders

- 2009 implementation strategy for the Federal Wildland Fire Management Policy
- 43 CFR Part 3 (Preservation of American Antiquities; implementing regulations for the Antiquities Act)
- 43 CFR Part 7 (Protection of Archaeological Resources)
- 43 CFR Part 10 (Native American Graves Protection and Repatriation Act Regulations; Final Rule)
- 36 CFR Part 78 (Waiver of Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act)
- 36 CFR 79 (Curation of Federally-Owned and Administered Archeological Collections)
- 36 CFR Part 60 (National Register of Historic Places)
- 36 CFR Part 800 (Protection of Historic Properties)
- American Indian Religious Freedom Act (49 United States Code (U.S.C.) 47125 et sequens)
- Antiquities Act of 1906 (P.L. 59-209; 34 Stat. 225; 16 U.S.C. 431 - 433)
- Appropriations Act of 1952, McCarran Amendment
- Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470)
- Classification of Multiple Use Act of September 1964, in accordance with 43 CFR 2400, Pub. L. No. 88-607, 78 Stat. 986 (1964) (expired 1970). 77 43 U.S.C. 1702(c). 78 Id. 1702(h)

- Clean Air Act of 1955 (42 U.S.C. 7401-7671q.)
- Clean Water Act of 1987, as amended (33 U.S.C. 1251)
- Colorado River Basin Salinity Control Act of 1974
- Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et sequens)
- Executive Order 11288—Prevention, Control, and Abatement of Water Pollution by Federal Activities
- Executive Order 11644—Use of Off-Road Vehicles on the Public Lands
- Executive Order 11738—Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans
- Executive Order 11987—Exotic Organisms
- Executive Order 13007—Indian Sacred Sites
- Executive Order 13084—Consultation and Coordination with Indian Tribal Governments
- Federal Cave Resources Protection Act of 1988 (16 U.S.C. 4301 et sequens)
- Federal Land Policy Management Act of 1976 (43 U.S.C. 1701 et sequens)
- Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2814)
- Federal Water Pollution Control Act (commonly known as the Clean Water Act), as amended (33 U.S.C. 1251-1387)
- *Guidance for Implementation of Federal Wildland Fire Management Policy* (USDA and DOI 2009)
- Fish and Wildlife Coordination Act (16 U.S.C. 661 et sequens)
- Healthy Forests Restoration Act of 2003
- Historic Sites Act of 1935 (16 U.S.C. 461)
- Migratory Bird Conservation Act of 1929, as amended (16 U.S.C. 715)
- Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712)
- Mining and Mineral Policy Act of 1970 (30 U.S.C. 181 et sequens)
- National Ambient Air Quality Standards (40 CFR 50.4-50.12)
- National Environmental Policy Act of 1969 (42 U.S.C. 4321 et sequens)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470)
- Native American Graves Protection and Repatriation Act, as amended (25 U.S.C. 3001 et sequens)
- Noise Control Act of 1972 (42 U.S.C. 4901 et sequens)

- Noxious Weed Control Act of 2004 (Public Law 108-412)
- Oil and gas onshore orders
- Onshore Oil and Gas Leasing Reform Act of 1987 (30 U.S.C. 181 et sequens)
- Public Rangelands Improvement Act of 1978 (43 U.S.C. 869 et sequens)
- Recreation and Public Purposes Act of 1926, as amended (43 U.S.C. 869 et sequens)
- Review and Update of the 1995 Federal Wildland Fire Management Policy (2001)
- The R&PP Amendment Act of 1988
- The Sikes Act of 1974, as amended (16 U.S.C. 670 et sequens)
- Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001)
- Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et sequens)
- Taylor Grazing Act of 1934 (43 U.S.C. 315)
- The Common Varieties of Mineral Materials Act of 1947
- The Mineral Leasing Act of 1920
- The Mineral Leasing Act for Acquired Lands of 1947
- The Multiple Use Mining Act of 1955
- The Organic Administration Act of 1897
- The Surface Mining Control and Reclamation Act of 1977
- The United States Mining Laws of 1872
- 43 CFR (Public Lands, Interior), Parts 2100, 2200, 2300, 2700, 2800, 2900, 3100, 3200, 3400, 3500, 3600, and 3800
- Water Resources Development Act of 1974
- Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et sequens)
- Wilderness Act, as amended (16 U.S.C. 1131 et sequens)
- Paleontological Resources Preservation Act (16 U.S.C. 473 aaa et sequens)

6.3. Instruction Memoranda, Information Bulletins, Manuals, Handbooks, and Notes

- BLM H-1601-1, *Land Use Planning Handbook*
- BLM H-1790-1, *National Environmental Policy Act*
- BLM H-2100-1, *Acquisition*

- BLM H-2200-1, *Land Exchange Handbook*
- BLM H-3042-1, *Solid Minerals Reclamation Handbook*
- BLM H-3150-1, *Onshore Oil and Gas Geophysical Exploration Surface Management Requirements*
- BLM H-3160-5, *Inspection and Enforcement Documentation and Strategy Development Handbook*
- BLM H-3420-1, *Competitive Coal Leasing*
- BLM H-3600-1, *Mineral Materials Disposal Handbook*
- BLM H-3720-1, *Abandoned Mine Land Program Policy Handbook*
- BLM H-3809-1, *Surface Management Handbook*
- BLM H-4180-1, *Rangeland Health Standards*
- BLM H-6310-1, *Wilderness Inventory and Study Procedures*
- BLM H-8410-1, *Visual Resource Inventory*
- BLM H-8550-1, *Interim Management Policy and Guidelines for Lands Under Wilderness Review*
- BLM H-9214-1, *Prescribed Fire Management Handbook*
- BLM H-9211-1, *Fire Planning Handbook*
- BLM Manual 1613, *Areas of Critical Environmental Concern*
- BLM Manual 2200, *Land Exchanges*
- BLM Manual 2881, *Mineral Leasing Act—General*
- BLM Manual 3600, *Mineral Materials Disposal*
- BLM Manual 3720, *Abandoned Mine Land Program Policy*
- BLM Manual 3800, *Mining Claims Under the General Mining Laws*
- BLM Manual 4180, *Land Health*
- BLM Manual 6840, *Special Status Species Management*
- BLM Manual 7250, *Water Rights Manual*
- BLM Manual 7300, *Air Resource Management Program*
- BLM Manual 8100, *The Foundation for Managing Cultural Resources*
- BLM Manual 8270, *Paleontological Resource Management*
- BLM Manual 8340, *Off-Road Vehicles*

- BLM policy and program guidance for the management of cultural resources outlined in BLM Manual sections 8100, 8110, 8120, H-8120-1, 8130, 8140, 8150, and 8170
- BLM Colorado *Handbook of Guidelines and Procedures for Inventory, Evaluation, and Mitigation of Cultural Resources* (BLM 2011a)
- *BLM-Colorado Digital Data Specifications Guide* (BLM 2013)
- *Department of the Interior Departmental Manual*. Part 411, Identifying and Managing Museum Property (DOI 2012)
- Colorado IB CO-2003-020, *Travel Management Planning and Implementation*
- Colorado IM 2007-020, *Comprehensive Travel Management Planning and OHV Designations* (BLM 2007b)
- IB 98-116, *Clean Water Action Plan*
- IM 78-410, *Policy on Protection of Wetland-Riparian Areas*
- IM 78-523, *Compliance with Bureau of Land Management Interim Floodplain Management Procedures*
- IM 87-274, *Riparian Area Management Policy*
- IB 99-085, *Federal Multi-Agency Source Water Agreement*
- IM CO-90-072, *Colorado Burial Discovery Procedures*
- IM CO-98-052, *Clarification of Cultural Resource Clearance Responsibilities and Maintenance on On-Going Projects*.
- IM WO-98-131, *Disposition Policy on Native American Graves Protection and Repatriation Act (NAGPRA) Repatriated Museum Collections*
- IM CO-2000-016, *Disposition Policy on Native American Graves Protection and Repatriation Act (NAGPRA) Repatriated Museum Collections* (BLM 2000a)
- IB WO-2002-002, *New Heritage Education Plan*
- IM CO-2002-029, *Interim Historic Preservation Guidelines and Procedures for Evaluating the Effect of Rangeland Management Activities on Historic Properties* (BLM 2002b)
- IB WO-2002-101, *Cultural Resource Considerations in Resource Management Plans* (BLM 2002a)
- IB WO-2003-093, *Implementation of Executive Order (EO) 13287 and Preserve America Initiative*
- IM WO-2003-147, *Application for Permit to Drill (APD) – Process Improvement No. 3—Cultural Resources*
- IM WO 2004-020, *Guidance for Recording Cultural and Paleontological Resource Locations for the Bureau of Land Management (BLM) using Global Positioning System (GPS) Technology*

- IM WO-2004-052, *Assessing Tribal and Cultural Considerations as Required in IM-2003-233, Integration of the Energy Policy and Conservation Act (EPCA) Inventory Results into the Land Use Planning Process*
- IB WO-2004-154, *Amendments to 36 CFR Part 800, Protection of Historic Properties*
- IM WO-2005-003, *Cultural Resources and Tribal Consultation and Fluid Minerals Leasing*
- IM WO-2005-027, *National Historic Preservation Act (NHPA) Section 106 and Oil and Gas Permitting*
- IM CO-2006-026, *Cultural Resource Standards and Guidelines for Renewal of Right-of-Way Grants and Temporary Use Permits under Section 106 of the National Historic Preservation Act*
- IM 2002-174, *Oil and Gas Leasing Stipulations*
- IM 2003-137, *Integration of the Energy Policy and Conservation Act Inventory Results into Land Use Planning and Energy use Authorization*
- IM 2003-158, *Memorandum of Understanding (MOU) between BLM and the Animal and Plant Health Inspection Service Addressing the Management of Grasshoppers and Mormon Crickets*
- IM 2003-226, *Fire Program Analysis System—Development of Fire Management Objectives*
- IM 2004-005, *Clarification of OHV Designations and Travel Management in the BLM Land Use Planning Process* (BLM 2004b)
- IM 2011-003, *Solar Energy Development Policy* (BLM 2010)
- IM 2005-008, *Black-tailed, White-tailed, and Gunnison Prairie Dog Conservation Update*
- IM 2007-002, *Bureau of Land Management (BLM) Reburial Policy on BLM Lands* (BLM 2006)
- IM 2008-014, *Clarification of Guidance and Integration of Comprehensive Travel and Transportation Management Planning into the Land Use Planning*
- IM 2009-043, *Wind Energy Development Policy* (BLM 2008c)
- *Interagency Standards for Fire and Fire Aviation Operations* ("The Red Book") (Federal Fire and Aviation Task Group 2014)
- *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (DOI and USDA 2008)
- *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book* (DOI and USDA 2007)
- Technical Note 346: *Erosion Condition Classification System* (Clark 1980)
- Technical Note 369: *Considerations in Rangeland Watershed Monitoring* (Jackson, Gebhardt, and Hudson 1985)
- Technical Note 405: *A Framework for Analyzing the Hydrologic Conditions of Watersheds* (McCammon, Rector, and Gebhardt 1998)

6.4. Applicable Colorado State Laws and Regulations

- Colorado Air Quality Control Commission, Regulation Number 9, Open Burning, Prescribed Fire, and Permitting, 5 CCR, 1001-11
- Colorado Water Quality Control Act
- Colorado Sound Law
- Colorado OHV Act
- Colorado OHV regulations
- Colorado Oil and Gas Conservation Act, C.R.S 34-60-100, et seq.
- Colorado Snowmobile Act
- Colorado Recreation Trails Act
- Colorado Revised Statues—Title 37, Water and Irrigation
- Colorado Surface Coal Mining Reclamation Act, 34-33-101 et sequens, C.R.S. 1973, as amended
- Primary Drinking Water Regulations, 5 CCR 1003-1 (amended January 2005; effective March 2005)
- Regulation No. 31—The Basic Standards and Methodologies for Surface Water (amended August 2005; effective December 2005 and December 2007)
- Regulation No. 39—Colorado River Salinity Standards (adopted May 1980; amended 1982 and 1997)
- Regulation No. 41—The Basic Standards for Groundwater
- Regulation No. 42—Site-Specific Water Quality Classifications and Standards For Groundwater
- Regulation No. 93—Section 303(d) List Water Quality Limited Segments Requiring TMDLs (adopted March 2006)
- Regulation No. 94—Colorado's Monitoring and Evaluation List (adopted March 2006)
- Title 34, Mineral Resources, Article 32, Colorado Mined Land Reclamation Act
- Title 34, Mineral Resources, Article 32.5, Colorado Mined Land Reclamation Act for the Extraction of Construction Materials
- Colorado Oil and Gas Conservation Commission rules and regulations pertaining to oil and gas development in the State of Colorado

6.5. Memoranda and Agreements

- *Federal Coal Management Programmatic Memorandum of Agreement among the BLM, Office of Surface Mining, DOI, USGS, and the Advisory Council on Historic Preservation*
- *Interagency Memorandum of Understanding (MOU) between the BLM and U.S. Department of Agriculture*. 60F26045-48 (May 1995)
- *Interagency Agreement between the Bureau of Reclamation and the BLM* (March 1983)
- Master MOU with the FWS (December 1986)
- *MOU on the Coordination and Enhancement of Services to and by the Outfitting Industry in Colorado on National Forest System, BLM and State Public Lands* (2007)
- *MOU Between the Colorado's Outfitters Association and the USDI, Bureau of Land Management, Colorado* (2006)
- *MOU Between Colorado Mountain Club and the USDI Bureau of Land Management, Colorado State Office* (2008)
- *MOU Between the Colorado Off-Highway Vehicle Coalition and the COHVCO Foundation and the USDI Bureau of Land Management, Colorado State Office* (2005)
- *MOU Between the International Mountain Bicycling Association and Bicycle Colorado and the USDI Bureau of Land Management, Colorado State Office* (2005)
- *MOU Between USDI Bureau of Land Management, Colorado State Office and Colorado River Outfitters Association and Colorado State Parks* (2007)
- *MOU Between USDI Bureau of Land Management and The Access Fund* (2005)
- *MOU Between USDI Bureau of Land Management, USDA Forest Service and U.S. Fish and Wildlife Service and Federal Lands Hunting, Fishing, and Shooting Sports Roundtable* (2006)
- *MOU Between USDI Bureau of Land Management and The Corps Network* (2008)
- *State Protocol Agreement Between the Colorado State Director of the Bureau of Land Management and the Colorado State Historic Preservation Officer, Regarding the Manner in which the Bureau of Land Management Will Meet Its Responsibilities Under the National Historic Preservation Act and the 2012 National Programmatic Agreement Among the BLM, the Advisory Council On Historic Preservation, and the National Conference of State Historic Preservation Officers*
- *MOU with Colorado Cattleman's Association for the Colorado Resource Monitoring Initiative* (2011)
- *MOU Between BLM and Colorado Natural Areas Program*
- *MOU Between NOAA and BLM, RGFO for managing oil and gas development on NOAA owned properties* (2003, agreement No. CO-200-237)

- *MOU Between the Colorado Oil and Gas Conservation Commission and the Colorado Bureau of Land Management*
- *Federal Lands Hunting, Fishing, and Shooting Sports Roundtable MOU*

6.6. Applicable Planning Documents

6.6.1. Land Use Plan Amendments

Table 6.1 below shows the applicable land use plan amendments.

Table 6.1. Land Use Plan Amendments

Document	Year	Description
Royal Gorge Resource Area RMP (BLM 1996)	1996	Resource management plan managing public land and Federal mineral estate for southeast Colorado.
Northeast RMP (BLM 1986b)	1986	Resource management plan managing public land and Federal mineral estate for northeast Colorado.
Colorado oil and gas leasing EIS (BLM 1991c)	1991	Amended Northeast RMP for oil and gas leasing.
Arkansas River TMP (BLM 2008d)	2008	Amended travel management in the Royal Gorge Resource Area RMP for the Arkansas River subunit.
Gold Belt TMP (BLM 2004a)	2004 (amended in 2009)	Amended travel management in the Royal Gorge Resource Area RMP for the Gold Belt subunit.
Fourmile TMP (BLM 2002d)	2002	Amended travel management in the Royal Gorge Resource Area for the Fourmile area east of Buena Vista.
Box Creek vegetation and TMP (BLM 2004c)	2004	Amended vegetation and travel management decisions for Box Creek in the Royal Gorge Resource Area RMP.
South Park land tenure adjustment plan (BLM 2009b)	2009	Amendment adjusting land tenure and classification in the South Park region based on updated information and newly discovered resource values.
Amendment to land health standards (BLM 1997)	1997	Amended "decisions common to all areas C-25 from prescribed fire could be used as a management tool to enhance other resources" to say "prescribed fire and prescribed natural fire could be used as a management tool to enhance other resources."
Designation of energy corridors in 11 western States (BLM 2009a)	2009	Amended the Royal Gorge Resource Area RMP by adding corridors.

6.6.2. Activity Level Plans

- Royal Gorge fire management plan(s)
- Arkansas River management plan(s)

6.6.3. Endangered Species Recovery Plans

- *Mexican Spotted Owl Recovery Plan, First Revision* (FWS 2012)
- *Recovery Outline for Gaura Neomexicana Ssp. Coloradensis (Colorado Butterfly Plant)* (FWS 2010b)

- *Ute Ladies'-Tresses (Spiranthes diluvialis) Agency Review Draft-Recovery Plan* (FWS 1995a)
- *Recovery Outline for the Penland Alpine Fen Mustard* (FWS 1993a)
- *Draft Recovery Plan Preble's Meadow Jumping Mouse (Zapus hudsonius preblei)* (FWS 2003)
- *Uncompahgre Fritillary Butterfly Recovery Plan* (FWS 1994b)
- *Pawnee Montane Skipper Butterfly Recovery Plan* (FWS 1998b)
- *Greenback Cutthroat Trout Recovery Plan* (FWS 1998a)
- *Recovery Plan for the Interior Population of the Least Tern (Sterna antillarum)* (FWS 1990)
- *Whooping Crane Recovery Plan* (FWS 1994a)
- *Pallid Sturgeon (Scaphirhynchus albus) Recovery Plan* (FWS 1993b)
- *Great Lakes & Northern Great Plains Piping Plover Recovery Plan* (FWS 1988)
- *Western Prairie Fringed Orchid (Platanthera praeclara) Recovery Plan* (FWS 1996)

6.6.4. Habitat Plans

- *Lesser Prairie-Chicken Range-Wide Conservation Plan* (Van Pelt et al. 2013)
- *Canada Lynx Conservation Assessment and Strategy* (Interagency Lynx Biology Team 2013)

6.6.5. Recreation Management Plans

- *Arkansas River Recreation Management Plan* (CPW 2001)

6.6.6. Other Policy and Guiding Direction

- *Recreation Management Guidelines to Meet Public Land Health Standards on Bureau of Land Management Lands in Colorado* (see BLM 2000b)
- *National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands* (BLM 2001a)
- *National Mountain Biking Strategic Action Plan* (BLM 2002c)
- *BLM Recreation Strategy: Connecting with Communities. 2014–2019* (BLM 2014c)
- *Federal Wildland Fire Management Policy and Program Review: Final Report* (DOI AND USDA 1995)
- *Review and Update of the 1995 Federal Wildland Fire Management Policy* ((DOI et al. 2001)
- *Guidance for Implementation of Federal Wildland Fire Management Policy* (USDA and DOI 2009)
- Interagency wildland fire use implementation procedures reference guide (2007)

- *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (USDA and DOI 2008)
- *Colorado Bark Beetle Strategic Plan 2012* (BLM 2012d)

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Chapter 7. List of Preparers

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Table 7.1 below lists the many people who contributed to the completion of this document.

Table 7.1. List of Preparers

Name	Discipline	Responsibility
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Sara (Lura) Matthews	Management and Program Analyst	Social and economic values
Martin Hensley	Economist	Social and economic values
BLM Front Range District		
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BLM Royal Gorge Field Office		
Stephanie Carter	Geologist	Geology/minerals, solid minerals (locatable, salable, solid leasables), abandoned mine lands, hazardous materials, and public safety
Melissa Smeins	Geologist	Geology/minerals, paleontological resources, coal, fluid minerals (geothermal), solid leasables, abandoned mine lands, hazardous materials, and public safety
John Smeins	Hydrologist and Project Lead	Water resources, soil resources, farmlands prime and unique (agricultural use)
John Lamman	Rangeland Management Specialist	Invasive species, vegetation, livestock grazing
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Matt Rustand	Wildlife Biologist	Terrestrial wildlife (includes migratory birds), special status species (federally threatened, endangered, proposed, and BLM sensitive species)
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Dave Gilbert	Fisheries Biologist	Aquatic wildlife, wetlands and riparian resources
Glenda Torres	Natural Resources Specialist	Wildland fire ecology and management
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Marie Lawrence	Technical Writer-Editor	Editing and associated tasks

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Chapter 8. Glossary

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Actual Use. The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by the BLM.

Air Pollution. The contamination of the atmosphere by any toxic or radioactive gases and particulate matter as a result of human activity.

Allotment. An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM lands but may also include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Alternative. A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision-making. An alternative need not substitute for another in all respects.

Alternative, No Action. An alternative that maintains established trends or management direction and implements those actions previously analyzed and/or approved.

Allotment Management Plan (AMP). A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment. An AMP is prepared in consultation with the permittee(s), lessee(s), and other affected interests. Livestock grazing is considered in relation to other uses of the range and to renewable resources, such as watershed, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

Animal Unit Month (AUM). The amount of forage needed by an “animal unit” (AU) grazing for one month. The animal unit in turn is defined as one mature 1,000-pound cow and her suckling calf, one horse, five goats, or five sheep.

Analysis of the Management Situation (AMS). Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

Areas of Critical Environmental Concern (ACECs). Areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. See FLPMA, Section 103(a).

Atmospheric Deposition. Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist and fall to the Earth. It’s sometimes referred to as "acid rain" and comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. If the acid chemicals in the air are blown into areas where the weather is wet, the acids can fall to Earth in the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke.

Back Country Byways. Vehicle routes that traverse scenic corridors using secondary or backcountry road systems. National backcountry byways are designated by the type of road and vehicle needed to travel the byway.

Best Management Practices (BMPs). A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes. BMPs are often developed in conjunction with **land use plans**, but they are not considered a land use plan decision, unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory.

Big Game. Indigenous ungulate wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, or pronghorn antelope.

Biomass. The amount of living matter (as in a unit area or volume of habitat).[1]

Candidate species. Taxa for which the FWS has sufficient information on their status and threats to support proposing the species for listing as endangered or threatened under the ESA but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the *Federal Register* (see BLM 2008a).

Casual Use. This means activities that involve practices that do not ordinarily cause any appreciable disturbance or damage to the public lands, resources or improvements, and therefore do not require a right-of-way grant or temporary use permit (43 CFR 2800). It also means any short term non-commercial activity that does not cause appreciable damage or disturbance to the public lands, their resources, or improvements, and which is not prohibited by closure of the lands to such activities (43 CFR 2920). Casual use generally includes the collecting of geochemical, rock, soil, or mineral specimens using hand tools, hand panning, and non-motorized sluicing. It also generally includes use of metal detectors, gold spears, and other battery-operated devices for sensing the presence of minerals, and hand battery-operated dry washers. Casual use does not include use of mechanized earth-moving equipment, truck-mounted drilling equipment, suction dredges, motorized vehicles in areas designated as closed to off-road vehicles, chemicals, or explosives. It also does not include occupancy or operations where the cumulative effects of the activities result in more than negligible disturbance.

Clean Air Act of 1963 and Amendments. Federal legislation governing air pollution control.

Closed. Generally denotes that an area is not available for a particular use or uses. The reader should refer to specific definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 sets forth the specific meaning of "closed" as it relates to OHV (see **Off-Highway Vehicle**) use, and 43 CFR 8364 defines "closed" as it relates to closure and restriction orders. See H-1601-1, *Land Use Planning Handbook* (BLM 2005).

Co-locate. To locate together; especially to place (two or more units) close together so as to share common facilities.[1]

Condition Class (Fire Regimes). Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loading. One or more of the following activities may have caused this departure: fire suppression,

[1]Merriam-Webster online: http://www.merriam-webster.com/. Accessed 3/31/2015.

timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or disease, or other management activities.

Conditions of Approval. Conditions or provisions (requirements) under which an application for a permit to drill or a sundry notice is approved.

Cooperating Agency. Assists the lead Federal agency in developing an **EA** or **EIS**. The **Council on Environmental Quality** regulations implementing **NEPA** define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ). An advisory council to the President established by the **National Environmental Policy Act** of 1969. It reviews Federal programs to analyze and interpret environmental trends and information.

Critical Habitat. An area occupied by a **threatened** or **endangered** species on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection.

Deferred Rotation. Rotation grazing with regard to deferring pastures beyond the growing season, if they were used early the prior year, or that have been identified as needing deferment for resource reasons.

Designated Roads and Trails. Specific roads and trails identified by the BLM (or other agencies) where some type of motorized vehicle use is appropriate and allowed either seasonally or year-long. See H-1601-1, *Land Use Planning Handbook* (BLM 2005).

Disposal. Transfer of public land out of Federal ownership to another party through sale, exchange, Recreation and Public Purposes Act, Desert Land Entry or other land law statutes.

Easement. A right afforded a person or agency to make limited use of another's real property.

Eligibility. Qualification of a river for inclusion into the **NWSRS** through the determination (professional judgment) that it is free-flowing and, with its adjacent land area, possesses at least one river-related value considered to be outstandingly remarkable. See BLM Manual 8351, *Wild and Scenic Rivers—Policy and Program direction for Identification, Evaluation, and Management*.

Endangered Species. Any species that is in danger of extinction throughout all or a significant portion of its range (BLM 2008a).

Environmental Assessment. A concise public document for which a Federal agency is responsible that serves to briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact, that aids in an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary, and that facilitates preparation of an **environmental impact statement** when one is necessary.

Environmental Education. A learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to

address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action.

Environmental Impact Statement (EIS). A detailed statement prepared by the responsible official in which a major Federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action provided, and effects analyzed.

Environmental Justice. The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, State, local, and Tribal programs and policies (Executive Order 12898).

Evaluation (Plan Evaluation). The process of reviewing a land use plan and periodic plan-monitoring reports to determine whether the land use plan decisions and NEPA analysis are still valid and whether the plan is being implemented.

Extensive Recreation Management Area (ERMA). Areas in which significant recreation opportunities and problems are limited and explicit recreation management is not required. Minimal management actions related to the BLM's stewardship responsibilities are adequate in these areas.

Federal Land Policy and Management Act of 1976 (FLPMA). Public Law 94-579, October 21, 1976, often referred to as the BLM's "Organic Act," which provides the majority of the BLM's legislated authority, direction, policy, and basic management guidance.

Fire Suppression. All work activities connected with fire extinguishing operations, beginning with discovery of a fire and continuing until the fire is completely out.

Fluid Minerals. Oil, gas, coal-bed natural gas, and geothermal resources.

Functioning at Risk. (1) Condition in which vegetation and soil are susceptible to losing their ability to sustain naturally functioning biotic communities. Human activities, past or present, may increase the risks. (2) Uplands or riparian-wetland areas that are **properly functioning**, but a soil, water, or vegetation attribute makes them susceptible to degradation and lessens their ability to sustain natural biotic communities. Uplands are particularly at risk if their soils are susceptible to degradation. Human activities, past or present, may increase the risks. See also **Properly Functioning Condition** and **Nonfunctioning Condition**.

Grazing Preference. A superior or priority position against others for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by a permittee or lessee.

Geographic Information System (GIS). A system of computer hardware, software, data, people and applications that captures, stores, edits, analyzes, and graphically displays a potentially wide array of geospatial information.

Goal. A broad statement of a desired outcome; usually not quantifiable and may not have established time frames for achievement.

Guidelines. Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as **best management practices**. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory.

Geologic Province. A USGS-defined area having characteristic dimensions of perhaps hundreds to thousands of kilometers encompassing a natural geologic entity (for example, a sedimentary basin, thrust belt, or delta) or some combination of contiguous geologic entities.

Governor's Consistency Review. The 60-day review period of a proposed RMP/final EIS provided to a State Governor. The Governor identifies any inconsistencies with State or local plans, policies, or programs and provides written recommendations to the BLM State Director regarding how to address the identified inconsistencies.

Habitat. An environment that meets a specific set of physical, biological, temporal or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle.

Herd Management Area. Public land under the jurisdiction of the BLM that has been designated for special management emphasizing the maintenance of an established wild horse or burro herd.

Indian Tribe (or Tribe). Any Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the *Federal Register*).

Indicator. An organism or ecological community so strictly associated with particular environmental conditions that its presence is indicative of the existence of these conditions.[1]

Information Bulletins (IBs). Are temporary directives that supplement the BLM manual sections. They disseminate information of interest to BLM employees. They do not contain new BLM policy, procedures, or instructional material. They may call attention to existing policies or procedures, transmit material such as publications and announcements, require an action or response from BLM officials such as confirming attendance at meetings, commenting on draft documents, or providing requested information. There are two kinds of IBs: WO (National), IBs, which apply to all of BLM, and Director's Office (DO) IBs, which apply only to Washington Office employees.

Interpretation. A mission-based communication process that forges emotional and intellectual connections between the interests of the audience and meanings inherent in the resource.

Instruction Memoranda (IMs). Temporary directives that supplement the BLM manual sections. They contain new policy or procedures that must reach BLM employees quickly, interpret existing policies, or provide one-time instructions. They are issued only when urgency compels release of a directive before the information can be incorporated into a manual section or when the issue treated is a one-time occurrence.

Intermittent Stream. An intermittent stream is a flowing system under normal weather conditions. During the dry season and in minor drought periods, these streams will not flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors (pollution, thermal modifications, etc.), there are biological organisms, but they are scarce and adapted to the wet and dry conditions of the fluctuating water level.

K-Factor. A soil erodibility factor used in the universal soil loss equation that is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff. Estimation of the factor takes several soil parameters into account, including soil texture, percent of sand greater than 0.10 mm in diameter, soil organic matter content, soil structure, soil permeability, clay mineralogy, and coarse fragments. K-factor values range from 0.02 to 0.64, the greater values indicating the highest susceptibilities to erosion.

Late Season. Fall or late summer grazing.

Land Classification. When, under criteria of 43 CFR 2400, a tract of land has potential for either retention for multiple use management or for some form of disposal, or for more than one form of disposal, the relative scarcity of the values involved and the availability of alternative means and sites for realization of those values will be considered. Long-term public benefits will be weighed against more immediate or local benefits. The tract will then be classified in a manner that will best promote the public interest.

Land Tenure. Land tenure refers to ownership of a parcel of land. BLM-managed lands are public lands owned by the United States Government for the citizens of the United States.

Land Tenure Adjustments. Land-ownership or jurisdictional changes. To improve the manageability of the BLM lands and improve their usefulness to the public, BLM has numerous authorities for "repositioning" lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges, but also through land sales, jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

Land Use Allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions. See H-1601-1, *Land Use Planning Handbook* (BLM 2005).

Land Use Plan. A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of **FLPMA**; an assimilation of land-use-plan level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both **RMPs** and **MFPs** (BLM 2005).

Land Use Plan Boundary. A BLM land use plan boundary is defined as the geographic extent of an **RMP**.

Land Use Plan Decision. Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to the Interior Board of Land Appeals.

Land Utilization Project Lands. Privately owned submarginal farmlands incapable of producing sufficient income to support the family of a farm owner and purchased under Title III of the Bankhead-Jones Farm Tenant Act of July 22, 1937. These acquired lands became known as "Land Utilization Projects" and were subsequently transferred from jurisdiction of the USDA to the DOI. They are now administered by the BLM.

Lease. Section 302 of **FLPMA** provides the BLM with authority to issue leases for the use, occupancy, and development of public lands. Leases are issued for purposes such as commercial

filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, harvesting of native or introduced species, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for the processing of these leases and permits are found in 43 CFR 2920.

Leasable Minerals. Minerals subject to lease by the Federal Government under the Mineral Leasing Act of 1920, including coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, and geothermal steam.

Limited. Designated areas and trails where the use of off-road vehicles is subject to restrictions, such as limiting the number or types or vehicles allowed, limiting dates and times of use (seasonal restrictions), limiting use to existing roads and trails, or limiting use to designated roads and trails. When use is limited to designated roads and trails, it would be allowed only on roads and trails that are signed for use. Combinations of restrictions are possible, such as limiting use to certain types of vehicles during certain times of the year (BLM 2001a).

Locatable Minerals. Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Mesic. Characterized by, relating to, or requiring a moderate amount of moisture.[1]

Mineral. Any naturally formed inorganic material, or solid or fluid inorganic substance that can be extracted from the earth, or any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained for man's use, usually from the ground. Under Federal laws, minerals are considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

Mineral Entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral Estate. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mineral Materials. Materials such as sand and gravel and common varieties of stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws but that can be acquired under the Materials Act of 1947, as amended.

Mineral Withdrawal. Closure of public land to specific mineral development laws, such as the Mining Law of 1872 and the Mineral Leasing Act of 1920. Withdrawal of public lands is subject to valid existing rights, such as valid mining claims and mineral leases, that precede the withdrawal. Note that an RMP can recommend a withdrawal, but that is a decision process outside of the land use plan.

Mining Claim. A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A

mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, mill site, and tunnel site.

Mitigation. Includes the following: 1) Avoiding an impact altogether by not taking a certain action or parts of an action. 2) Minimizing impacts by limiting the degree of magnitude of the action and its implementation. 3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. 4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. 5) Compensating for the impact by replacing or providing substitute resources or environments.

Multijurisdictional planning. Collaborative planning in which the purpose is to address land use planning issues for an area, such as an entire watershed or other landscape unit, in which there is a mix of public and/or private land ownerships and adjoining or overlapping Tribal, State, local government, or other Federal agency authorities.

Multiple Use. The management of the public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment, with consideration given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

National Wild and Scenic Rivers System (NWSRS). A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with essentially primitive watersheds or shorelines and unpolluted waters.

Nonfunctioning Condition. (1) Condition in which vegetation and ground cover are not maintaining soil conditions that can sustain natural biotic communities. (2) Riparian-wetland areas are considered to be in nonfunctioning condition when they don't provide adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, or showing other normal characteristics of riparian areas. The absence of a floodplain may be an indicator of nonfunctioning condition. See also **Properly Functioning Condition** and **Functioning at Risk**. See BLM Handbook H-4180-1, *Rangeland Health Standards*.

No Surface Occupancy (NSO). A fluid mineral leasing constraint that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may

exploit the fluid mineral resources under the leases restricted by this constraint through use of directional drilling from sites outside the NSO area.

Off-Highway Vehicle (OHV). Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding (1) any non-amphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used for national defense. See H-1601-1, *Land Use Planning Handbook* BLM 2005).

Open. Designated areas and trails where off-road vehicles may be operated, subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343; or an area where all types of vehicle use are permitted at all times, subject to the standards in BLM Manuals 8341 and 8343.

Outstandingly Remarkable Values. Values among those listed in Section 1(b) of the Wilderness Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values." Other similar values that may be considered include ecological, biological, botanical, paleontological, hydrological, scientific or research values. See BLM Manual 8351, *Wild and Scenic Rivers—Policy and Program direction for Identification, Evaluation, and Management*.

Ozone. A faint blue gas produced in the atmosphere from chemical reactions of such sources as burning coal, gasoline, and other fuels, or from chemicals found in products including solvents, paints, hair sprays, etc.

Paleontological Resources. Any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth.

Perennial Streams. Perennial streams carry flowing water continuously throughout the year, regardless of weather conditions. They have well-defined geomorphological characteristics, and in the absence of pollution, thermal modifications, or other man-made disturbances they have the ability to support aquatic life. During hydrological drought conditions, the flow may be impaired.

Permit Long. Grazing for the duration of the permitted time, with care taken not to overuse the resource.

Permitted Use. The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease, and is expressed in **AUMs** (43 CFR 4100.0-5). See BLM Handbook H-4180-1, *Rangeland Health Standards*.

Planning Issue. A matter of controversy or dispute regarding a resource management activity or land use that is well defined and/or topically discrete and involves alternatives among which to choose or decide (BLM 2005).

Prevention of Significant Deterioration (PSD). An air-pollution permitting program intended to ensure that air quality does not diminish in attainment areas.

Primitive and Unconfined Recreation. Non-motorized, non-mechanized (except as provided by law) and undeveloped types of recreational activities. Bicycles are considered mechanical

transport. See BLM Handbook H-6310-1, *Wilderness Inventory and Study Procedures* (BLM 2001b).

Properly (or Proper) Functioning Condition. (1) An element of the fundamentals of rangeland health for watersheds, and therefore a required element of State or regional standards and guidelines under 43 CFR 4180.2(b). (2) The condition in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities.

(3) For riparian areas, the process of determining function is described in BLM Technical Reference 1737-9. Riparian wetland areas are functioning properly when the following conditions are met:

- Adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality
- They filter sediment, capture bedload, and aid floodplain development
- They improve floodwater retention and groundwater recharge
- They develop root masses that stabilize stream banks against cutting action
- They develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- They support greater biodiversity.

The functioning condition of riparian-wetland areas is influenced by geomorphic features, soil, water, and vegetation.

(4) Uplands function properly when the existing vegetation and ground cover maintain soil conditions capable of sustaining natural biotic communities. The functioning condition of uplands is influenced by geomorphic features, soil, water, and vegetation. See also **Nonfunctioning Condition** and **Functioning at Risk.** See BLM Handbook H-4180-1, *Rangeland Health Standards*.

Public Land. Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM without regard to how the U.S. acquired ownership, except lands located on the outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos. (BLM H-1601-1, *Land Use Planning Handbook*).

Radiative Forcing. A measure of the influence of a particular factor (e.g. greenhouse gas (GHG), aerosol, or land use change) on the net change in the Earths energy balance.[2]

Reasonable Foreseeable Development (RFD) Scenario. The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

Recreation and Public Purposes (R&PP) Act (of 1926). The Recreation and Public Purposes Act provided for the lease and sale of public lands determined valuable for public purposes. The

[2]"Glossary of Climate Change Terms." EPA online: http://www.epa.gov/climatechange/glossary.html#A. Accessed 3/31/2015.

objective of the R&PP Act is to meet the needs of State and local government agencies and nonprofit organizations by leasing or conveying public land required for recreational and public purpose uses. R&PP lands are used for such purposes as parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost benefits for land acquisition and provides for recreational facilities or historical monuments at no cost.

Recreation Opportunity Spectrum (ROS). A continuum used to characterize recreational opportunities in terms of setting, activity, and experience. The spectrum covers a range of recreational opportunities from primitive to urban. With respective to river management planning, the ROS represents one possible method for delineating management units or zones. See BLM Manuals 8320 (BLM 2011b) and 6400 (BLM 2012f) for more details.

Rehabilitation. The activities necessary to repair damage or disturbance. Most of these are the same as emergency stabilization treatments. The primary difference between the two is the urgency of emergency stabilization as opposed to rehabilitation and the time frame for implementation. Rehabilitation actions can occur up to 3 years after control of a fire to 1) repair or improve land damaged by wildfire that is unlikely to recover to a pre-fire condition, 2) repair or replace minor facilities damaged or destroyed by fire, or 3) re-treat areas that were treated under an emergency stabilization and rehabilitation plan that failed due to factors such as flooding or drought.

Resource Management Plan (RMP). A land use plan as prescribed by the FLPMA that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved.

Resource Advisory Council (RAC). A council established by the Secretary of the Interior to provide advice or recommendations to BLM management. In some States, provincial advisory councils (PACs) are functional equivalents of RACs.

Restoration. Activities used to restore the structure and function of desired plant communities for wildlife habitat.

Rest Rotation. Grazing rotation that rests pastures that have been grazed early the prior year or that have been identified as needing rest for resource reasons.

Revised Statute 2477 (RS 2477). Revised Statute 2477 is a complex and controversial issue with far-reaching implications for the management of Federal lands throughout the West. Revised Statute 2477 was enacted in 1866 during a period when the Federal Government promoted settlement of the West. It was a primary authority under which many State and county highways were constructed over Federal lands in the West. By its general wording—"The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted"—the Act minimized the administrative burden on the Federal Government to authorize the construction of each highway across the largely undeveloped lands in the West. However, although the Act accomplished its goal of facilitating development of the West, the general wording is a source of disagreement and controversy. RS 2477 was repealed by the Federal Land Policy and Management Act of 1976 (FLPMA).

Revision.. The process of completely rewriting a land use plan due to changes in the planning area affecting major portions of the plan or the entire plan.

Right-of-Way (ROW). The public lands authorized to be used or occupied for specific purposes pursuant to a right-of-way grant, which are in the public interest and which require rights-of-way over, upon, under, or through such lands.

Right-of-Way Corridor. A linear parcel of land that has been identified by law, by Secretarial Order through the land use planning process, or by other management decision as being a preferred location for existing and future right-of-way grants that are similar or compatible.

Riparian Area. An area of wetland transition between permanently saturated wetlands and upland areas. Riparian areas have vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, or the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

Road. A vehicle route that has been improved and maintained by mechanical means to ensure relatively regular and continuous use.

Rock Art. Various forms of human artistic expression created by incising, etching, or pecking (petroglyphs); painting (pictographs); or otherwise physically changing the faces of stone outcrops or the walls of caves; or moving or piling rocks on the landscape to form a design or pattern (geoglyphs).

Rotation. Grazing that is rotated between pastures in the allotment for the permitted time.

Saleable Minerals. High volume, low value mineral resources, including common varieties of rock, clay, decorative stone, sand, and gravel. Specifically, mineral materials made available for sale under provisions of the Mineral Materials Act of 1947, as amended.

Scenic Byways. Highway routes that have roadsides or corridors of special aesthetic, cultural, or historic value. An essential part of the highway is its scenic corridor. The corridor may contain outstanding scenic vistas, unusual geological features, or other natural elements.

Season of Use. The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease or permit.

Secretary. The Secretary of the Interior or the individual to whom the Secretary's authority and responsibility have been delegated.

Section 106 Consultation. Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in the regulations, "Protection of Historic Properties" (36 CFR Part 800).

Soil Polygon. A distinct type of soil that has similar attributes throughout the area where it exists. Attributes can be soil type, surface form, slope, water table depth, or other soil feature.

Special Recreation Management Area (SRMA). A public land unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured, recreational opportunities (i.e., activity, experience, and benefit opportunities). The

BLM recognizes three distinct types of SRMAs: community-based, intensive, and undeveloped big open (BLM 2005).

Split Season. Removing livestock from the allotment and returning them later in the year within the permitted time.

Standard Lease Terms and Conditions. Areas that are open to leasing with no specific management decisions defined in a resource management plan are subject only to lease terms and conditions that are set out on standard lease forms (Form 3100-11, Offer to Lease and Lease for Oil and Gas; and Form 3200-24, Offer to Lease and Lease for Geothermal Resources).

State Implementation Plan (SIP). A detailed description of the programs a State will use to carry out its responsibilities under the Clean Air Act. State implementation plans are based on the regulations used by a State to reduce air pollution.

Stipulations. Conditions, promises, or demands added to a lease when the environmental and planning record demonstrates the necessity for them. Stipulations, as such, are neither "standard" nor "special"; they are a necessary modification of the terms of the lease. In order to accommodate the variety of resources encountered on Federal lands, stipulations are categorized by how the stipulation modifies the lease rights, not by the resource(s) to be protected. What, why, and how this mitigation/protection is to be accomplished is determined by the land management agency through land use planning and NEPA analysis. If, upon weighing the relative resource values, uses, and/or users, conflict with oil, gas, and geothermal operations is identified that cannot be adequately managed and/or accommodated on other lands, then a lease stipulation is necessary. Land use plans serve as the primary vehicle for determining the necessity for lease stipulations. Documentation of the necessity for a stipulation is disclosed in planning documents or through site-specific analysis. Land use plans and/or NEPA documents also establish the guidelines under which future waivers, exceptions, or modifications may be granted. Stipulations may be necessary if the authority to control the activity on the lease does not already exist under laws, regulations, or orders. An authorized Federal officer has the authority to modify the site location and design of facilities, control the rate of development and timing of activities, and require other mitigation under standard lease terms. The necessity for individual lease stipulations is documented in the lease-file record, with reference to the appropriate land use plan or other leasing analysis document. The necessity for exceptions, waivers, or modifications is documented in the lease-file record through reference to the appropriate plan or other analysis.

Threatened Species. Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (BLM 2008a).

Total Maximum Daily Load (TMDL). An estimate of the total quantity of pollutants (from all sources: point, non-point, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

Traditional Cultural Property. a property that derives significance from traditional values associated with it by a social and/or cultural group such as an Indian tribe or local community. A traditional cultural property may qualify for the NRHP if it meets the criteria and criteria exceptions in 36 CFR 60.4. See *National Register Bulletin 38* (available online: http://www.nps.gov/nr/publications/bulletins/pdfs/nrb38.pdf).

Travel Management Areas. GIS polygons or otherwise delineated areas where a rational approach has been taken to classify them as open, closed, or limited, and that have an identified

and/or designated network of roads, trails, ways, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined allowed activity types, modes of travel, and seasons or time frames for allowable access or other limitations.

Valid Existing Rights. Any lease established (and valid) prior to a new authorization, change in land designation, or in regulation.

Visibility (Air Quality). A measurement of the ability to see and identify objects at different distances.

Visitor Day. Twelve visitor hours that may be aggregated by one or more persons in single or multiple visits.

Visitor Use. The ways in which visitors to public lands interact with the resources on those lands. Visitors may engage with a resource for inspiration, stimulation, solitude, relaxation, education, pleasure, or satisfaction.

Visual Resource Management (VRM) Classes. Visual resource management classes define the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. Class categories are assigned to public lands on the basis of scenic quality, sensitivity level, and distance zones. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape. The four classes are described below:

- **Class I—**provides for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification activities should be restricted.

- **Class II—**those areas where changes in any of the basic landscape elements (form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.

- **Class III—**areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

- **Class IV—**areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

Volatile Organic Compounds (VOCs). Organic chemicals that produce vapors readily at room temperature and normal atmospheric pressure. VOCs include gasoline, industrial chemicals such as benzene, solvents such as toluene and xylene, and tetrachloroethylene (perchloroethylene, the principal dry cleaning solvent).

Watershed Approach. A framework to guide watershed management that 1) uses watershed assessments to determine existing and reference conditions, 2) incorporates assessment results into resource management planning, and 3) fosters collaboration with all landowners in the watershed. The framework considers both ground and surface water flow within a hydrologically defined geographical area.

Wild, Scenic, and/or Recreational. A term used to describe rivers protected under the Wild and Scenic Rivers Act of 1968. The Act provides three levels of protection: wild, scenic, and recreational. Rivers under consideration for WSR designation are a fourth category:

- **Wild River.** Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

- **Scenic River.** A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

- **Recreational River.** Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

- **Wild and Scenic Study River.** Rivers identified in Section 5 of the Wild and Scenic Rivers Act for study as potential additions to the NWSRS (see above). The rivers shall be studied under the provisions of Section 4 of the Act. See BLM Manual 8351, *Wild and Scenic Rivers—Policy and Program direction for Identification, Evaluation, and Management*.

Wilderness. A congressionally designated area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that 1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; 2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; 3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and 4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value. From Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891). See BLM Handbook H-6310-1, *Wilderness Inventory and Study Procedures* (BLM 2001b).

Wilderness Characteristics. Wilderness characteristics include size, the appearance of naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include ecological, geological, or other features of scientific, educational, scenic, or historical value. Indicators of an area's naturalness include the extent of landscape modifications, the presence of native vegetation communities, and the connectivity of habitats. Outstanding opportunities for solitude or primitive and unconfined types of recreation may occur when the sights, sounds, and evidence of other people are rare or infrequent, in locations where visitors can be isolated, alone or secluded from others, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreational facilities are encountered.

Wilderness Study Area (WSA). A designation made through the land use planning process. A WSA is a roadless area found to have wilderness characteristics as described in Section 2(c) of the Wilderness Act of 1964. See BLM Handbook H-6310-1, *Wilderness Inventory and Study Procedures* (BLM 2001b).

Wildland Fire. Any fire, regardless of ignition source, that is burning outside of a prescribed fire, and any fire burning on public lands or threatening public land resources, where no fire prescription standards have been prepared. See BLM Handbook H-1742-1, *Burned Area Emergency Stabilization and Rehabilitation Handbook*.

Xeriscaping. A landscaping method developed especially for arid and semiarid climates that uses water-conserving techniques (as the use of drought-tolerant plants, mulch, and efficient irrigation).[1]

Chapter 9. References

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