Chapter 3 Affected Environment

3.1 Introduction

This chapter describes the existing condition and trend of issue-related elements of the biological, physical, and socioeconomic characteristics found in the Planning Area, including human uses, that could be affected by the implementation of the Proposed Plan and alternatives described in Chapter 2. During an environmental analysis, a description of the present condition of the affected public lands, and their associated resources, provides a basis for identifying and interpreting potential impacts of the alternatives.

This chapter includes a discussion of resources, resource uses, special designations, and social and economic conditions. Within these subsections, a description of current conditions includes the indicators (which assess the resource condition) and trends (which express the direction of change between the present and some point in the past). Certain types of resources that may be present on BLM-managed public lands elsewhere (e.g., wild horses and burros) do not exist in the Planning Area, and are not covered in this Section.

Information from broad-scale assessments was used to help set the context for the Planning Area. The information and direction for public lands, and their associated resources and resource uses, has been further broken down into fine-scale assessments and information. The information presented in this chapter provides a baseline against which to compare the potential environmental impacts (discussed in Chapter 4) of the Proposed Plan and alternatives (discussed in Chapter 2.)

A discussion of the North Park Master Leasing Plan (MLP) analysis area is included in Section 3.2.18 Energy and Minerals. There are a number of references in Chapter 3 to "North Park." The term "North Park" is often used to refer to Jackson County. The North Park MLP analysis area encompasses 62 percent of the acreage in Jackson County (all ownerships). Similarly, the term "Middle Park" may be used to refer to Grand County. The MLP analysis area encompasses 31 percent of the acreage in Grand County (all ownerships).

3.2 Resources

This section describes the biological and physical resources in the Planning Area, as follows:

3.2.1 Air and Atmospheric Values
3.2.2 Soil Resources;
3.2.3 Water Resources;
3.2.4 Vegetation Resources;
3.2.5 Fish and Wildlife Resources;
3.2.6 Special Status Species;
3.2.7 Cultural Resources;
3.2.8 Paleontological Resources;
3.2.9 Visual Resources;
3.2.10 Wildland Fire Management;

3.2.11 Lands with Wilderness Characteristics outside Existing Wilderness Study Areas;
3.2.12 Cave and Karst Resources;
3.2.13 Forestry;
3.2.14 Range Management (Livestock Grazing);
3.2.15 Recreation and Visitor Services;
3.2.16 Comprehensive Travel and Transportation Management;
3.2.17 Lands and Realty
3.2.18 Energy and Minerals
3.2.19 Renewable Energy
3.2.20 Areas of Critical Environmental Concern
3.2.21 Wilderness and Wilderness Study Areas;
3.2.22 Wild and Scenic Rivers;
3.2.23 Watchable Wildlife Areas;
3.2.24 National Trails
3.2.25 National Scenic Byways;
3.2.26 Transportation System;
3.2.27 Public Health and Safety;
3.2.28 Socioeconomics; and
3.2.29 Environmental Justice

Note: Acreage figures and other numbers used in the following resource sections are approximate projections; readers should not infer that they reflect exact measurements or precise calculations. Acreage figures are generally rounded to the nearest 100 acres. Acreages were calculated using Geographic Information Systems (GIS) technology, and there may be slight variations in total acres between resources.

3.2.1 Air and Atmospheric Values

3.2.1.1 Air Quality

Clean air, expansive vistas, and minimal acidification of the lands, streams, and lakes are considered significant values in the Planning Area. Some activities analyzed in this RMP could affect these values both in the Planning Area, and on lands adjacent to the Planning Area. In addition, BLM-authorized management activities and resource uses may also contribute to the effects of climate change, depending upon the types of land uses and the intensity of those uses. Accordingly, activities on BLM-managed public lands in the Planning Area must comply with State and Federal air quality regulations. Deterioration of air quality could result in imposed restrictions on those activities.

Air pollution control programs are based on a combination of Federal and State legislation. The Clean Air Act (CAA) is the primary Federal legislation. Additional State air quality management authority is based upon state legislation. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for several different pollutants, which are often referred to as criteria pollutants, including ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, suspended particulate matter, and lead. Standards for suspended particulate matter have been set for two size fractions: inhalable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

Additionally, Hazardous Air Pollutants (HAPs), which are suspected to cause cancer or other serious health effects, are regulated under the Clean Air Act (CAA), although ambient air quality standards have not been set by the EPA.

The Colorado Air Quality Control Commission (CAQCC) has adopted State ambient air quality standards that, generally, are equal to current or former Federal standards. The Air Pollution Control Division (APCD) of the Colorado Department of Public Health and Environment (CDPHE) implements regulatory and planning programs based upon State and Federal regulations. The CDPHE issues Air Quality Permits for many stationary sources.. For stationary sources in attainment or maintenance areas, the pollutant-specific uncontrolled actual emissions permitting thresholds are 200 pounds per year (Pb), 5 tons per year (PM2.5, PM10, VOC) and 10 tons per year (CO, SOx, NOx). In nonattainment areas, the thresholds are 200 pounds per year (Pb), 1 ton per year (PM2.5, PM10), 2 tons per year (VOC), and 5 tons per year (CO, SOx, NOx). However, CDPHE does not issue permits for mobile sources or for portable and stationary sources that emit less than the threshold quantities of regulated pollutant. The CAA and the FLPMA require the BLM and other Federal agencies to comply with local, State, Native American tribal, and other Federal agencies air quality standards and regulations. The FLPMA further directs the Secretary of the Interior to take any action necessary in order to prevent unnecessary or undue degradation of the lands [Section 302 (b)], and to manage the public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values" [Section 102 (a)(8)].

Air resource management is accomplished by establishing allowable uses (land use allocations) and management actions in RMPs designed to achieve desired outcome that, at a minimum, must comply with regulatory standards. The BLM, within the scope of its authority to do so, may also go beyond simple regulatory requirements to prevent unnecessary or undue degradation of the public lands and their associated resources. Achieving management objectives requires implementation of certain actions designed to achieve those objectives. For example, an objective of assessing mercury deposition in an aquatic system might include air quality monitoring of this non-regulated pollutant; or an objective of reducing atmospheric pollution might include requiring advance designed engines as conditions of approval (COAs) in a BLM permit. (Air resource management goals and desired outcomes for this RMP are summarized in Chapter 2, Table 2-2.)

Activities on BLM-managed public lands that produce PM10, PM2.5, nitrogen oxides, volatile organic compounds (VOCs), carbon monoxide, sulfur oxides, and greenhouse gas (GHG) pollutants include: wildfires, prescribed burns, and slash pile burns; mechanical thinning and other vegetation management activities; vehicle travel on paved and unpaved roads; OHV activity on roads, trails, and off-road areas; energy development, mineral extraction, and mining operations; livestock grazing; and camping and other recreational activities. It is the combustion processes in wildfires, prescribed burns, and other vegetation burns that produce reactive organic compounds, nitrogen oxides, carbon monoxide, PM10, PM2.5, and GHG emissions. Similarly, fuel combustion in vehicle engines produces reactive organic compounds, nitrogen oxides, carbon monoxide, PM10, PM2.5, and GHG emissions. Vehicle travel on unpaved roads, or in off-road areas, generates fugitive dust that contains PM10 and PM2.5. Energy development, mining operations, and mineral extraction activities use vehicles and equipment that produce reactive organic compounds, nitrogen oxides,

carbon monoxide, PM10, PM2.5, and GHG emissions. Camping and other recreational activities produce pollutant emissions through the use of campfires, vehicles, camp stoves, and portable internal combustion engines. Livestock grazing produces dust, while livestock produce GHG pollutants through digestive processes and manure generation. In addition, wind erosion from disturbed or sparsely vegetated lands produces PM10 and PM2.5.

Air pollutant emissions caused by BLM management activities include work-related vehicle travel by BLM personnel, prescribed burning, hand-thinning timber management activities, and other vegetative treatments. Air pollutant emissions are also a consequence of BLM management programs and authorized activities related to energy and mineral development, recreational use, and livestock grazing on BLM-managed public lands. Activities directly undertaken by the BLM, or those requiring the BLM's approval, must comply with all applicable local, State, Native American tribal, and other Federal air quality laws, rules, regulations, policies, standards, and guidelines.

Current Conditions and Trends

With respect to the NAAQS, the EPA classifies all locations in the United States as either "Attainment" (including "Unclassified"), "Non-attainment," or "Maintenance" Areas. These classifications are determined by comparing actual monitored air pollutant concentrations to their applicable Federal standards. Under the CAA Amendments of 1977, Congress established a system for the prevention of significant deterioration (PSD) in order to protect areas that are not classified as Non-attainment Areas (cleaner than the NAAQS). A "PSD increment" classification system was implemented based upon the amounts of additional NO2, PM, and sulfur dioxide (SO2) degradation that would be allowed above existing baseline levels for various areas. A Class I Area would have the greatest limitations, where virtually any degradation would be considered unacceptable. A Class II Area would permit moderate deterioration and controlled growth. National Parks of more than 6,000 acres, and Wilderness Areas and Memorial Parks of more than 5,000 acres were defined as Mandatory Federal Class I Areas under the 1977 Amendments. All other areas not classified as Non-attainment Areas were defined as Class II Areas. In addition to more stringent ambient air increments, Class I Areas are also protected by the regulation of Air Quality Related Values (AQRVs) by the Federal Land Managers (FLMs) responsible for the areas. Typically, FLMs are concerned about detectable changes to AQRVs, such as to visibility, flora, fauna, and water and soil chemistry.

Currently, all of the counties in the Planning Area are designated as Attainment or Unclassified Areas. (Unclassified means that there is not enough air monitoring data to make a formal finding on attainment status. Based upon emission levels and other factors, however, they are considered likely to be meeting air quality standards. In most regions of the Rocky Mountain west, ozone and particulate matter are the most common air quality problems.

Based on the BLM's request, CDPHE provided background air quality data to be used in the Kremmling air quality assessment (Nancy Chick, personal communication, June 5, 2008). Appropriate background concentrations were provided for areas located throughout northern Colorado, primarily on the west slope. Table 3-1 lists the background concentrations provided by CDPHE.

Table 3-1: Background Ambient Air Quality Concentrations

Pollutant	Averaging Period	Measured Background Concentration	Basis for Background Concentration
PM10	24-hr (2nd Max) Annual	23 µg/m3 11 µg/m3	Colowyo Axial, West Site, 1997-1998
PM10	24-hr (2nd Max) Annual	56 µg/m3 30 µg/m3	Rifle, Garfield County, 2006
PM2.5	24-hr (98th percentile) Annual	16 µg/m3 6 µg/m3	Chatfield State Park, Colorado, 2006
CO	1-hr (2nd Max) 8-hr (2nd Max)	1 ppm (1,165 µg/m3) 1 ppm (1,165 µg/m3)	Rural default based on American Soda, Piceance 2003 – 2004
SO2	1-hr (99th percentile) 3-hr (2nd Max) 24-hr (2nd Max) Annual	0.031 ppm (80.8 µg/m3) 0.026 ppm (66.6 µg/m3) 0.013 ppm (34.6 µg/m3) 0.002 ppm (5.3 µg/m3)	Colorado College, Colorado Springs, El Paso County, 2005-2006
Ozone	1-hr (2nd Max) 8-hr (4th Max)	0.058 ppm (116 µg/m3) 0.053 ppm (106 µg/m3)	Golden Energy Florence, 2005 – 2006
Ozone	1-hr (2nd Max) 8-hr (4th Max)	0.088 ppm (176 µg/m3) 0.075 ppm (150 µg/m3)	Rocky Mountain National Park, 2004 - 2006

The monitoring stations most relevant to the Planning Area are in Steamboat Springs (outside of the Planning Area) and in Breckenridge (southern end of the Planning Area). A monitoring station previously operating in Silverthorne is now closed. All of the current and former monitoring stations measure PM_{10} concentrations. The monitoring station in Steamboat Springs also measured $PM_{2.5}$ concentrations between 2000 and 2005.

Table 3-2, Concentrations of Criteria Air Pollutants–Planning Area, is a summary of ambient PM_{10} and $PM_{2.5}$ concentrations from monitoring stations near the Planning Area.

Table 3-2: Concentrations of Criteria Air Pollutants—Planning Area

Location	Averaging Time	Current Standard	Pollutant Concentration						
			2000	2001	2002	2003	2004	2005	2006
Inhalable Particulate Matter (PM_{10})									
Steamboat Springs	24-hour maximum	150 μg/m^3 (State/Fed)	98	100	119	149	94	86	87
	Annual average	50 μg/m^3 (State)	25.0	23.0	25.0	24.0	22.5	22.0	23.4
Silverthorne	24-hour maximum	150 μg/m^3 (State/Fed)	52	27					
	Annual average	50 μg/m^3 (state)	23.0	16.0					
Breckenridge	24-hour maximum	150 μg/m^3 (State/Fed)	182	107	98	82	82	170	86
	Annual average	50 μg/m^3 (State)	22.0	24.0	22.0	17.0	16.7	21.4	16.7
Fine Particulate Matter ($PM_{2.5}$)									
Steamboat Springs	24-hour maximum	35 μg/m^3 (Federal)	17.1		20.2	19.3	27.8	12.6	
	Annual average	15 μg/m^3 (Federal)	7.1		7.5	7.0	7.5	6.3	

Compliance with Federal 24-hour PM standards is based upon multi-year statistical analysis, although maximum 24-hour values do not always indicate a violation of Federal standards. Some of the high PM_{10} values listed in the table are attributed to exceptional events, which are excluded from analysis when determining compliance with Federal air quality standards.

Source: CDPHE 2001, 2002, 2003, 2004, 2005, 2006, 2007

Carbon Monoxide

There is no monitoring of carbon monoxide in the Planning Area. The closest carbon monoxide monitoring locations are in Grand Junction. The data from Grand Junction indicate compliance with Federal and State carbon monoxide standards.

Particulate Matter

Airborne particulate matter (PM) consists of tiny coarse-mode (PM_{10}) or fine-mode ($PM_{2.5}$) particles or aerosols combined with dust, dirt, smoke, and liquid droplets. PM2.5 is primarily derived from the incomplete combustion of fuel sources and secondarily formed aerosols.

PM_{10} is primarily derived from crushing, grinding, or abrasion of surfaces. Sources of PM include industrial processes, power plants, mobile sources (vehicle exhaust and road dust), construction activities, home heating, and fires. PM causes a wide variety of health and environmental impacts. Many scientific studies have linked breathing PM to significant health problems, including aggravated asthma, increased respiratory symptoms (such as coughing, and difficult or painful breathing), chronic bronchitis, decreased lung function, and premature death. PM is the major cause of reduced visibility, and can stain and damage stone and other materials, including culturally significant objects, such as monuments and statues.

As indicated in Table 3-2, Concentrations of Criteria Air Pollutants–Planning Area, PM_{10} is monitored at two locations in, or near, the Planning Area: in Steamboat Springs and in Breckenridge. All available PM_{10} data indicate compliance with Federal and State PM_{10} standards, but the Breckenridge station has recorded elevated PM_{10} concentrations due to high winds events, which are typically excluded when determining compliance with Federal and State air quality standards. There is no monitoring of $PM_{2.5}$ in the Planning Area. The closest $PM_{2.5}$ monitoring location is in Steamboat Springs. The data from Steamboat Springs indicate compliance with Federal and State $PM_{2.5}$ standards.

Ozone

Ground-level ozone is a secondary pollutant that is formed by a chemical reaction between oxides of nitrogen (NO_X) and VOCs in the presence of sunlight (photochemical oxidation). Precursor sources of NO_x and VOCs include motor vehicle exhaust, industrial emissions, gasoline vapors, vegetation emissions (such as terpenes), wood burning, and chemical solvents. Ground-level ozone is the primary constituent of smog. Ozone has generally been considered to be a summertime air pollutant, as the abundant sunlight during the summer months drives the photochemical process creating ground-level ozone. Ozone is a regional air quality issue because winds carry ozone, along with its precursors, hundreds of miles from its origins. Maximum ozone levels can occur at locations many miles downwind from the sources. The primary health effects resulting from ozone exposure range from breathing difficulty to permanent lung damage. Significant ground-level ozone also contributes to plant and ecosystem damage.

There are no State-operated ozone monitoring stations in, or near, the Planning Area. The USFS, however, operates a portable ozone monitoring station at Ripple Creek Pass near the Flat Tops Wilderness. The Clean Air Status and Trends Network (CASTNET) dry deposition monitoring system includes ozone monitoring on the east side of Rocky Mountain National Park (outside of the Planning Area). Data from these ozone monitors has not been subjected to quality assurance/quality control (QA/QC) evaluation. Such data, therefore, cannot be used for regulatory determination of violations of Federal ozone standards. Preliminary data indicates compliance with the NAAQS.

A draft report prepared for the Western Governors' Association (WRAP 2008) estimates that by 2018, broad regions of the western United States may violate current and potential future health standards for ozone. Historically, ozone has been an urban air quality problem, although the modeling conducted for this planning effort, and recent ozone monitoring conducted in western Colorado, southwest Wyoming, and eastern Utah, are finding that ozone is also an issue in rural areas, especially in areas that have seen a large amount of oil

and gas development in recent years. High concentrations of ozone have been measured in these areas during winter "cold pool" events, which are typified by strong surface inversions, snow-covered ground (which reflects sunlight), and localized sources of NOx and VOCs. Elevated ozone concentrations have not been measured in the Planning Area. Given the regional nature of ozone and predicted future concentrations, however, ozone and its precursor gases are pollutants of concern for the Planning Area.

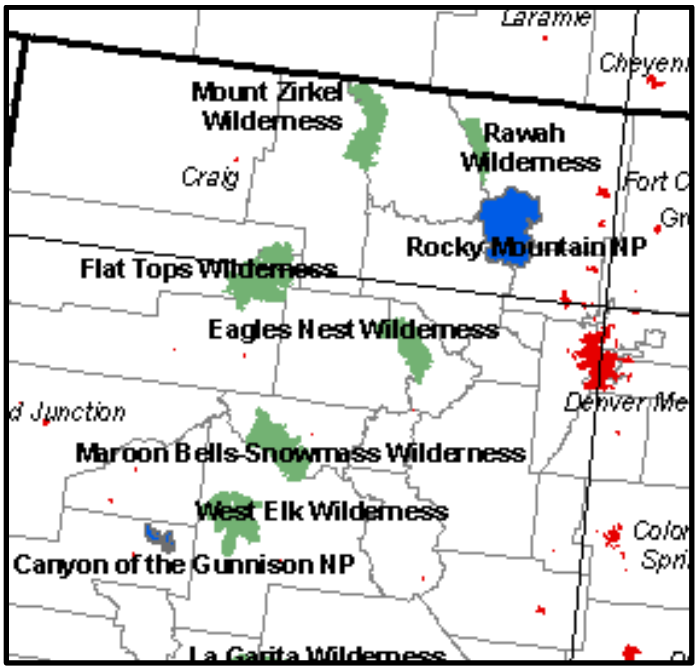
Hazardous Air Pollutants

There is no data available concerning HAP concentrations in the Planning Area. There is one monitoring station at Buffalo Pass located at the south end of the Mount Zirkel Wilderness that measures wet deposition of mercury. That monitoring station began operation in 1999, but did not collect sufficient data in 1999, 2002, 2003, 2004, 2006, or 2007 to meet data completeness protocols for commuting annual deposition rates. Reported annual wet deposition rates for mercury at Buffalo Pass were 0.09 grams per hectare (0.000080 pounds per acre) per year in 2000; 0.08 grams per hectare (0.000071 pounds per acre) per year in 2001; and 0.069 grams per hectare (0.000062 pounds per acre) per year in 2005. The reported mercury deposition rates fall into the low to moderate category when compared to wet deposition rates measured across the United States.

Visibility

The CAA requires a planning program with the goal that all areas of the country achieve the NAAQS within various specified time frames. For Attainment Areas that already meet the NAAQS, the Federal PSD Permit Program established a three-tier classification system defining the extent to which baseline air quality conditions can be degraded. Class I Areas have the smallest allowable air quality deterioration limits. Class II Areas allow greater deterioration of air quality, but must maintain air quality conditions better than the Federal air quality standards. Class III Areas allow deterioration of air quality to the level of the NAAQS. (See Figure 3-1: Class I Areas In, or Near, Planning Area) All of the areas outside of the Class I Areas are designated as Class II Areas.

Figure 3-1: Class I Areas In, or Near, Planning Area



Wilderness Areas

Rocky Mountain National Park

Cities (Denver, Colorado Springs, Fort Collins, etc.)

The CAA requires the protection of visibility conditions in Class I Areas established under the PSD program. The CAA also requires development of programs designed to remedy existing visibility impairment in Class I Areas if that visibility impairment results from human-made air pollution. The EPA has identified two general types of visibility impairment at Class I Areas:

- impairment due to smoke, dust, colored gases, or layered haze attributable to a single stationary emission source or a small group of emission sources; and
- impairment due to widespread, regionally homogeneous haze resulting from the cumulative emissions of varied emission sources in a region.

The PSD Permit Program addresses visibility impairment from nearby major stationary point sources of emissions. Regional haze impacts resulting from cumulative emissions in a region are being addressed through new State Implementation Plan planning requirements.

Some Federal land management agencies and regional associations of State air quality management agencies operate the IMPROVE program in order to monitor visibility conditions and particulate matter concentrations in, or near, Class I Areas across the country. Some of the IMPROVE sites also document visibility conditions with remotely operated cameras. There are six IMPROVE monitoring locations in Colorado, two of which are in, or near, the Planning Area. The National Park Service (NPS) operates one monitoring station on the east side of Rocky Mountain National Park. The USFS operates a monitoring station at Buffalo Pass located at the south end of the Mount Zirkel Wilderness.

Visibility in Class I Areas

Table 3-3: Summary of Visual Range Data for the Rocky Mountain National Park IMPROVE Site, presents a summary of the standard visual range data from the Rocky Mountain National Park IMPROVE Site.

Table 3-3: Summary of Visual Range Data for the Rocky Mountain National Park IMPROVE Site

Year	Standard Visual Range in miles			
	Annual Average	Worst 20 Percent of Days	Mid 20 Percent of Days	Best 20 Percent of Days
1991	110.13	64.67	101.47	166.52
1992	106.97	65.87	101.25	163.57
1993	109.24	65.68	104.69	160.79
1994	104.28	63.45	98.10	152.37
1995	113.18	66.01	108.70	157.76
1996	113.89	63.27	106.35	171.69
1997	114.11	74.12	110.77	163.58
1998	105.86	65.96	99.72	153.49
1999	118.28	70.72	111.11	171.98
2000	112.99	59.76	107.24	174.59
2001	114.72	62.41	108.60	177.72
2002	112.13	50.42	104.07	187.01
2003	112.66	60.50	106.45	175.71
2004	Data not available	72.70	113.96	182.28

Source: IMPROVE 2008.

Table 3-4: Summary of Visual Range Data for the Buffalo Pass (Mount Zirkel Wilderness) IMPROVE Site, summarizes standard visual range data from the Buffalo Pass IMPROVE Site.

Table 3-4: Summary of Visual Range Data for the Buffalo Pass (Mount Zirkel Wilderness) IMPROVE Site

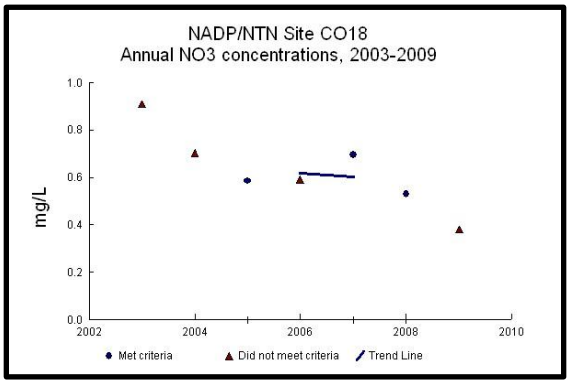
Year	Standard Visual Range in miles			
	Annual Average	Worst 20 Percent of Days	Mid 20 Percent of Days	Best 20 Percent of Days
1995	121.52	85.69	119.40	156.60
1996	113.79	75.77	109.61	157.36
1997	123.54	90.27	118.32	167.94
1998	111.03	74.53	105.35	150.73
1999	119.40	88.78	115.36	157.99
2000	No data	No data	No data	No data
2001	119.69	81.55	119.71	162.02
2002	123.32	71.84	128.80	179.80
2003	127.97	82.26	126.30	183.65
2004	Data not available	94.94	129.92	184.68

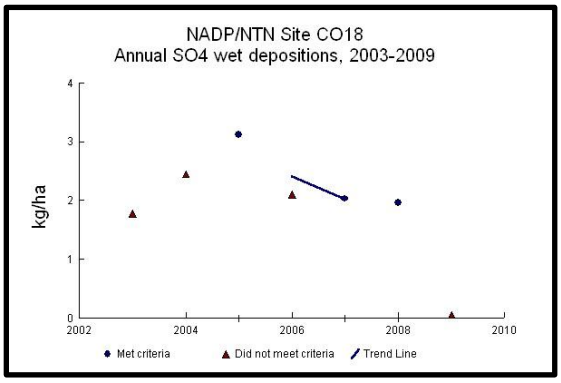
Source: IMPROVE 2008

Atmospheric Deposition

The National Atmospheric Deposition Program (NADP) measures atmospheric deposition and studies its impacts on the environment. The NADP data are not available as convenient summaries by monitoring station. Where specific impact analyses require reference to historical deposition rate data, however, they are included in Chapter 4. Trend charts obtained from the NADP, and shown in Figure 3-2, show that nitrate (NO_3) and sulfate (SO_4) deposition rates at the Ripple Creek Pass Monitoring Station site as either stable or improving. Ripple Creek Pass is outside of the Planning Area, located to the southwest of Steamboat Springs.

Figure 3-2: Nitrate and Sulfate Deposition Rates at Ripple Creek Pass





Conformity for General Federal Actions

According to Section 176(c) of the CAA (40 CFR 51.853), a Federal agency must conduct a general conformity analysis and, if necessary, must conduct a formal determination before approving a project that has emissions that exceed specified thresholds in Non-attainment or Maintenance Areas. The Planning Area is not located in any Non-attainment or Maintenance Area; therefore, a general conformity analysis is not required.

Characterization

Indicators

The most useful indicators regarding air quality, and a determination as to whether air quality standards are being violated, are ambient air pollution concentration data (for the averaging times) specific to Federal and State ambient air quality standards. In the absence of ambient air quality standards for a pollutant, or in the absence of ambient pollutant concentration data, daily, monthly, or annual pollutant emission quantities serve as an alternative air quality indicator.

Trends

As is apparent from the data in Table 3-2: Concentrations of Criteria Air Pollutants—Planning Area, available air quality monitoring data indicate that year-to-year variability in PM concentrations is improving over the time period presented. Furthermore, if the exceptional events values in the table were removed, the improvement trend would become even more pronounced. The visibility data in Table 3-3: Summary of Visual Range Data for the Rocky Mountain National Park IMPROVE Site, and Table 3-4: Summary of Visual Range Data for the Buffalo Pass (Mount Zirkel Wilderness) IMPROVE Site indicate that the visual range is slightly improving over the time period presented.

In 1995, the Colorado Air Pollution Control Division (APCD) reviewed Federal land management activities of the USFS, the NPS, the BLM, and the USFWS in order to determine whether Federal agency actions were resulting in visibility impacts in Class I Areas (APCD, 1995). This review concluded that prescribed fires sometimes created temporary visibility impacts to Class I Areas, but that those events were infrequent. The APCD concluded that prescribed fires on Federal lands were not a significant problem for visibility conditions in Class I Areas.

Based upon existing data, PM (primarily in the form of fugitive dust during wind events) and regional ozone are the pollutants of concern for the Planning Area. Emission of NOx and VOCs, while unlikely to create localized air quality problems in the Planning Area, are also of concern due to their role in regional ozone formation as precursor gases.

3.2.1.2 Climate and Meteorology

Climate represents the long-term statistics of daily, seasonal, and annual weather conditions. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years (typically, 30 years). Climate is both a driving force and a limiting factor for biological, ecological, and hydrologic processes; as well as for resource management activities (such as disturbed site reclamation, wildland fire management, drought management, rangeland and watershed management, and wildlife habitat administration). Climate also influences renewable and non-renewable resource management, affecting the productivity and success of many BLM management activities. Incorporating effective application of climate information into BLM programs, projects, activities, and decisions authorizing use of the public lands is critical for effective management. Climate data include information such as trends in precipitation, temperature, wind speed, cloud cover, relative humidity, and solar radiation.

Current Conditions

The Planning Area’s climate is characterized by long, cold winters and short, cool summers. with low to moderate precipitation. The precipitation varies throughout the area but is closely correlated to the elevation. The lowest elevations receive the least precipitation, with the quantity increasing as elevation increases. This rate of increase ranges from 5 to 15 inches per 1,000-foot rise in elevation for the area. There is also a seasonal variation that is correlated to elevation. The lower areas receive about equal precipitation from May to October and November to April, while the higher elevations receive more during the November to April period. Local topography can also affect the amount of precipitation due to rain shadows or channeling of storms. Kremmling and Walden are located in a rain shadow. These rain shadows are caused by precipitation falling on the west (windward) sides and summits of nearby mountain ranges. As storms move across the east side there is little precipitation remaining.

The prevailing winds are westerly, but are greatly affected by local topography. The growing season is short, but varies widely in the area. Fluctuations of temperature and precipitation from year-to-year and season-to-season are often quite dramatic. Summer temperatures may reach the upper 90’s (F), while winter temperatures may go below - 50°F. Elevation also affects temperature. During the summer, higher elevation lands may be 10 or more degrees

cooler than the valleys or park floors. Winter inversions can cause the valleys to be much cooler than the surrounding higher areas. Daily fluctuations can be extreme, especially during the early summer and early fall months. Daily temperatures may go from the 80's during the afternoon to near or below freezing (32°F) at night. The short growing season severely limits the variety of vegetation and the amount of annual growth. Table 3-5: Summary of Climate Data for Locations in the Planning Area, summarizes readily available temperature and precipitation data.

Indicators

Climate indicators include monthly, seasonal, annual, and long-term statistics for weather factors such as air temperature, days or hours with temperatures below 32° F, and days or hours with temperatures above 90° F; precipitation components such as water equivalent of total precipitation, days with measurable precipitation, total rainfall, total snowfall; average and maximum snowpack depths, and water content of snowpack; pan evaporation rates; and wind speed and direction patterns.

Table 3-5: Summary of Climate Data for Locations in the Planning Area

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Hohnholz Ranch (Laramie River Valley)	Avg Max. Daily Temperature, ° F	1971-2000	34.5	37.4	43.6	51.6	61.9	72.2	78.2	76.8	69.1	56.8	41.1	34.2	54.9
	Avg Min. Daily Temperature, ° F	1971-2000	7.4	9.5	15.6	20.9	29.0	36.1	40.3	38.4	30.2	21.4	14.1	7.3	22.6
	Mean Days Below 32° F	1985-2010	30.7	28.0	30.2	28.5	21.9	6.5	0.9	3.9	18.7	28.3	28.8	30.7	257.0
	Mean Days Above 90° F	1985-2010	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	1.0
	Mean. Precipitation inches	1971-2000	0.90	1.00	1.19	1.54	1.96	1.52	1.43	1.58	1.35	1.08	0.97	0.86	15.37
	Mean Days With >= 0.01" Precipitation	1985-2010	8.0	9.0	10.0	11.0	11.0	10.0	10.0	11.0	9.0	7.0	8.0	9.0	113.0
	Mean Mon. Snowfall, inches	1985-2010	12.2	13.7	17.8	17.4	7.9	0.9	0.0	0.0	2.1	8.8	12.5	13.7	107.1
Hot Sulphur Springs	Avg Max. Daily Temperature, ° F	1953-1981	28.4	32.3	40.2	51.7	64.0	73.5	80.7	78.5	70.9	60.2	42.9	31.0	54.5

Table 3-5: Summary of Climate Data for Locations in the Planning Area

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
	Avg Min. Daily Temperature, ° F	1953-1981	0.7	3.4	11.8	20.7	28.9	35.5	40.9	38.9	31.7	22.6	12.0	1.7	20.7
	Mean Days Below 32° F	1953-1981	30	28	30	28	23	8	1	5	16	28	29	30	257
	Mean Days Above 90° F	1953-1981	0	0	0	0	0	0	0	0	0	0	0	0	1
	Mean Total Precipitation, inches	1953-1981	0.74	0.64	0.91	0.95	1.19	1.23	1.28	1.19	1.35	1.00	0.73	0.88	12.09
	Mean Days With >= 0.01” Precipitation	1953-1981	6	5	7	7	7	6	7	8	6	5	4	6	75
	Mean Mon. Snowfall, inches	1953-1981	16.3	11.5	13.7	9.9	1.6	0	0	0	1.5	4.3	10.4	14.7	83.9
Kremmling	Avg. Max. Daily Temperature, ° F	1948-2007	28.4	32.5	42.8	54.5	65.0	75.3	81.5	79.0	72.6	60.3	42.2	29.8	55.2
	Min. Daily Temperature, ° F	1948-2007	-0.7	1.8	14.9	23.2	30.9	37.1	43.2	41.4	32.5	22.2	12.8	1.4	21.7
	Mean Days Below 32° F	1948-2007	30	28	30	27	18	6	1	2	15	27	29	30	240
	Mean Days Above 90° F	1948-2007	0	0	0	0	0	0	2	0	0	0	0	0	2
	Mean Mon. Precipitation, inches	1948-2007	0.77	0.52	0.67	0.86	1.26	1.06	1.40	1.51	1.20	0.87	0.77	0.73	11.62
	Mean Days With >= 0.01” Precipitation	1948-2007	7	6	6	6	9	7	9	10	9	6	6	6	86
	Mean Mon. Snowfall, inches	1948-2007	10.6	8.4	7.3	3.9	0.6	0.1	0	0	0.1	2.4	7.3	8.8	49.5

Table 3-5: Summary of Climate Data for Locations in the Planning Area

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Rand	Avg. Max. Daily Temp., ° F	1971-2000	30.9	33.7	40.6	47.9	59.2	68.6	73.4	72.7	65.6	53.0	37.7	30.9	51.4
	Avg. Min. Daily Temp., ° F	1971-2000	4.8	6.8	14.2	21.2	29.2	35.4	38.5	38.4	32.7	23.1	13.3	5.3	22.0
	Mean Days Below 32° F	1988-1998	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mean Days Above 90° F	1988-1998	30.9	28.2	30.6	28.9	22.4	9.4	3.6	3.0	13.4	28.1	29.1	31.0	258.7
	Mean Mon. Precipitation, Inches	1988-1998	0.80	0.83	1.00	1.31	1.83	1.29	1.72	1.35	1.94	1.26	1.04	0.63	14.99
	Mean Days With >= 0.01” Precipitation	1988-1998	6	7	6	8	11	8	10	10	9	6	7	5	92
	Mean Mon. Snowfall, inches	1988-1998	13.4	13.9	14.4	14.2	5.7	0.3	0.0	0.0	2.1	9.3	15.0	10.1	98.4
Walden	Avg. Max.. Daily Temp., ° F	1948-2007	28.9	32.3	39.2	50.0	60.9	71.2	78.3	75.8	67.8	56.1	39.6	30.9	52.6
	Avg. Min. Daily Temp., ° F	1948-2007	3.9	5.8	13.2	20.9	28.5	35.9	39.9	37.5	30.1	21.9	12.9	5.7	21.4
	Mean Days Below 32° F	1948-2007	31	28	31	28	23	7	2	6	19	28	29	31	262
	Mean Days Above 90° F	1948-2007	0	0	0	0	0	0	0	0	0	0	0	0	1
	Avg. Mon. Precipitation, inches	1948-2007	0.58	0.53	0.67	0.89	1.28	1.15	1.27	1.26	1.17	0.83	0.73	0.60	10.96
	Mean Days With >= 0.01” Precipitation	1948-2007	6	6	7	7	9	7	9	9	7	6	6	6	86
	Mean Mon. Snowfall, inches	1948-2007	8.4	6.7	7.8	7.0	3.4	0.4	0	0	1.5	4.2	9.0	8.8	57.2

3.2.1.3 Climate Change

Climate represents the long-term statistics of daily, seasonal, and annual weather conditions (including temperature, atmospheric pressure, humidity, wind, rainfall) and meteorological measurements in a given region over long periods of time. In contrast, weather is the present condition of these elements, and their variations, over shorter periods of time.

Climate is both a driving force and a limiting factor for biological, ecological, and hydrological processes, and it has great potential to influence resource management. Climate change is a phenomenon that could alter natural resource and ecologic conditions on spatial and temporal scales that have not yet been experienced. The Intergovernmental Panel on Climate Change (IPCC) has stated, "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] GHG [greenhouse gas] concentrations" (IPCC 2007). The general consensus is that as atmospheric concentrations of GHGs continue to rise, average global temperatures and sea levels will rise, precipitation patterns will change, and climatic trends will change and influence the Earth's natural resources in a variety of ways.

Ongoing scientific research has identified the potential impacts of human-made GHG emissions, changes in biological carbon sequestration, and other changes to the global climate resulting from land management activities. Through complex interactions on a regional and global scale, these changes result in a net warming of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Natural GHG levels have varied for millennia, but recent industrialization and the burning of fossil carbon sources have caused carbon dioxide equivalent (CO_2e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes.

Secretarial Order 3289 directs the BLM to address the impacts of climate change on America's water, land, and other resources. Planning conducted in response to climate change impacts must be informed by science, and must require that scientists work with managers who are confronting this issue evaluate impacts through the NEPA process. The CEQ is crafting guidance on addressing climate change in environmental analysis documents for Federal agencies, which will eventually assist the BLM (and other USDOI agencies) in addressing climate change. The following discussion will summarize briefly changes in climate at the global, continent, regional, and Colorado scales. The KFO manages approximately 377,900 acres of Federal surface estate, which is approximately 5 percent of the 8.3 million acres of BLM-managed public lands in Colorado.

There are uncertainties associated with the science of climate change, but this does not imply that scientists do not have confidence in many aspects of climate change science. According to the EPA, some aspects of the science are "known with virtual certainty because they are based on well-known physical laws and documented trends" (EPA 2010a).

Decisions made as the result of this planning effort will have no meaningful direct impacts on area weather conditions. Decisions, however, can have indirect impacts resulting from activities that release GHG air pollutants, or from activities that terrestrially sequester carbon, which would otherwise exist in the atmosphere as carbon dioxide. (Terrestrial sequestration involves the collection and storage of carbon dioxide by plants and the storage of carbon in soil.)

Greenhouse Gas Conditions

The GHGs are compounds in the atmosphere that absorb infrared radiation and then re-radiate a portion of that back toward the Earth's surface, thereby trapping heat and warming the Earth's atmosphere. The most important naturally occurring GHG compounds are carbon dioxide (CO_2), methane (CH_4,), nitrous oxide (N_2O), ozone (O_3), and water vapor. Carbon dioxide, methane, and nitrous oxide are produced naturally by respiration and other physiological processes of plants, animals, and microorganisms; by decomposition of organic matter; by volcanic and geothermal activity; by naturally occurring wildfires; and by natural chemical reactions in soil and water. Ozone is not released directly by natural sources. It forms during complex chemical reactions in the atmosphere among organic compounds and nitrogen oxides in the presence of ultraviolet radiation. Water vapor is a strong GHG, although its concentration in the atmosphere is primarily a result of, not a cause of, changes in surface and lower atmospheric temperature conditions.

Although naturally present in the atmosphere, concentrations of CO_2, CH_4, and N_2O are also affected by emissions from industrial processes, transportation technology, urban development, agricultural practices, and other human activity. In addition to these GHGs, three industrially generated GHGs also contribute to climate change: sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Carbon dioxide and methane account for the most significant anthropogenic (caused by humans) GHG emissions. BLM-authorized activities accounting for the largest quantities of GHG emissions include fossil fuel development and operations, large unplanned natural fires, and activities using combustion engines (such as generators and vehicles). Quantification of GHG emissions for this RMP includes only CO_2, CH_4, and N_2O.

A GHGs' ability to contribute to global warming is based on its longevity in the atmosphere and its heat-trapping capacity. In order to aggregate GHG emissions, and assess their contribution to global warming, the EPA has assigned each GHG a Global Warming Potential (GWP) that is used to calculate carbon dioxide equivalent (CO_2e). The CO_2e for each GHG is calculated by multiplying the quantity of emissions by the GWP for that GHG. Total CO_2e emissions for all GHGs are then determined by adding the CO_2e emissions of each GHG. GWPs used for GHG emission calculations and reporting are $CO_2 = 1$, $CH_4 = 21$, and $N_2O = 310$. Typically, GWPs for other GHGs, including sulfur hexafluoride, HFCs, and PFCs, are much higher.

Global Climate Change Trends

The IPCC and the NOAA estimated the following changes in global atmospheric concentrations of the most important GHGs (IPCC 2007; NOAA 2010):

- atmospheric concentrations of CO_2 have risen from a pre-industrial background of 280 parts per million by volume (ppmv) to 386 ppmv in 2009;
- atmospheric concentrations of CH_4 have risen from a pre-industrial background of approximately 0.70 ppmv to 1.79 ppmv in 2009; and
- atmospheric concentrations of N_2O have risen from a pre-industrial background of 0.270 ppmv to 0.322 ppmv in 2009.

The IPCC has concluded that these changes in atmospheric composition are almost entirely the result of human activity, not the result of changes in natural processes that produce or remove these gases (IPCC 2007). The IPCC estimates that mean global surface temperatures increased by 0.74° C (1.3° F) from 1906 to 2006 (IPCC 2007). In addition, the rate of warming, averaged over the past 50 years, is nearly twice that for the past 100 years.

Global and regional climate changes have already been documented, and will continue to occur as the result of GHG concentrations already present in the atmosphere and ongoing global emissions of GHGs. The global mean surface temperature has increased by approximately 1.5 degrees Fahrenheit (°F) since 1900 (USGCRP 2009). Climate models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions; however, increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2007, the IPCC indicated that by 2100, the global average surface temperature would increase by between 2.0°F and 11.5°F above 1980–1999 levels, depending upon the assumptions made in the predictive model (IPCC 2007). The National Academy of Sciences (NAS) has confirmed these findings, but has indicated that there are uncertainties regarding how climate change may affect different regions. Computer model predictions show that temperature increases will not be equally distributed, but will likely be accentuated at higher latitudes. Warming during the summer is expected to be greater than during the winter, and increases in daily minimum temperatures are likely to be greater than increases in daily maximum temperatures. Increases in temperature would increase water vapor retention in the atmosphere and reduce soil moisture, increasing generalized drought conditions while, at the same time, enhancing heavy storms. Large-scale spatial shifts in precipitation distribution may occur, although these changes are more uncertain and difficult to predict.

Eleven of the last 12 years (from 1995 to 2006) rank among the 12 warmest years in the instrumental record of global surface temperature since 1850 (see Figure 3-3). Global surface temperatures from 1906 to 2005 have increased approximately 0.74 °C, with a range of 0.56 to 0.92. The linear warming trend of global surface temperatures over the 50 years from 1956 to 2005 is 0.13 °C per decade, which is nearly twice that for the 100 years from 1906 to 2005. Increases in sea level are consistent with warming.

Figure 3-3: Variations of the Earth's Surface Temperature over the Past 140 Years

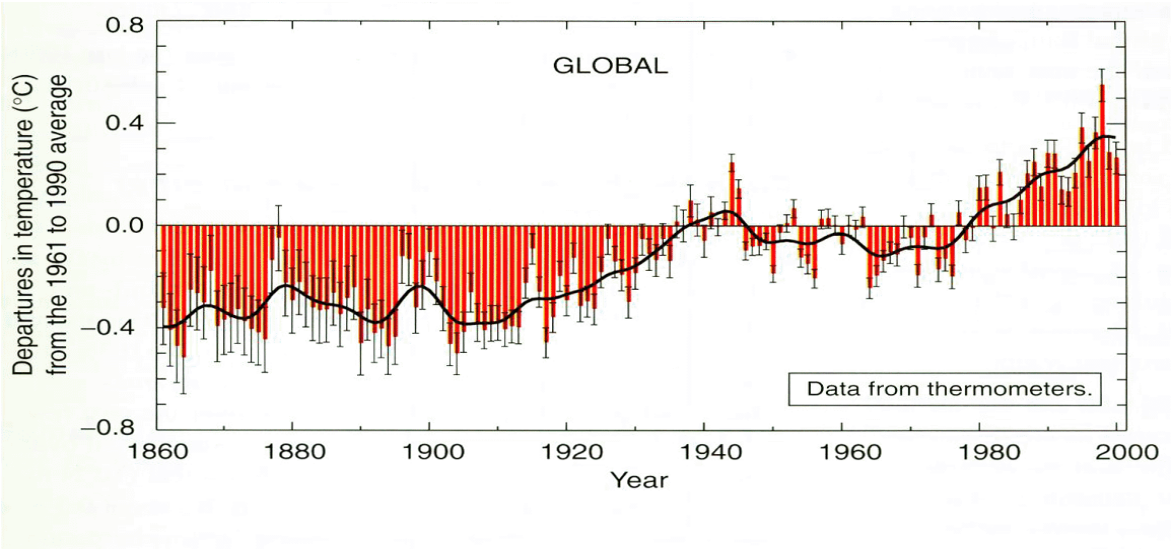
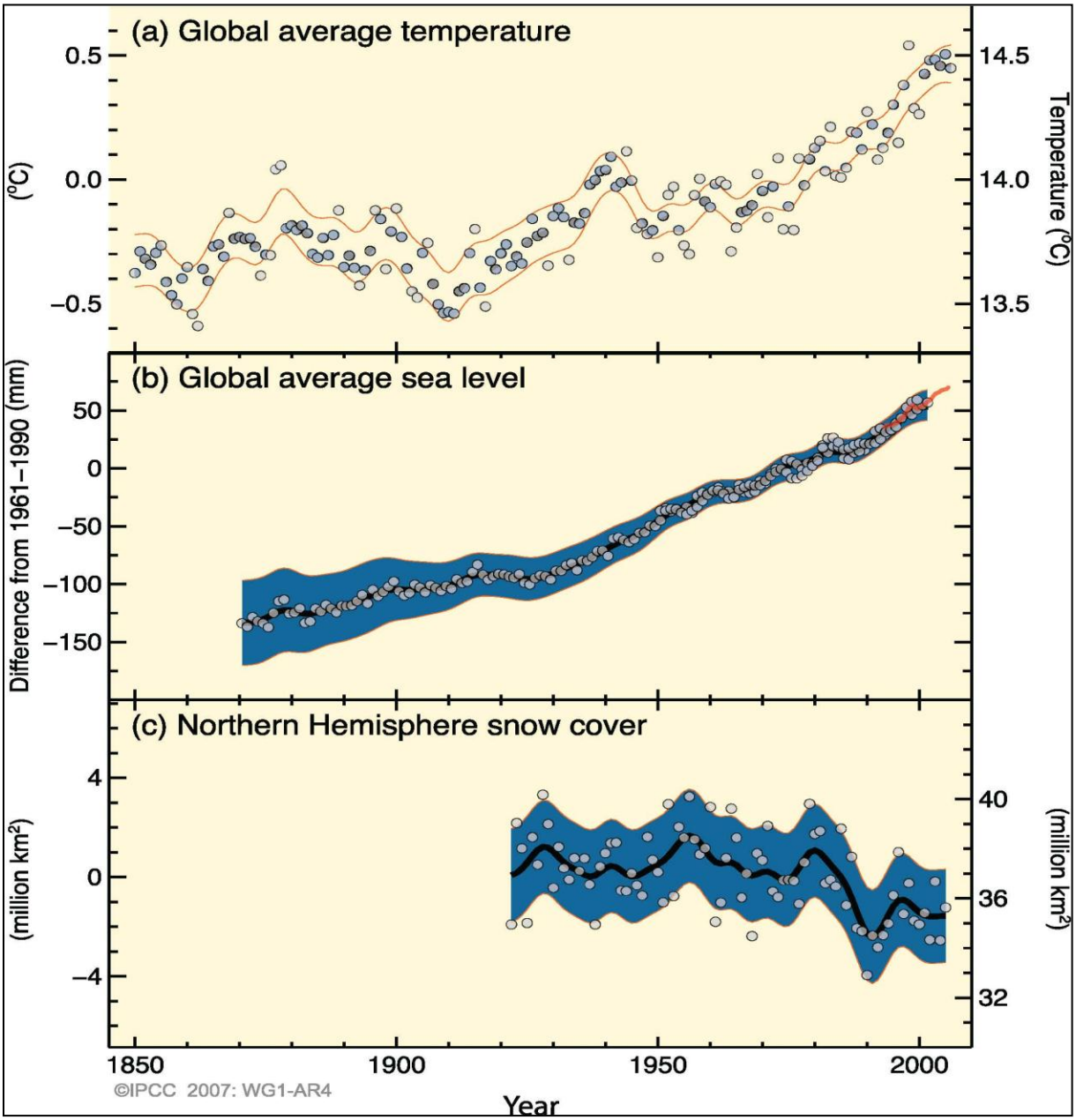


Figure 3-4 demonstrates changes in global surface temperatures over an even longer period of time: 150 years.

Figure 3-4: Global Surface Temperatures over the Past 155 Years



Climate change predictions are based upon multiple modeling scenarios involving different sets of GHG emission assumptions. Emission assumptions are primarily based upon determinations of global population growth, economic growth, fossil fuel development and use, and many other factors. The predictions described below are not based upon implementation of GHG emission reduction programs (such as the Kyoto Protocol or EPA's regulation of GHG emissions). For example, the EPA recently began to regulate GHGs, and these regulations will decrease future GHG emissions in the United States through a variety of methods. EPA regulatory actions to date are as follows:

- setting GHG emission standards for new light-duty vehicles;
- requiring mandatory reporting of annual GHG emissions from many types of stationary sources responsible for the bulk of GHG emissions in the United States;
- requiring air pollution control agencies to review GHG emissions when issuing air quality construction and operating permits for stationary sources with large quantities of GHG emissions; and
- requiring identification and imposition of GHG emission reduction-control technologies for large GHG emission sources before constructing new facilities or modifying or reconstructing existing facilities.

Projected changes are likely to occur over the span of several decades up to a century. Many of the projected changes associated with climate change described below, therefore, may not be measurable within the reasonably foreseeable future. Research on climate change science is ongoing, however, and it is expected that regional projects will only be finer in scale and will be more precise as the science advances. To the extent practicable, the BLM will review its authorized actions and the impacts to, or resulting from, climate change as the state of the science advances over the life of the Approved RMP (Approved Plan).

Climate Change Impacts on a Southwest Regional Scale

The southwest region encompasses six western states, from the Rocky Mountains to the Pacific Ocean. Recent warming there is among the most rapid in the nation, significantly more than the global average in some areas (US Global Change Research Program 2009). Some areas of the Colorado River basin have seen declines in spring snowpack and streamflows. Projections suggest continued warming, with summertime temperatures greater than the annual average in some parts of the region.

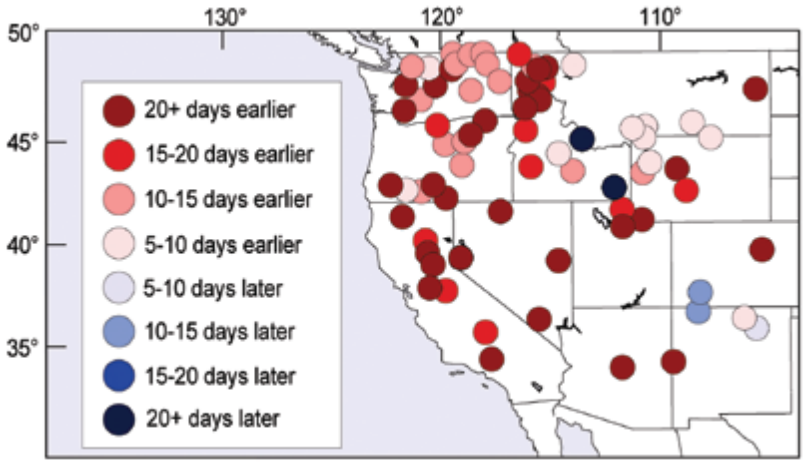
Summarily, water supplies are projected to become increasingly scarce, which may lead to conflicts among cities and agricultural users. Changes in stream morphology and aquatic habitat may occur, due to changes in the magnitude, timing, and frequency of streamflows. Prolonged drought and dry periods can lead to accelerated down-cutting or head-cuts (Leopold 1978).

Increasing temperature, drought, wildfire, and invasive species will accelerate changes across the landscape. (For example, it is estimated that 4,600 square miles of pinon-juniper woodland in the Four Corners region have experienced die-off). It is not well understood how climate change will affect wildfire activity, but it is expected to increase due to rising temperatures, and reductions in snowpack and soil moisture. It will vary by location, depending upon regional changes in precipitation and temperature. At higher elevations,

changes in forests and alpine tundra may decline, and increases in grasses are projected, which can affect fire activity. USGS studies in the Sonoran Desert suggest a shift in saguaro cactus northward, and the encroachment of woody species.

Rising temperatures have also led to earlier melting of snowpack in the western United States. Changes in the timing, and the magnitude, of runoff can exacerbate problems with already limited water supplies (see Figure 3-5).

Figure 3-5: Observed Spring Snowmelt Dates



Note: Reddish-brown circles indicate significant trends toward onsets more than 20 days earlier. Lighter circles indicate less advance of the onset. Blue circles indicate later onset. The changes depend upon a number of factors in addition to temperature, including altitude and timing of snowfall.

Climate Change Impacts on Colorado and Regional Resources

Global climate models poorly represent the complexity of Colorado's topography. Researchers, therefore, are using "downscaling" and other techniques to study processes that matter to Colorado water resource managers. Several projects are underway that are designed to improve regional understanding. Some of these studies use statistical "downscaling" methods, which adjust for the effects of elevation and the mountains on snowfall and temperature; other studies involve compiling, calibrating, and studying historical datasets; others involve enhanced climate modeling efforts designed to include finer spatial resolution that better represents Colorado's mountainous terrain. Currently, the BLM in Colorado is working with the University of Colorado at Boulder (CU Boulder), the NOAA, and the Western Water Assessment in order to better understand potential climate change effects in the San Juan basin.

All of these factors contribute to detrimental changes to ecosystems (such as increases in insect and disease infestations, shifts in species distribution, and changing in the timing of natural events). Adverse impacts to human health, agriculture (crops and livestock), infrastructure, water supplies, energy demand (due to the increased intensity of extreme weather and reduced water for hydropower), and fishing, ranching, and other resource use activities are also predicted (GAO 2007; NSTC 2008; Backlund et al. 2008). The State of Colorado has plans to reduce its GHG emissions by 80 percent over the next 40 years (Ritter 2007). Initiatives designed to accomplish this goal will focus on modifying farm practices (such as less frequent tilling, improving storage and management of livestock manure, and capturing livestock-produced methane); improving standards in the transportation sector; providing reliable, and sustainable, energy supplies (such as small-scale hydropower, solar, wind, and geothermal energy), and joining the Climate Registry of North American GHG emissions.

Specific climate change predictions are not readily available for most of the Planning Area, so climate change trends are summarized for western Colorado. Many of the following reported changes are derived from color shadings on U.S. climate change maps (USGCRP 2009); climate change predictions are within the given range, and may not reach the maximum or minimum extents of the range. Past climate trends and future predictions for western Colorado are as follows (IPCC 2007; PCGCC 2007; RMCO-NRDC 2008; EPA 2010a, 2010b; USGCRP 2009, CWCB, 2008):

The average temperature increased by 1°F to 3°F from a 1961 to 1979 baseline average to the average temperature measured from 1993 to 2008. By 2099, the average temperature is predicted to increase by 5°F to 10°F above the 1961 to 1979 baseline. Temperatures are expected to increase more in summer than in winter, more at night than during the day, and more in the mountains than at lower elevations.

No consistent, long-term trends in annual precipitation have been detected. Climate model projections do not agree whether annual mean precipitation will increase or decrease in Colorado by 2050. The multi-model average projection shows little change in annual mean precipitation, but seasonal shifts in precipitation are likely. The multi-model average projection shows little change in annual mean precipitation, although seasonal shifts in precipitation are likely. The multi-model average projections show a wetter winter and drier spring, although the range of projection is large.

Peak streamflow from melting snow is occurring earlier. From 2080 to 2099, peak streamflow is predicted to occur 15 days to 35 days earlier than during the 1951 to 1980 period. Reduced winter snowpack, and earlier snowmelt, result in less water to flow into the Colorado River; less water available for downstream residential and agricultural users; and shorter ski seasons, unless additional snowmaking is used to prolong the season.

While recent hydrology projections suggest declining runoff for most of Colorado's river basins in the 21st century, the impact of climate change on runoff in the Rio Grande, Platte, and Arkansas River Basins has not been studied as extensively as the Colorado River Basin. This has major implications to water providers and irrigators in Colorado. The lowest 5-year period of Colorado River natural flow since records began in the late 1800s occurred in 2000 to 2004 (9.9 million acre feet per year). Studies predict decreases in the Upper Colorado

River basin's runoff by 2050 ranging from 6 to 20 percent, depending on the climate assumptions used.

More frequent, more sever, and longer-lasting droughts are occurring, and are expected to become more prevalent. Warmer and drier conditions will stress ecosystems and wildlife due to the following impacts:

- shrinkage of coniferous forests within Colorado, and replacement with larger savannas and woodlands;
- greater pest infestations in pine forests (such as the pine beetle infestation in Colorado's lodgepole forests);
- contraction of aspen forests due to sudden aspen decline linked to reduced snowpack and drought; and
- grassland and rangeland expansion into previously forested areas.

Land will have increased susceptibility to fire with more frequent, larger, and more intense fires. Geographic flora and fauna will shift to the north or to higher elevations. Some species may be at greater risk of extinction if they cannot successfully migrate or adapt. Longer growing seasons may increase productivity for some crops; decrease productivity for others; and increase agricultural pest populations, including weeds and insects.

There is high confidence that impacts to hydrologic systems are occurring. Increased run-off, earlier spring peak discharge in many glacier- and snow-fed rivers, and warming of lakes and rivers in many regions, for example, have impacts on thermal dynamics and water quality (IPCC, 2007). Secretary of Interior Ken Salazar released a report (April, 2011) that assesses climate change risks and how these risks could impact water operations, hydropower, flood control, and fish and wildlife in the western United States. The report to Congress, prepared by the BOR, is the first coordinated assessment of risks to future water supplies across eight major river basins (including the Colorado, Rio Grande, and Missouri River basins). The report, which responds to requirements under the SECURE Water Act of 2009, shows several increased risks to western United States water resources during the 21st century. Specific projections include:

- temperature increases of 5 F to 7 F;
- precipitation increases over the northwestern and north-central portions of the western United States, and a decrease over the southwestern and south-central areas;
- decreases for almost all of the April 1st snowpack (a standard benchmark measurement used to project river basin run-off); and
- an 8 to 20 percent decrease in average annual stream flow in several river basins (including the Colorado, the Rio Grande, and the San Joaquin).

The report notes that projected changes in temperature and precipitation are likely to impact the timing and quantity of stream flows in all western basins, which could, in turn, impact water available to farms and cities, hydropower generation, fish and wildlife, and other uses (such as recreation).

There is also high confidence that warming is strongly affecting terrestrial biological systems, as well as observed changes in marine and freshwater biological systems associated with increasing water temperatures, and related changes in ice cover, salinity, oxygen levels, and circulation. Impacts resulting from temperature increases have been documented with medium confidence on agricultural and forestry management in the northern hemisphere at higher latitudes (such as alterations in disturbances of forests due to fires and pests).

Warmer and drier conditions will adversely affect air quality due to the following impacts:

- increased ambient concentrations of PM as less vegetated soils are more susceptible to wind erosion;
- increased ozone formation; and
- reduced visibility due to increased particulate matter and wildfire smoke.

Climate changes may have the following impacts on human health:

- heavy precipitation increases frequency and severity of flooding, and may contaminate water supplies; and
- heat stresses some individuals, especially older adults.

It should be noted that uncertainty remains about the precise nature, timing, and severity of these effects in a given area. In addition, due to the fact that the climate-change models predict shifts in multiple climatic variables (such as the seasonal distribution, amount, and intensity of precipitation in addition to temperature regime), the precise relationship of these variables may profoundly influence the specific outcomes of climate change. It is also possible that some currently unknown future factors could result in different outcomes from those currently anticipated. Some of the predicted effects, those involving shifts in plant and animal communities, may occur over a period of centuries due to the community and component species adapting to changing conditions. Some community types may occur across an elevational or latitudinal range that represents a greater range of climatic conditions than the changes predicted by climate models. Existing communities may persist in conditions no longer favorable for their establishment. Therefore, elevational or latitudinal shifts in composition and structure may be discernible at the upper and lower margins of the community type, while intermediate areas show less, or no, change.

Forests, woodlands, and rangelands store carbon, affecting atmospheric concentrations of carbon dioxide (CO_2) and global climate. Vegetation management can provide a source of carbon dioxide, or it can provide a sink of carbon dioxide through vegetation growth. Generally, the net storage, or loss, of carbon on rangelands and grasslands in the Planning Area is small and difficult to measure. Soils on these sites also contain relatively little organic matter when compared to forest soils (Ryan et al. 2008).

It is not possible to describe precisely and accurately the total storage of carbon in forests and rangelands in the Planning Area, or in wood harvested from the Planning Area, because there is incomplete and unavailable information on the current inventory of carbon storage and the impact of management on carbon storage (as described below). On the other hand, it is possible to approximate the current condition of these pools of carbon storage using some broad generalizations and assumptions that are consistent with current theoretical approaches.

Carbon storage related to forest management can be divided into three pools:

- live trees;
- forest carbon other than live trees; and
- harvested wood.

Live trees include the carbon in foliage, branches, stems, bark, and live roots of all trees (regardless of whether the trees are merchantable as timber). Generally, estimations of carbon in live trees involve the least uncertainty of all carbon pools associated with forest management. Forest inventory data on live trees is more detailed, and more reliable, than data on other forest carbon pools. The correlation between above-ground and below-ground biomass in trees is variable among species, stand age, and stand structure (Litton et al. 2007; Lehtonen et al. 2004). There is no inventory information, however, on which to base more refined expansion factors for trees in the Planning Area.

The pool of forest carbon other than live trees includes:

- dead wood (snags, coarse woody debris, stumps, and dead roots);
- plants other than trees (shrubs and other plants);
- litter (fine organic debris on the soil surface); and
- soil organic carbon.

The biomass in dead wood, shrubs, other plants, litter, and soil organic carbon likely vary tremendously within the Planning Area (Page-Dumroese and Jurgensen 2006; Smithwick et al. 2002; Harmon 2001). Accurate inventory information for dead wood and shrubs and litter levels is poor, and the amount of soil organic carbon in the Planning Area is not known.

Carbon is also stored in harvested wood (Ruddell et al. 2007). Quantifying the storage of carbon in harvested trees is challenging due to the variability in the product life of harvested wood, the amount of product recycling, and the fate of disposed harvested wood (Skog and Nicholson 2000). Some of the carbon in harvested wood is lost in processing and some is lost through disposal (such as burning and decay).Disposal in landfills results in only partial loss of carbon, while some portion of the carbon in land-filled products continues to be stored (EPA 2007; Smith et al. 2006). Calculating the carbon stored in wood products from previous harvests is even more challenging than calculating the carbon stored in wood products from current harvests due to the fact that all of the variables described above have changed over time. For example, harvesting and processing have become more efficient, resulting in a greater portion of harvested wood in products. Disposal in open dumps previously resulted in rapid decay and loss of carbon, whereas current disposal in landfills results in slower decay and longer carbon storage (Woodbury et al. 2007; EPA 2007). Due to incomplete and unavailable information on the product life of harvested wood, the amount of product recycling, and the fate of disposed harvested wood from past harvests, it is not possible to quantify precisely or accurately the amount of carbon currently in storage from past harvests in the Planning Area.

Under average historic (pre-1850s) conditions, the Planning Area is thought to have stored somewhat more carbon on rangelands, but less on forested and woodland sites, than these respective sites do today. Rangelands, although individual site conditions could vary, were generally in good to excellent ecological condition, and invasive non-native annual grasses and noxious weeds had not yet arrived. Forest and woodlands were kept more open with larger, but fewer, trees per acre with less understory vegetation due to frequent but low intensity fire intervals.

3.2.2 Soil Resources

The soil resources present in the Planning Area must be able to sustain planned land uses. BLM management land and resource use decisions influence the long-term soil health and productivity. Soil resources in the Planning Area, especially in erodible soil areas, have the potential to be affected by surface-disturbing activities. For example, management decisions regarding the type, location, amount or use levels of grazing, minerals activities, harvesting of forest products, fire management, roads and travel management (including OHV use), and recreational activities would affect the removal of soils, removal of vegetation holding soils in place, and otherwise contribute to, or mitigate, the potential for erosion and loss of soils.

Current Conditions

The soils found in the Planning area are cold, with a mean soil temperature less than 47°F (8°C). Due to the low temperatures, the chemical reactions that release plant nutrients from minerals take place slowly. The rate of biologic activity is also limited by temperature, which results in a slow rate of biologic decomposition, seed germination, and root growth. These factors combine to give the soils low fertility. Fine textured soils (greater percentages of silt and clay) store more moisture than coarse textured soils (BLM 1984b).

The most productive soils in the Planning Area are those in valley bottoms and at higher elevations. The valley bottoms receive additional moisture because they concentrate run-off from adjacent uplands, and because water will percolate laterally into the subsoil from stream channels. Most valley bottoms support grass hay production. Areas at higher elevations receive a greater amount of precipitation during the growing season (BLM 1984b).

Soil Types

Most of the Planning Area is grouped by the Natural Resources Conservation Service (NRCS) into the southern Rocky Mountains Major Land Resource Area (MLRA). The valley around Walden is in the southern Rocky Mountain Parks MLRA. The dominant soil orders found in the southern Rocky Mountain MLRA include Mollisols, Alfisols, Inceptisols, and Entisols (NRCS 2006). The dominant soil orders in the Southern Rocky Mountain Parks MLRA are Mollisols, and Alfisols to a lesser extent (NRCS 2006).

Detailed soil surveys prepared by the NRCS are available for the Planning Area. Each applicable soil survey describes soil map units by the individual soil, or soils, that make up a unit. These descriptions indicate the limitations and hazards inherent in each. Descriptions include soil depth, range of elevation, origin, climate, physical properties, run-off capabilities, erosion hazard, associated native vegetation, wildlife habitat use, and capability for community development and other uses.

The 1984 RMP Record of Decision (ROD), which was updated in 1999, identified soil priority areas and sensitive watersheds that have soil concerns or sensitivity to land uses. Many of the impacts to soils were from past uses and practices. General objectives were included to ensure that soil resources and sensitive watersheds were considered and protected, or that management actions initiated by other resource programs were mitigated.

More specific management objectives consistent with the ROD were set by the KFO, including ensuring that potential land uses were compatible with soil priority areas; taking soil priority areas into account in Activity Plans for the Junction Butte and Barger Gulch areas; and ensuring that intensive management programs consider sensitive watershed values for Big Muddy Creek, Lawson Ridge/Junction Butte, Sulphur Gulch, Barger Gulch, Muller Creek (south of Granby), King Creek (north of Parshall), and areas north of the Colorado River from Windy Gap to Hot Sulphur Springs.

Intensive management was determined for areas where 20 percent or more of the watershed is in a moderate to severe erosion class (considered a sensitive watershed); areas where BLM-managed public lands were the source of pollution; and areas where stream improvements would benefit fish and wildlife, and noticeably improve water quality. Management practices employed include improving vegetation cover on watersheds by developing grazing systems for livestock in order to increase plant density and stabilize the soil.

Restrictions are imposed on other activities or uses of the BLM-managed public lands, including: ensuring rapid revegetation of disturbed areas; limiting surface-disturbing activities from sensitive watersheds where they were contributing to, or had the potential for contributing to, water quality degradation; providing buffer strips between streams and surface-disturbing activities (such as mining, road building, and clear-cutting); controlling OHV use in sensitive watersheds; reducing erosion or run-off on disturbed sites; limiting vegetation manipulations or treatments in sensitive watersheds to spraying, aerial seeding, or designed grazing systems; placing timing restrictions on surface-disturbing activities in order to avoid spring thaw and run-off seasons; and constructing snow management structures for watershed improvement.

Best Management Practices (BMPs) for livestock grazing have improved the overall vegetative conditions in the Decision Area, which helps maintain soil health on a landscape scale. Upland soil improvements are generally slow to accrue, and difficult to perceive, due to the cold soil temperatures and fairly xeric moisture regimes in the rangeland areas.

Biological Crusts

In arid and semi-arid lands throughout the world, vegetation cover is often sparse or absent. Nevertheless, in open spaces between the higher plants, the soil surface is generally not bare of life, but rather covered by a community of highly specialized organisms. These communities are referred to as biological soil crusts (also known as cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts) that are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. Biological soil crusts integrate through the top few millimeters of soil, coalescing loose particles together and forming a matrix that stabilizes and protects soil surfaces from erosive forces. These crusts occur in all hot, cool, and cold arid and semi-arid regions. Biological soil crusts can reach up to several inches in thickness and vary in terms of color, surface topography, and surficial coverage. Generally, crusts cover all soil spaces not occupied by vascular plants, which may be 70 percent or more in arid regions (Belnap 1994). They provide important functions, including improving soil stability and reducing erosion, fixing atmospheric nitrogen and contributing nutrients to plants, and assisting with plant growth. The Planning Area also has abundant vagrant lichens, found in the sagebrush interspaces. These unrooted lichens provide wildlife forage.

Biological crusts are well adapted to severe growing conditions, but they are extremely susceptible to physical disturbances, domestic livestock grazing, and recreational activities (e.g., hiking, biking, and off-road driving). Fire can also damage the crust. Low-intensity fires, however, do not remove all of the crust structure, which allows for regrowth without significant soil loss. Shrub presence (particularly sagebrush) may increase fire intensity, thereby decreasing the likelihood of early vegetative or crust recovery after a burn (BLM 2009h). There are many areas in the Planning Area where historic (around the 1950s) rangeland vegetation treatments included ripping or plowing the soils, breaking apart the biological crusts. These crusts will remain broken during the life of the Approved Plan, regardless of current land conditions.

Disturbance of biological crusts results in decreased soil organism diversity, nutrients, stability, and organic matter. Trampling may reduce the number of crust organisms found on the surface and increase run-off and the rate of soil loss without apparent damage to vegetation. Burial of crusts by sediments kills non-mobile photosynthetic components (mosses, lichens, and green algae) of the crust.

Soil Erosion

Soil erosion is a concern throughout the western United States, especially in semi-arid rangelands. The quantity of soil lost by water or wind erosion is influenced by climate, topography, soil properties, vegetative cover, and land use. While erosion occurs under natural conditions, rates of soil loss may be accelerated if human activities are not carefully managed (BLM 2007d). Recreational trails can quickly turn into widely braided ruts, especially in wetlands and at streambank crossings. The resulting gully erosion can rapidly erode substantial quantities of previously stable soils (BLM 2007d).

It is possible to control rates of soil erosion by managing vegetation, plant residues, and soil disturbance. Vegetative cover is the most significant factor in controlling erosion, because it intercepts precipitation, reduces rainfall impact, restricts overland flow, and improves infiltration. Biological soil crusts are especially important for protecting the soil and controlling erosion in desert regions, but they are easily disturbed by grazing and human activities.

In general, BLM-managed public lands include many areas of low productivity, including rock outcrops, steep slopes, and harsh exposures. These public lands tend to have many areas of naturally sparse ground cover and higher erosion rates, and land uses can result in significant soil erosion.

Soil Compaction

Soil compaction is a complex process that depends upon the nature of the loading and moisture content of the soil, as well as on characteristics such as particle size, organic matter content, structure, and percent of coarse fragments. Soil compaction occurs in response to pressure exerted by machinery or animals. The risk for soil compaction is greatest when soils are wet. Compacted soil allows less water to infiltrate, resulting in greater overland flow of water for longer periods of time. The overland flow has greater energy to detach and transport soil particles, resulting in increased soil erosion.

Characterization

Indicators

Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997a) describe conditions necessary to sustain public land health, and relate to all uses of the public lands. Standards, based upon their associated indicators, are applied on a landscape scale and relate to the potential of the landscape. Public Land Health Standard No. 1 states, “soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form and geologic processes.” See Appendix J for more information about the upland soil land health standard.

In this document, erodible soils are defined as those where small changes in vegetative cover or level of disturbance can result in large changes in erosion rates.

Grazing allotments within the Decision Area are evaluated regularly. Of those evaluated, approximately 3 percent have been assessed as not meeting the Public Land Health Standard No. 1. About a quarter of the acres not meeting Standard No. 1 failed due to historic vegetation manipulations, including disking. The acres failing Public Land Health Standard No. 1 have had various restorative actions taken, including rest, exclusion from grazing, seeding, and, in one case, soil amendments.

Trends

BLM-managed public lands in the Planning Area are primarily used by permitted (authorized) users, including livestock permittees, energy developers, loggers, and utility providers. There is increasing demand for energy resources, including coalbed methane. Oil and gas leasing activities have been increasing in the Planning Area, as well as regionally. In the past, energy companies often insisted that due to the geology, drill sites could not be moved. When this occurred on steeper slopes, these sites required greater attention to erosion mitigation and were more difficult to reclaim. Currently, directional drilling is used. This may allow for easier relocation of proposed well sites, and the avoidance of steeper slopes.

Other activities with the potential to impact soils include lands and realty actions, recreational activities, livestock grazing, and logging. The roads associated with most of these activities are likely to increase in the future. Increased recreational use throughout the Planning Area has led to growing concerns regarding resource protection and conflicting uses. The wildland-urban interface (WUI) areas (zones where BLM-managed public lands and urban lands are side-by-side or intermixed) have grown significantly throughout the Planning Area.

Management actions in the Decision Area have included improving grazing allotments by implementing new grazing schedules, reducing Animal Unit Months (AUMs), and using range projects and grazing plans in order to improve allotments. Other resource projects have included seasonal closures and additional design and reclamation requirements designed to reduce soil impacts. Due to the increasing population in the Planning Area, BLM-managed public lands are being increasingly used year-round by both permitted users and the general public. Progress is being made on improving permitted uses, but other land uses are more difficult to manage. Other than timber access roads, roads and trails are mostly user created. At one time, BLM roads were most heavily used during the hunting seasons. Currently, user-created roads and trails are not only increasing in number, they are also receiving more frequent use. Areas of accelerated erosion, resulting from unmaintained roads and an abundance of trails, have been observed during the rangeland health assessments. Maintaining current soil resources will continue to be a priority in the Decision Area.

3.2.3 Water Resources

Water resources include surface and groundwater sources that are integral in maintaining healthy plant communities and wildlife habitats, and for providing drinking water for wildlife and people. Surface water also provides important habitat for aquatic organisms. The water resources present in the Planning Area must be of sufficient quantity and quality to sustain these uses, and BLM management decisions on both uplands and in drainages influence water quantity and quality.

Factors such as the amount of precipitation and run-off, water storage and withdrawals, pollution from outfalls, soil erosion, and overall conditions of the uplands and riparian areas affect surface water resources. Recharge, withdrawal, and infiltration of contaminants affect groundwater resources. BLM management decisions regarding energy development, lands and realty actions, grazing, recreation, and forestry can result in potential negative impacts to water resources.

Current Conditions

Surface Water

The Planning Area covers three distinct topographic regions: North Park, Middle Park, and the Laramie River Valley. North Park is on the east side of the Continental Divide, and is the headwaters for the North Platte River. Middle Park is on the west side of the Continental Divide, and forms the headwaters for the Colorado River. The Laramie River region is part of the North Platte River Basin, east of North Park on the other side of the Medicine Bow Range (Map 3-2, KFO Watersheds). The water resources in the Planning Area consist of the streams forming the headwaters of the North Platte and Colorado Rivers, many springs, and several large reservoirs. Snowfall results in a high spring run-off in May and June. Streams reach a base flow by August or September, and remain at this level throughout the winter (BLM 1984b).

The Colorado River watershed has an area of approximately 2,654 square miles in the Planning Area, and ranges in elevation from 6,700 feet to 13,000 feet above sea level. Most of the streams in Middle Park originate in the surrounding mountains. They have very high gradients, falling several hundred feet per mile until they reach about the 8,000 feet in elevation. At this point the gradients are less steep and the streams start to meander. As the streams flow out of the mountains, they pass through relatively insoluble geologic formations, resulting in soft water (BLM 1984b).

The Colorado River and its larger tributaries (the Blue, Williams Fork r, and Fraser rivers, and Willow and Muddy creeks) are directly affected by reservoir operations and, except for Muddy Creek, trans-basin diversions. Dillon Reservoir, located on the Blue River, provides domestic water supplies to Denver. Shadow Mountain, Granby, and Willow Creek Reservoirs, and Grand Lake are part of the Colorado-Big Thompson Project. This project diverts water from the Colorado River and Willow Creek to the South Platte basin for domestic and agricultural use. The Williams Fork and Green Mountain Reservoirs provide water to the Colorado River to replace water taken out by east slope diversions. The Windy Gap Reservoir provides additional water to the Big Thompson system (BLM 1984b). Approximately 60 percent of the stream flow that originates in the Upper Colorado River Basin is diverted to the eastern slope. Water remaining in the Basin is primarily used for agriculture, snow-making, and municipal uses. Less than 10 percent of the Colorado River watershed in the Planning Area is managed by the BLM. The BLM does not manage the streamflows in the public stream segments, but manages the public lands adjacent to the streams. Domestic water supplies for Granby and Hot Sulfur Springs are derived from the Colorado River. Recreation is a major water use; rafting on the Colorado River, fishing on the streams and lakes, and boating on the larger reservoirs are popular activities (BLM 1984b).

The North Platte River watershed encompasses North Park and the Laramie River Valley. The North Platte flows north out of Colorado, as part of the Missouri River basin. Included in the North Platte basin is the Laramie River watershed. The Laramie River is separated from the headwaters of the North Platte by the Medicine Bow Mountain Range. The major water uses in the North Platte basin are agricultural, primarily for livestock and irrigation for hay meadows. The Michigan River, a tributary to the North Platte River, provides the domestic water supply for the town of Walden. Water uses also include recreation. There are several high quality fishing streams and reservoirs in the North Platte watershed (BLM 1984b).

Elevations in the watershed range from 8,000 feet to 13,000 feet. Streams in the North Platte basin have a very steep gradient, falling several hundred feet per mile until they reach the open portion of the park, where the gradient is lower and the streams spread out in wide, alluvial valleys. The geology of the mountains is similar to Middle Park, and yields soft water. Geologic formations in the lower elevation area of North Park are more soluble and contribute more minerals to the water (BLM 1984b).

The average discharge for the North Platte (near the Wyoming border) is 312,300 acre feet per year (AF/yr); and for the Laramie River (near Glendevey) is 53,030 AF/yr. The North Platte and Laramie Rivers have a combined watershed area of approximately 2,030 square miles within the Planning Area. Only 16.7 percent (approximately 339 square miles) of the surface area is managed by the BLM. There are seven trans-basin diversions into the Cache La Poudre River; averaging 19,110 AF/yr. The water diverted is used for agricultural purposes, primarily irrigation, and as domestic water for cities, including Fort Collins and Greeley (BLM 1984b).

The North Platte River's use is governed by the equitable apportionment decrees (Nebraska v. Wyoming, and Wyoming v. Colorado). The decrees quantify the amount of water that may be used for irrigation and irrigation storage, and limit total water exports from the North Platte in a 10-year period. (BLM 2007k).

Water Quality

Water quality is defined in relation to its specified or beneficial uses (such as human consumption, irrigation, fisheries, livestock, industry, recreation, etc.). The quality of surface water is determined by interactions with soil, transported solids (organics and sediments), rocks, groundwater, and the atmosphere. The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S., and is responsible for setting water quality standards for all contaminants in surface waters. Section 313 of the CWA requires all Federal agencies to comply with State water quality standards "... to the same extent as any non-governmental entity." Thus, the BLM has a responsibility to fulfill its obligations under the CWA, and the Safe Drinking Water Act (SDWA), to maintain waters that meet or surpass designated beneficial uses, to restore impaired water resources in support of their designated beneficial uses, and to provide water for public consumption and use. Section 303(d) of the CWA requires that water bodies violating State water quality standards, and failing to protect beneficial uses, be identified and placed on a 303(d) list. The delisting of 303(d) listed streams is a priority of the BLM.

Non-point source pollution, the largest source of water quality problems, comes from diffuse or scattered sources rather than from an outlet (such as a pipe, which would constitute a point source). Sediment is a non-point source of pollution that results from activities such as livestock grazing and timber harvesting. Erosion and delivery of eroded soil to streams is the primary non-point source pollution problem of concern to the BLM (BLM 1980a).

The most important factors impacting water quality are sediments, microbes, pesticides, nutrients, metals, and radionuclides (Nash 1993). Sedimentation and nutrient loading affect surface waters, while agricultural run-off and industrial wastes can also leach into groundwater. Surface water quality can also be affected by solar loading and shade producing vegetation that affect water temperature, flow, total suspended solids (TSS), total dissolved solids (TDS), turbidity, changes in dissolved oxygen, salinity, and acidity. The susceptibility of aquifers to groundwater contamination relates to geology, depth to groundwater, infiltration rates, and solubility of contaminants. Deep aquifers are often too deep to be affected by surface alteration or shallow waste disposal; however, shallow aquifers may be directly affected by surface alternation and by waste and wastewater disposal. Generally, shallow, unconfined aquifers with rapid recharge rates are the most vulnerable to contamination due to the rapid infiltration of groundwater from the surface to the water table.

Maintaining high-quality water is essential to any ecosystem. Water quality is also important for human health and safety. Impacts to water quality may come from many sources (including cross-country vehicle travel, historic mining activities, oil and gas development, livestock grazing, and increased visitor use in sensitive riparian areas). Water quality problems coming from natural sources (e.g., high sediment content from inflowing streams and oxidation of exposed mineral formations) may also pose threats to the aquatic and riparian resources. Maintaining sufficient quantities of water to support a wide variety of habitats and land uses will be essential for the long-term health of the Planning Area. Sufficient quantities of water at both point sources (springs, reservoirs, wells, etc.) and in streams will be necessary in order to support uses such as fisheries, terrestrial wildlife, plants, livestock grazing, and recreation.

Water quality is generally good in the Planning Area, with low dissolved solids in the upper portions of the Colorado River and North Platte River Basins. Streams in the west half of Grand County increase in sediments and dissolved salts as the geology tends to be more sedimentary. In the Muddy Creek watershed, Red Dirt Creek, Pinto Creek, and Deer Creek occasionally exceed the State's water quality standards for sulfates and selenium, and tend to have the highest total dissolved solids and electrical conductivities in the Planning Area. The BLM's segments of these streams are below irrigation diversions and irrigated meadows that appear to aggravate the problem. Water quality on these three streams appears to be largely geologic, and outside of the BLM's control (BLM 2007k).

There are many public stream segments in the Planning Area that are affected by upstream diversions and private water uses. There are a few short segments of streams where private diversions completely dry up streams on BLM-managed public lands. Generally, ditch seepage, groundwater sources, and irrigation return flows help put some water back into the channel. In the larger streams and rivers, the cumulative diversions have resulted in wide shallow streams.

The State of Colorado regulates water quality on BLM-managed public lands, under authority from the EPA and in accordance with the CWA. The State of Colorado has the authority to create, implement, and revise water quality standards for stream segments within each river basin of the State, depending upon the beneficial uses assigned to each segment. Beneficial uses include aquatic life, water supply, agriculture, and recreation. Section 303(d) of the CWA requires the State to submit to the EPA a list of those waters for which technology-based effluent limitations, and other required controls, are not stringent enough to implement water quality standards. Colorado State Regulation No. 93 (5 CCR 1002-93, Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List) identifies water bodies where there is reason to suspect water quality problems. Water bodies that are impaired, but where it is unclear whether the cause of impairment is attributable to pollutants as opposed to pollution, are also placed on the Monitoring and Evaluation List.

The BLM participates in the State's non-point source pollution efforts, monitoring BLM stream segments that are listed and sharing water quality data with the State. Other water-quality related rules, regulations, policies, standards, and guidelines include: the CWA; the CRBSSA; the SDWA, EO 11988, Floodplains Management; Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a); and the Colorado Water Quality Control Division Stormwater Permit Program.

In relation to water quality, public land health assessments have been performed on most of the grazing allotments. Monitored streams that have water quality or channel stability concerns include: Deer Creek, Government Creek, Grizzly Creek, Pinto Creek, Red Dirt Creek, and Stink Creek. Grazing allotment permit renewals include environmental analysis of vegetation, soils, riparian conditions, and actual run-off pathways. Where riparian or wetland conditions in an allotment are failing, or are of concern, then "on-site" water quality issues are considered by BLM management and staff, even if downstream stream segments are unlikely to be affected (BLM 2007k).

Water Use

The BLM has an absolute water right on most developed water sources, and on inventoried undeveloped springs, in the Decision Area. There are some private filings that are also on BLM-managed public lands, and some associated with USGS wells drilled in the 1970s and filed on by nearby landowners. In addition, there are several allotments where the permittees' irrigation ditches provide livestock water on BLM-managed public lands. These are private water rights, outside the jurisdiction of the BLM. In the late 1980s, the KFO completed a Water Needs Assessment for each allotment in the Decision Area. This Assessment serves as a baseline. During permit renewal, the physical and legal availability of water for the permitted livestock is reviewed. Where there is an obvious shortage of water, and if additional water cannot be developed, a decrease in animal unit months (AUMs) is recommended (BLM 2007k).

The BLM files for water rights on water sources (such as springs) when the opportunity arises, to ensure water availability for multiple-use and sustained-yield management, and for the functioning of healthy riparian and upland systems. Many streams in the Planning Area are over appropriated, with water rights dating back to the turn of the century. These private rights are senior to the BLM's water rights, and generally determine the resulting streamflows. The BLM also collects stream data and makes recommendations to the Colorado Water Conservation Board (CWCB) for stream segments suitable for in-stream flow rights, which only the CWCB can hold in Colorado.(In-stream flows are the minimum flows necessary to "preserve the natural environment to a reasonable degree.") The BLM has been collecting field data on streams in the Decision Area to recommend in-stream flows on public stream segments. Currently, the CWCB holds instream flow water rights on three streams segments crossing public lands in North Park, including segments on Grizzly Creek, Indian Creek, and Government Creek. Most of the streams crossing public lands in Middle Park and the Laramie River Valley have instream flow water rights. However, some of these instream flow water rights are older and have one-flow rate year-round, and do not include seasonal variations in flow rates.

Groundwater

The KFO has inventoried 48 wells on BLM-managed public lands within the Planning Area, 120 undeveloped seeps or springs, and 101 developed springs. Most of the sources provide livestock and wildlife water, with only one well providing public drinking water (at a recreation site) (BLM 2007k).

The geology and groundwater hydrology of North Park and Middle Park are very complex. Unlike the eastern portion of Colorado, there are no large, well-defined aquifers that yield large volumes of groundwater. Most of the groundwater is found either in alluvial aquifers (such as those along the North Platte River or Colorado River) or in isolated pockets of porous sedimentary rocks. These latter sources are not considered aquifers, due to their limited extent, great depth of burial, or probability of being drained (BLM 1884b; BLM 2007k).

Aquifers and groundwater sources are recharged primarily by infiltration from streams and percolation of precipitation. Both North Park and Middle Park have essentially closed groundwater basins, from which very little groundwater moves out. Alluvium is the principal groundwater source in North Park. In addition, glacial deposits and sandstone areas in the North Park and Coalmont formations yield adequate water for domestic and livestock uses. The Coalmont formation and alluvial deposits are the most dependable sources of groundwater (BLM 1984b; BLM 2007g). North Park's groundwater in the Coalmont formation is primarily recharged at the edges of the Park and along the major interior ridges. The center of the Park has very low transmissivity (Robson, 1996). Groundwater quality and quantity is adequate for both domestic (human) and livestock uses. It is infrequently used for irrigation (BLM 1984b; BLM 2007g).

Most of Middle Park is underlain with rock that is capable of yielding only small amounts of water. The alluvium is the principal source of groundwater, yielding supplies adequate for domestic and livestock use. Most of the formations are nearly impermeable to water, which reduces the amount of groundwater. In some areas, however, these formations are faulted and fractured so that some groundwater is stored. Sedimentary rocks of the Tertiary System yield good water when the primary constituents of the formation are sandstone, sand, gravel, or boulders (Voegeli, 1965).

Characterization

Indicators

BLM Colorado's Standards for Public Land Health (BLM 1997a) describe conditions necessary to sustain public land health, and relate to all uses of the public lands, including water resources. Standards, based upon their associated indicators, are applied on a landscape scale and relate to the potential of the landscape. Public Land Health Standard 2 (Riparian Systems) and Public Land Health Standard 5 (Water Quality) contain indicators related to impacts to water resources. See the Appendix J for a detailed discussion of the standards.

Trends

The BLM primarily monitors riparian and wetland conditions, and does limited chemical analyses. The overall conditions of riparian areas and wetlands in the Decision Area are improving, due primarily due to more intensive range management techniques. In the past, heavy use of small riparian segments or wetlands was accepted. Grazing plans, upland improvements, and allowable use are being developed, based upon the unique qualities and needs of these areas, to help meet the Public Land Health Standards related to riparian areas and wetlands. In the more recent drought years, many riparian areas and wetlands actually continued to improve as permittees opted not to use their allotments or to shorten their grazing season. Some riparian areas, however, were grazed heavier as upland water developments dried up and livestock stayed along the streams.

Irrigation rights are expected to continue to be bought and sold, with some new property owners informally changing how the rights were historically used. Due to the continued population growth and land sales, more agricultural water rights may be converted to municipal and industrial uses. These changes may greatly impact the hydrology of streams, riparian areas and wetlands on BLM-managed public lands. There are several acres of public wetlands that are supported, or created, by current private irrigation practices.

There will be continued demand for upland water sources on both private lands and BLM-managed public lands. As more varied users access public lands in the Planning Area, there will be more pressures on the riparian areas and wetlands systems. Increasing public awareness of the unique values of these areas, and managing the levels of use to reduce impacts, are important, especially in areas where uses have not yet caused significant impacts.

There is a continued management effort by the BLM to protect or improve water quality, and to reduce non-point source pollution. Phase II of the Stormwater Regulations requires more permitted actions on BLM-managed public lands to develop erosion control plans and to reduce non-point source pollution resulting from ground disturbances. BLM-managed public lands are often a small percentage of a watershed. In developing Total Maximum Daily Load calculations (TMDLs) for impaired streams, however, Federal lands are among the most manageable, in terms of potential improvement, as they must be managed in accordance with all applicable laws, rules, regulations, policies, standards, and guidelines. Improving stream segments with limited public ownership, and mostly private water rights, would be more difficult. (Section 303(d) of the CWA requires States, Native American tribes, and Federal agencies to establish priority rankings for waters on the lists of impaired waters, and to develop TMDLs for these waters. (A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.) Currently, none of the listed streams in the Planning Area have TMDLs that involve the BLM.

Increased energy production may occur in the Planning Area, especially in the North Park area. If coalbed methane production is to be developed, an adequate review of the geohydrology of North Park is needed to help reduce concerns of groundwater quality and quantity impacts. Opportunities or problems resulting from produced water disposal on both private and Federal leases would also need review. Most of Planning Area's groundwater resources, riparian areas, wetlands, and livestock wells that could be affected by coalbed methane production are in the North Park area.

3.2.4 Vegetation Resources

Vegetation serves multiple purposes on the landscape, and provides many ecosystem benefits.

A healthy cover of perennial vegetation stabilizes the soil, increases infiltration of precipitation, slows surface run-off, prevents erosion, provides clean water to adjacent streams, uses carbon dioxide (CO2), releases oxygen (O2), increases species diversity, and provides habitat and food for animals and products for human use. Energy development, timber harvesting and associated activities, fuels management, livestock grazing, recreation (such as OHV use), travel management, and special management area designations can affect vegetation.

Many of the BLM's land management policies are directed toward the maintenance, and improvement, of healthy vegetation communities. Generally, vegetation can be characterized by ecological provinces, and more specifically characterized by plant communities. The plant communities discussed below are those that provide the most important land cover across the Planning Area.

Current Conditions

Vegetation Communities

The Planning Area lies within two Level III Ecoregions. Most of the area is in the Southern Rockies Ecoregion and a small portion is in the Wyoming Basin Ecoregion. The Planning Area is characterized by high-elevations and rugged mountains where vegetation is dominated by conifers of the Southern Rockies Ecoregion (Chapman et al. 2006). Vegetation types in this ecoregion are organized by elevation zones, with grass and shrublands fin the lower elevation mountain parks; gradually transitioning into cool, dry conifer stands and pinyon-juniper woodlands; followed by mixed conifer stands at mid-elevations; and finally, by spruce-fir forests and tundra. Vegetation in the Planning Area is largely determined by precipitation, elevation, topography, aspect, soil type, and past disturbance.

The Planning Area supports 12 vegetation communities. See Table 3-6, and Map 3-3, General Vegetation Zones. In spite of the diversity in vegetation communities, about 74 percent of the Planning Area is represented by sage steppe and conifer vegetation communities. Community information for the decision area is based upon field inventory data.

The Planning Area is comprised of high mountain valleys and parks surrounded by slopes and mountains. It is divided into the North Park, Middle Park, and the Laramie River Drainage regions. The valleys and parks are primarily sagebrush steppe vegetation communities that usually transition to aspen, and then either to lodgepole pine or to spruce/fir/Douglas-fir forests. The landscape can be characterized at the ecological province level and, more specifically, by the vegetation communities that occur within. The plant communities discussed below are the most abundant, and are those that provide the most important land cover across the Planning Area.

Table 3-6: KFO Vegetation Communities

Vegetation Community	KFO Total Planning Area Acreage *	KFO Total Acreage **	Percent of Planning Area	Percent of KFO
Forests and Woodlands				
Lodgepole pine	1,098,282	62,530	35.3	16.5
Aspen	231,604	17,905	7.4	4.7
Spruce-fir	392,080	1,855	12.6	0.5
Douglas-fir	10,413	4,530	.3	1.2
Pinyon-juniper	29,127	6,955	.9	1.8
Ponderosa pine	21,008	5	0.7	< 0.1
Limber pine-Bristlecone pine	394	120	< 0.1	< 0.1

Table 3-6: KFO Vegetation Communities

Vegetation Community	KFO Total Planning Area Acreage *	KFO Total Acreage **	Percent of Planning Area	Percent of KFO
Rangelands				
Sagebrush steppe	740,510	270,663	23.8	71.6
Irrigated meadow	173,460	1190	5.6	0.3
Mountain shrub	17,348	450	0.6	0.1
Salt shrub	10,159	600	0.3	0.2
Native grasslands	31,440	5,880	1.0	1.6
Tundra	255,380	0	8.2	0
Subalpine meadow	47,916	0	1.5	0
Riparian				
Riparian	22,721	2,925	0.7	.8
Other				
Water Bodies	15,685	2,020	.5	.5
Exposed Rock	4,885	0	.2	0
Mining Operation	3,744	0	.1	0
Urban/Built-up	7,978	0	.3	0
Sandy Areas	846	232	<0.1	<0.1

* Source: BLM 2007g
** Source for forests and woodlands acreages: McCallie and Williams 1993. Acreages for rangeland vegetation types were derived from best estimates of the BLM Rangelands Management staff. Acreages for riparian were calculated from recent surveys of wetlands and riparian areas within the KFO.

Ecological Provinces

In response to increased involvement by public land management agencies in regional and long-range planning, a system was developed by Robert G. Bailey (1995) for the USFS that divided North America into a hierarchy of domains, divisions, provinces, and sections. The basis for classification is climate, vegetation, and topography. Within any specific section, conditions will be similar, which facilitates regional planning.

Bailey (1995) places the Planning Area in two different ecological provinces of the North American Ecoregions. See Map 3-4, General Ecological Provinces. Most of the Planning Area is in the Southern Rockies Ecoregion, which is composed of steep, rugged mountains over 8,000 feet in elevation. Vegetation types dominated by coniferous forests, and by soil and land use, follow a pattern of elevational banding. The lowest elevations (7,000 feet) are generally grass or shrub communities. Low- to mid-elevations (7,000 feet to 8,500 feet) have a variety of vegetation types, including Douglas-fir, ponderosa pine, aspen, and pinyon-

juniper woodlands. Mid- to high elevations (8,000 feet to 10,000 feet) are primarily dominated by coniferous forests. The highest elevations (over 10,000 feet) have alpine characteristics.

The Rocky Mountains are rugged glaciated mountains with a north-south orientation, reaching altitudes of up to 14,000 feet. Average annual temperatures range from 35° F to 45° F, with annual precipitation ranging from 10 to 20 inches in the lower elevations, increasing as elevation increases. At higher elevations, precipitation averages approximately 40 inches per year, mostly in the form of snow. Vegetation is a mixture of forests, grasslands, and shrublands, with tundra above the treeline. Forests are mostly coniferous, with Englemann spruce and subalpine fur in the Subalpine Zone, and some Douglas-fir in the moister areas. Typically, aspen and lodgepole pine become dominant in the Subalpine Zone following fire. The Montane Zone falls just below the Subalpine Zone in elevation, and is dominated by lodgepole pine, with Douglas-fir on the wetter, cooler north-facing slopes. Grasslands and shrublands are in the numerous parks and other open areas interspersed throughout the southern Rocky Mountains. These grass and shrub lands are usually dominated by big sagebrush communities and native perennial grasses.

Vegetation (Forests and Woodlands)

The best estimate of forest and woodland acres in the Decision Area is approximately 93,900 acres. This estimate was calculated in 1993 as part of a project to determine a sustainable timber harvest level for the Field Office (McCallie and Williams, 1993).

Forest occupies approximately 23 percent of the Decision Area, and is dominated by lodgepole pine and aspen. Both species occupy a wide elevational range, and colonize rapidly following wildland fire, establishing early seral communities. Woodland vegetation, characterized by pinyon pine and juniper species, occupy approximately 2 percent of the Decision Area. Woodland communities are found on dry, warm slopes, mesas, and ridges.

The following discussion summarizes key characteristics of forest and woodland communities in the Decision Area.

Lodgepole Pine

Lodgepole pine communities are common throughout the Rocky Mountains, and they are the dominant forest community in the Planning Area. Lodgepole pine communities are found on all aspects and slopes at higher elevations. Generally, soils supporting these forests are well drained, gravelly, course textured, and acidic (CNHP 2005). This species colonizes rapidly following fire, developing even-aged, dense stands.

Lodgepole pine stands make up approximately 62,530 acres (67 percent) of the total forest and woodland acres in the Decision Area. The vast majority of these stands are between 110 years and 150 years in age, and are in a mature or over-mature condition. Species composition and age-class in these stands range from almost pure stands of single-aged lodgepole pine to stands dominated by lodgepole pine containing a sizable component of other species (mainly aspen and subalpine fir, although they may also contain Douglas-fir, limber pine and Engelmann spruce) and size classes. Many of these stands are overstocked, and exhibit the smaller diameters indicative of stands in this condition.

The age and density of these stands has, in many cases, contributed to a decrease in stand vigor, and to a reduced resistance to insect and disease infestations. Colorado is experiencing the largest outbreak of mountain pine beetle (MPB) in its recorded history. The current epidemic began during the late 1990s, resulting from a combination of stand conditions, drought, and warmer winters. Data compiled from annual aerial forest health surveys from 1996 to 2009 disclose the extent of the MPB epidemic. As of 2009, it was estimated that this landscape-changing event had affected more than 2.9 million acres of lodgepole and ponderosa pine forests in Colorado. At current rates of spread and intensification of tree mortality, the MPB will likely kill the majority of Colorado's large diameter lodgepole pine trees within the next 5 years.

The KFO administers public land in several of the Colorado counties hardest hit by the MPB epidemic. The data show that approximately 1.5 million acres in Grand, Jackson, and Larimer Counties have been infested with MPB. With the possible exception of recently regenerated stands, most, if not all, lodgepole pine communities on publicly administered lands within the KFO have been impacted by the epidemic.

Mortality rates in most stands with an 8.0 inch or greater average diameter are estimated to be between 80 percent and 95 percent. Many stands with smaller average diameters are also experiencing significant mortality. Younger stands, generally a result of previous harvest, are estimated to comprise approximately 10 to 16 percent of the total lodgepole pine acres.

General stand conditions (tree density, age, mortality) have resulted in increased fuel loads on many sites, increasing the likelihood of high-intensity or high-severity fire, should an ignition occur.

Aspen

Aspen vegetation communities are common in the Rocky Mountains, and account for approximately 19 percent of the forested land in the Decision Area. Aspen communities typically occur in a mosaic with conifer and sagebrush communities. Understory vegetation is often a dense mix of grasses and forbs, with an occasional shrub component (CNHP 2005). Aspen sprout vigorously following fire, establishing early seral communities, often in conjunction with lodgepole pine. Many aspen stands are eventually replaced by conifer forests. Disturbance is needed to maintain aspen communities as mature trees become increasingly susceptible to insect and disease (CNHP 2005), and conifer encroachment.

Most aspen stands in the Decision Area are mature and starting to decline. Aspen is vulnerable to insects and disease in the absence of disturbance. As with lodgepole pine communities, fire suppression has increased stand density. Advanced stand age and disease, compounded by recent drought, is affecting stand vigor. Some aspen stands in the Decision Area are displaying increased mortality of mature and over-mature trees;, suckering response (regeneration) is limited or not occurring at all. The combination of these factors has resulted in the deterioration of many aspen stands in the Decision Area, and has increased the risk of insects, disease, and fire.

Spruce/fir

Spruce-fir forest is a minor, but important, community in the Decision Area. These communities occur on cold sites over a broad a range of elevations (CNHP 2005). Spruce-fir communities often form in cold air sinks along mountain streams and ravines where snowpack is persistent (CNHP 2005). Fire, insects, windthrow, and avalanches all contribute to the stand dynamics of these communities (CNHP 2005). Some Engelmann spruce are at, or over, maturity and are susceptible to insect infestation. Spruce beetle, affecting Engelmann spruce, has caused mortality in some spruce-fir stands. The spruce beetle is still active in some areas, although they appear to be in decline. Fir decline, affecting subalpine fir, is sporadic but widespread.

Douglas-fir

Douglas-fir communities constitute a minor component of vegetation in the Decision Area, generally occurring on steep north- or northeast-facing slopes at mid-elevations. Understory communities are typically shrubby with a perennial grass component. Soils are usually shallow, and sites are colder and moister than surrounding habitat, which supports primarily mixed mountain shrubs or aspen. Stand density is increasing in many stands, resulting in increased fuel loads and tree stress, thereby increasing the likelihood of insect and disease infestation.

Pinyon-juniper

Pinyon-juniper woodlands in the Decision Area include pure stands of Utah juniper at the lower elevations, with an increasingly greater component of pinyon pine and Rocky Mountain juniper at higher elevations. The understory is typically dominated by shrubs and perennial bunchgrasses. These woodlands are found on warm, dry slopes at lower to mid-elevations on a variety of soil textures, ranging from stony, cobbly, gravelly, or sandy loams to clay loam or clay (CNHP 2005). Pinyon-juniper stand density and canopy cover are also increasing, and are inhibiting understory diversity and productivity.

Ponderosa pine

Ponderosa pine is limited in the Decision Area. This species typically occurs at lower treeline ecotones, between foothills grasslands and more mesic coniferous forests (CNHP 2005). Understory communities are typically shrubby, with a perennial grass component. Ponderosa pine sites are often warm and dry, and can occur on all slopes and aspects. Fire suppression has altered stand density and fuel loads as shade-tolerant Douglas-fir have encroached into ponderosa pine stands (CNHP 2005).

Coniferous Forest-Limber Pine

Coniferous forest-limber pine communities constitute a minor vegetation component in the Decision Area. Limber pines grow in some of the harsher sites on the fringe of lodgepole pine stands. Commonly found on exposed rocky and windswept ridges, its range is limited in the Decision Area. It is also susceptible to the MPB, and many of the mature trees are dead or dying. Limber pines have no commercial value, although they often act as a windbreak, protecting adjoining lodgepole pine stands.

Rocky Mountain Dry Tundra

This widespread ecological system occurs above upper treeline throughout the Rocky Mountain cordillera, including alpine areas of mountain ranges in Colorado. It is found on gentle-to-moderate slopes, flat ridges, valleys, and basins where the soil has become relatively stabilized and where the water supply is more or less constant. Vegetation in these areas is controlled by snow retention, wind desiccation, permafrost, and a short growing season. This system is characterized by a dense cover of low-growing, perennial graminoids (grass-like plants that include grasses, sedges, and rushes) and forbs. Rhizomatous (stems which are underground), sod-forming sedges are the dominant graminoids, and prostrate and mat-forming plants with thick rootstocks or taproots characterize the forbs. Dominant species include boreal sagebrush (*Artemisia arctica*),blackroot sedge (*Carex elynoides*), dryspike sedge (*Carex siccata*), northern singlespike sedge (*Carex scirpoidea*), spike sedge (*Carex nardina*), curly sedge (*Carex rupestris*), tufted hairgrass (*Deschampsia caespitosa*), alpine fescue (*Festuca brachyphylla*), Idaho fescue (*Festuca idahoensis*), Ross' avens (*Geum rossii*),Bellardi bogsedge (*Kobresia myosuroides*), cushion phlox (*Phlox pulvinata*), and alpine clover (*Trifolium dasyphyllum*). Alpine tundra dry meadow is the matrix of the alpine zone; however, it typically intermingles with alpine bedrock and scree, ice field, fell-field, alpine dwarf shrubland, and alpine-subalpine wet meadow systems.

Rocky Mountain Subalpine Mesic Meadow

This Rocky Mountain ecological system is restricted to sites in the Subalpine Zone where finely textured soils, snow deposition, or wind-swept dry conditions limit tree establishment. The Rocky Mountain Subalpine Mesic Meadow is typically found above approximately 9,800 feet in elevation in the southern part of its range, and above approximately 5,000 feet in the northern part. These upland communities occur on gentle- to moderate-gradient slopes. Typically, the soils are seasonally moist to saturated in the spring, drying out later in the growing season. These sites are not as wet as those found in Rocky Mountain Alpine-Montane Wet Meadow (CES306.812). Typically, vegetation is forb-rich, with forbs contributing more to overall herbaceous cover than graminoids. Important taxa include fleabane (*Erigeron spp*.), Aster (*Aster spp*.), bluebells (*Mertensia spp*.), beardtongue (*Penstemon spp*.), bellflower (*Campanula spp*.), lupine (*Lupinus spp*.), goldenrod (*Solidago spp*.), licorice-root (*Ligusticum spp*.), western meadow-rue (*Thalictrum occidentale*), sitka valerian (*Valeriana sitchensis*), arrowleaf balamorhiza (*Balsamorhiza sagittata*), northern mule ears (*Wyethia* amplexicaulis),tufted hairgrass (*Deschampsia caespitosa*), prairie junegrass (*Koeleria macrantha*), and shrubby cinquefoil (*Dasiphora fruticosa*). Burrowing mammals can increase forb diversity in these types of vegetation communities.

Vegetation (Rangelands)

Sagebrush steppe

Sagebrush steppe is the most common vegetation community in the Planning Area. It is where most livestock grazing occurs, and provides valuable winter habitat for big game. Most of the livestock grazing systems in the Decision Area are designed to apply Best Management Practices (BMPs) to the sagebrush steppe vegetation community. Generally, this vegetation community is considered to be in good condition across the Decision Area. It is dominated by big sagebrush, with scattered other shrubs and an understory of grasses and forbs. The grasses are mostly native, cool season, and perennial. Annual and perennial forbs provide a substantial amount of feed, especially for wildlife, including the Greater Sage-Grouse. The forb component is highly variable from year-to-year, however, depending heavily on precipitation timing and amounts.

Four of the subspecies of Big sagebrush occur in the Planning Area, and although they are of the same species, they have different growth forms and require different methods of management:

- **Mountain Big Sagebrush** (*Artemisia tridentata var. pauciflora*) **–** Mountain Big sagebrush grows in a variety of soils on side slopes and ridges, from approximately 6,500 feet to 8,500 feet in elevation (Winward 2004). Most sites occupied by Mountain Big sagebrush are very productive, and have a diverse understory of grasses and forbs. Mountain Big sagebrush grows on relatively productive sites; many acres have been treated for sagebrush control in the past 50 years. Treatments continue to make a mosaic of sites with different age classes, degree of canopy cover, and amounts of fringe between existing sagebrush and newly created open areas.
- **Wyoming Big Sagebrush** (*Artemisia tridentata spp. wyomingensis*) **–** Wyoming Big sagebrush is the shortest of the subspecies (24 inches to 36 inches), and grows on the driest sites. It can grow in areas with a 7- to 11-inch average annual precipitation. It is often found on shallow fine soils. The understory is generally composed of a variety of native grasses and forbs. The forb component may vary significantly in relation to precipitation amounts and timing. Wyoming Big sagebrush provides a considerable amount of forage for wild ungulates and for Greater Sage-Grouse, but the recent drought and browsing by big game have put this vegetation type in poor condition (Winward 2004). A management goal is to improve the overall condition of the Wyoming Big sagebrush vegetation community in the Decision Area.
- **Subalpine Big Sagebrush** (*Artemisia tridentata var. vaseyana*) **–** Subalpine Big sagebrush is similar to Mountain Big sagebrush, although it is usually found on moister sites at higher elevations (8,500 feet to 10,000 feet). This vegetation community usually produces a dense understory of grasses and forbs, but it is not highly grazed due to the high elevation and short grazing season.
- **Basin Big Sagebrush** (*Artemisia tridentata spp. tridentata*) **–** Basin Big sagebrush is the tallest of the subspecies, growing up to 6 feet in height. Basin Big sagebrush grows in deep, well-drained soils and alluvial plains. These ecological conditions exist only in very small areas in the Planning Area. Basin Big sagebrush does not grow in North Park, and very little grows in Middle Park or Larimer County.

- **Additional sagebrush**—In addition to the big sagebrush, other species of sagebrush in the North Park region are: black sagebrush (*Artemisia nova*), tall black sagebrush (*Artemisia nova* hybrid), early sagebrush (*Artemisia longiloba*), mountain silver sagebrush (*Artemisia cana* subsp. *cana*), and coaltown sagebrush (*Artemisia argilosa*).

Other shrubs in the sagebrush steppe communities include antelope bitterbrush (*Purshia tridentate)*, mountain mahogany (*Cercocarpus spp*.), serviceberry (*Amelanchier spp*.), snowberry (*Symphoricarpos oreophilus*), rabbitbrush (*Chrysothamnus nauseosus*), currant *(Ribes spp*.), Wood's rose (*Rosa woodii*), broom snakeweed (*Gutierrezia sarothrae*), and winterfat (*Krascheninnikovia lanata*). While these species comprise a small percentage of the shrubs in the sagebrush steppe vegetation communities, they provide an important source of browse for big game and for other wildlife species.

Irrigated meadows

Irrigated meadows are primarily found on private lands not managed by the BLM. Irrigated meadows typically consist of lower elevation, flat areas, including river bottoms, terraces, and benches, that are mainly used for hay production in the summer, and for feeding areas in the winter. The major grasses used for hay production on the irrigated meadows include timothy (*Phleum* spp.), smooth brome (*Bromus inermis*), orchardgrass (*Dactylis glomerata*), American sloughgrass (*Beckmannia syzigachne*), meadow foxtail (*Alopecurus pratensis*), and redtop (*Agrostis gigantea*). Grass-like plants, such as sedges and rushes, are also found in these meadows, often on the bog-like sites.

Mountain shrub

Mountain shrub communities constitute only a small amount of vegetation cover in the Planning Area. They are primarily composed of serviceberry *(Amelanchier alnifolia)* and true mountain mahogany *(Cercocorpus montanus)*, with some snowberry, gooseberry *(Ribes spp.)*, antelope bitterbrush, big sagebrush, and rabbitbrush. The most common areas where mountain shrub vegetation communities are found are on northern exposures in snow pockets, and along drainages where moisture is not a limiting factor. These areas are frequently located about mid-slope, and may be associated with steep topography. Thinly scattered, mountain shrub vegetation communities often provide vital forage and habitat for wildlife and livestock.

Salt shrub

Salt shrub, including mat saltbush *(Atriplex corrugate)*, occupies lower-elevation drainages in Middle Park and North Park. These areas are characterized by heavy, poorly drained soils. The water table is usually high, and as the water evaporates it leaves an accumulation of salt on the soil's surface. Salt bush is primarily dominated by greasewood (*Sarcobatus vermiculatus*), with a sparse understory. Poor-quality, salty soils, and a lack of water restrict vegetation growth to a few salt-tolerant grass species, including inland salt grass (*Distichlis spicata*), western wheatgrass (*Pascopyrum smithii*), squirreltail (*Elymus elymoides*), and scattered hardy forbs that do not generally provide much forage value.

Native grasslands

Generally, native grasslands in the Planning Area consist of two distinct types: dry and moist or wet. The dry grasslands occur as small isolated areas, often on exposed ridges or hilltops, where winds reduce available moisture and prevent shrub growth. Soils at these sites typically are very shallow and include a high percentage of rocks or cobbles. The vegetation consists mainly of low-growing grasses and forbs adapted to these harsh conditions.

Moist or wet grasslands occur primarily as high mountain meadows. These plant communities typically are productive and diverse. These grasslands are in areas with ample moisture and gentle topography, such as mountain valleys, swales, parks, and around pot holes Numerous grass, grass-like, and forb species produce a lush variety of vegetation that provides significant amounts of summer feed for wildlife and livestock.

The BLM adopted the Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado 1997 (BLM 1997a). See appendix J. These Standards and Guidelines were developed to help guide the BLM, and public land users, toward maintaining or achieving rangeland health. During the permit renewal process, allotments are assessed for compliance with the Standards and Guidelines by a BLM Interdisciplinary (ID) Team that visits the site and determines the health of the allotment. For livestock grazing allotments, a goal is for the vegetation to meet, or to be moving toward compliance with, the following Standard:

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 the population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes. The health of the vegetation is determined by the following:

- analysis of the amount and distribution of noxious weeds and other undesirable species;
- spatial distribution of the native plant species across the landscape, with a density, composition, and frequency of species suitable to reproductive capability and sustainability;
- representation of proper age classes; and
- correct density and diversity of plant species to match the landscape.

During the livestock grazing permit renewal process, rangeland health is assessed by allotment according to the Standards and Guidelines protocol. A goal of fully processing all livestock grazing permit renewals, which includes assessment for compliance with the BLM Standards, has been met.

Vegetation (Riparian)

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

PFC assessments have been performed on most riparian areas in the Decision Area. Upstream diversions and private water use have altered the streamflows of many public-land stream segments. If the associated riparian communities meet the Standards for a healthy stream, however, these segments may still receive a rating of PFC.

Streams rated Functioning at Risk (FAR) are functional, but at risk. In the Decision Area, most of the FAR streams are streams where the use levels place the area at risk for degradation, especially if such use levels continue. Desired plant communities that can help stabilize the stream are starting to be replaced by communities that tolerate moderate-to-heavy use. Areas rated Non-functioning (NF) no longer provide the basic riparian area or wetlands values due to current on-site conditions. Areas where these factors are not known need to be inventoried to determine the current condition, including some streams that have not been inventoried for many years. Most stream segments in the Decision Area have had PFC assessments, and are repeatedly evaluated due to the changes in land use that can affect riparian areas and wetlands. See Table 3-7 for a summary of PFC assessments for riparian areas and wetlands.)

There is still a need for better inventory of wetlands in the Decision Area, especially in timbered areas where aerial photographs do not necessarily reveal small seeps. Wetlands also need to be mapped to improve acreage estimates. In North Park, there are several small swales that support wetlands, which have not been mapped. Included in the wetland acreage are non-jurisdictional wetlands and constructed water impoundments that support wetland vegetation. See Table 3-8 for a summary of wetlands in the Decision Area.

Table 3-7: Streams and Riparian Areas in the Decision Area, by Watershed

Watershed	PFC (Miles)	FAR (Miles)	NF (Miles)	Unknown (Miles)	Total Miles
Big Creek/Beaver Creek	10.7	0	0	0	10.7
Lower Blue River	7.6	0	0	0	7.6
Canadian	4.0	2.5	0.4	0	6.9
Colorado River Headwaters to Fraser River	0	0	0	0	0
Colorado River Fraser confluence to Williams fork	21.5	0.8	0	0	22.3
Colorado River above Kremmling	38.2	6.2	0	0.4	44.8
Colorado River above State Bridge	22.7	0	0	0.8	23.5
Fraser River	14.9	0	0	0	14.9
Grizzly Creek	7.9	0.4	2.6	0	10.9
Illinois River	4.5	1.2	0	0	5.7
Lake Creek/N. Fork of the N. Platte River	4.6	0	0	0	4.6
Laramie River	15.4	2.6	0	0	18
Michigan River	3.6	0	0	0	3.6
Muddy Creek	15.7	3.9	0	0.3	19.9
North Platte River Upper	0	0	0	0	0
North Platte River Above 3-Way	7.9	0.4	0	0	8.3
North Platte River Below 3-Way	2.6	0	0	0	2.6
Piney River	2.3	0	0	0	2.3
Sheephorn Creek	2.4	0.5	0	0	2.9
Shell Creek/Sand Creek	8.3	0.2	0	0	8.5
Williams Fork River	6.3	1.9	0	1.1	9.3
Willow Creek	1.0	0	0	0.4	1.4

Source: BLM 2007k

Table 3-8: Wetlands in the Decision Area, by County

County	PFC (Acres)	FAR Upward Trend (Acres)	FAR No Trend (acres)	FAR Downward Trend (Acres)	NF (Acres)	Unknown (Acres)
Eagle	8	0	2	0	0	0
Grand	196	48	150	20	0	3
Jackson	2,163	315	9	0	0	3
Larimer	2	0	0	1	0	0
Summit	5	0	0	0	0	0
Total	2,374	363	161	21	0	6

Source: BLM 2007k

Vegetation (Weeds)

Noxious weeds and other invasive vegetation are aggressively competitive and can often out-compete native vegetation, especially on recently disturbed sites. A "noxious weed" is a plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new, or not common to the United States. "Invasive vegetation," as defined in EO 13112, are "non-native plants whose introduction does, or is likely to, cause economic or environmental harm or harm to human health."

Noxious weeds and other invasive vegetation are compromising the ability of the BLM to manage public lands in a manner conducive to healthy native ecosystems. Noxious weeds and other invasive vegetation degrade or reduce soil productivity, water quality and quantity, native plant communities, wildlife habitat, wilderness values, recreational opportunities, and livestock forage, and are detrimental to the agriculture and commerce of the U.S. and to public health (NAS 1968, BLM 2000e). If left untreated, noxious weed infestations can become permanent.

Controlling the rapid spread of invasive species and noxious weeds has become a priority for public land managers. Species found on State lists of noxious weeds require eradication.

See Appendix G for details on the Colorado Noxious Weed List. The Noxious Weed Control and Eradication Act of 2004 requires the Secretary of Agriculture to provide assistance to eligible weed management entities in order to control or eradicate noxious weeds on public and private land. In 2004, Colorado amended the Noxious Weed Control and Eradication Act to list species in three categories: A, B, and C. List A includes those species in Colorado that are designated by the Commissioner of Agriculture for eradication. List B includes those species for which a State Noxious Weed Management Plan is being, or will be, developed and implemented to stop the continued spread. List C includes those species that build from the goals of List B species, and for which additional education, research, and biological

control will be provided to jurisdictions that chose to require management. Table 3-9 provides a list of species compiled from the State weed lists.

The KFO has contracts with, and cooperates with, counties for weed control efforts. Funding that the KFO obtains for weed control is transferred to the Counties to manage weed eradication efforts on BLM-managed public lands.

Table 3-9: Noxious Weed Species in the Planning Area

Common Name	Scientific Name	State List Designation
Black henbane	Hyoscyamus niger	B
Canada thistle	Cirsium arvense	B
Chamomile, mayweed	Anthemis cotula	B
Chamomile, scentless	Matricaria perforata	B
Field bindweed	Convolvulus arvensis	C
Hoary cress (whitetop)	Cardaria draba	B
Houndstongue	Cynoglossum officinale	B
Knapweed, diffuse	Centaurea diffusa	B
Knapweed, Russian	Acroptilon repens	B
Knapweed, spotted	Centaurea maculosa	B
Leafy spurge	Euphorbia esula	B
Musk thistle	Carduus nutans	B
Orange hawkweed	Hieracium aurantiacum	A
Oxeye daisy	Chrysanthemum leucanthemum	B
Scotch thistle	Onopordum acanthium	B
Toadflax, Dalmatian	Linaria genistifolia	B
Toadflax, yellow	L. vulgaris	B
Yellow starthistle	Centaurea solstitialis	A
Bull thistle	Cirsium vulgare	B
Chamomile, corn	Anthemis arvensis	B
Dame’s rocket	Hesperis matronalis	B
Dyer’s Woad	Isatis tinctoria	A
Salt cedar	Tamarix chinensis	B
Wild caraway	Carum carvi	B
Chinese clematis	Clematis orientalis	A
Common tansy	Tanacetum vulgare	A
Knapweed, meadow	Centaurea pratensis	A
Perennial pepperweed	Lepidium latifolium	B
Plumeless thistle	Carduus acanthoides	B

Source: Colorado Department of Agriculture 2008

Characterization

Indicators

Forest and Woodlands

Conditions related to forests and woodlands will be assessed based upon health (insect and disease affected areas by vegetation type), invasion of non-native species, density, and decadence.

Rangelands

During the livestock grazing permit renewal process, allotments are assessed for compliance with the Standards and Guidelines (see Appendix J) by an ID Team that visits the site and determines the health of the vegetation within the allotment. The health of the vegetation is determined by:

- analysis of the amount and distribution of noxious weeds and other undesirable species;
- spatial distribution of the native plant species across the landscape, with a density, composition, and frequency of species suitable to reproductive capability and sustainability;
- representation of proper age classes; and
- correct density and diversity of plant species to match the landscape.

Riparian

PFC assessments and Public Land Health Standards and Guidelines are used to assess the health of riparian areas and wetlands ecosystems.

Weeds

Indicators of noxious weed invasion, and the potential for invasion, are the same as those used to assess the health of rangeland communities, since rangeland health is proportional to the extent and potential for weed invasion. Generally, the greater the diversity and cover of rangeland vegetation, and the lower the amount of surface disturbance and human presence, the lower the potential for weed invasion and spread.

Trends

Forest and Woodlands

Aging stands, stand conditions and climatic conditions (such as drought), have led to a decline in forest health. Many lodgepole, Douglas-fir, and spruce-fir forest communities are mature, even-aged stands with increasing density. Increased stand density magnifies competition among species and decreases tree vigor. Low-vigor stands are more susceptible to insect and disease infestation, including MPB. MPB is endemic in lodgepole pine stands, and epidemics are cyclic. Large-scale, periodic mountain pine beetle infestations have occurred in the past in the Planning Area, and are expected to continue. The current infestation is especially severe. Increasing the number of acres under active forest management could reduce the severity, extent, and frequency of outbreaks.

The current epidemic is expected to continue until either the infested areas experience colder temperatures of necessary duration to significantly decrease beetle numbers, or when the beetles have infested all of the lodgepole pines. Although trees are still being attacked and killed throughout the Planning Area, active infestations are beginning to decline in some areas, especially in Grand County and parts of Jackson County, due to the mortality of most of the susceptible trees. As of 2010, active infestations were increasing in Larimer County. Most of the beetle-killed lodgepole pine stands on BLM-managed public lands have transitioned from the red-needle stage to the gray stage.

During the next 10 years to 15 years, it is expected that there would be an increase in ground vegetation as more sunlight reaches the forest floor. Live understory trees would increase in growth, and there would likely be an increase in aspen sprouting in areas where they currently exist. Regeneration of lodgepole pine would occur where viable seed is present and site conditions are favorable. Increased ground vegetation and duff layers may inhibit regeneration. Older dead trees have begun to fall, and the fall-down rate would accelerate as time-since-death increases. Ground fuel levels would increase, as most dead trees will be on the ground.

Most aspen stands are mature and starting to decline. Recent drought has contributed to low species vigor, and there is an increased risk of insect and disease infestations. Younger stands are rare, and found only where there has been a recent disturbance or disease outbreak that killed the aspen overstory and triggered reproduction. This trend is expected to continue in the absence of disturbance, although some increase in aspen suckering is likely to occur in beetle-killed lodgepole pine stands where aspen is present.

Pinyon-juniper woodland communities have also experienced increased stand and canopy cover density. Overstocked stands have low vigor and a sparse understory component, increasing the likelihood of insect, disease, and non-native plant infestation. This trend will continue unless management practices or disturbances reduce stand density.

Rangelands

The Kremmling RMP (BLM 1984b) contained no direct guidelines for vegetation management; although improvements in range condition have been made through the grazing permit renewal process. Improving upland communities to support animals was identified as a planning issue to be addressed in planning process. Range management would include a focus on supporting domestic animals, animal and plant species, and their habitats. Species to be considered include Greater Sage-Grouse, elk, and federally listed Threatened and Endangered Species of plants. Managing habitat for Sage-Grouse and sagebrush-obligate species was also identified as a planning issue. Habitat conversion, invasion by non-native and noxious species, and recreation use are increasing the need to designate land uses that would conserve sagebrush habitat and the species that depend upon it.

Since 1999, livestock grazing allotments have been analyzed during the permit renewal process for compliance with the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a). If the Field Office ID Team determined that improvements in the range condition were needed for an allotment to comply with the Standards and Guidelines, actions were implemented following the appropriate consultation, cooperation, and coordination with the permittee and interested members of the public. Frequently, the action was a rest or deferred rotation grazing system, vegetation treatments, and water developments (or a combination of the three actions). Future permit renewals would continue to be guided by the BLM Standards and Guidelines, as a prerequisite. Appropriate actions would be taken, as necessary, to meet the requirement that all allotments comply with, or are heading toward complying with, the Standards and Guidelines (BLM 1997a).

Sagebrush steppe

Poor livestock management policies, such as season-long grazing and high livestock numbers, historically have resulted in some areas not meeting the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a). These areas are being converted to lower grazing pressure and rest or deferred rotation grazing systems. Rotation grazing systems have proven to be valuable for improving the condition of the vegetation, allowing the range to recover and progress toward complying with the Standards and Guidelines. Sagebrush steppe communities, however, often require a relatively long time to recover following changes in livestock grazing practices. More rapid recovery can be accomplished by applying vegetation management techniques, such as brush beating, Dixie harrow, or Lawson aerator. Seeding following treatment may, or may not, be required, depending upon the current soil seed bank.

By implementing rest or deferred rotation grazing systems, reducing the amount of authorized active use, and removing livestock when utilization levels for key forage species are met, the long-term trend of the vegetation in the Decision Area is positive. The ultimate goal is for all public-land vegetation to comply with the Standards and Guidelines (BLM 1997a).

Irrigated meadows

Irrigated meadows have an intricate role in rangeland management. The meadows are irrigated and used for hay production during summer. During winter, the livestock are kept on the meadows and fed the hay that the meadows have produced. The irrigated meadows have proved valuable for hay production and winter feeding, and should continue to support these resource uses into the foreseeable future.

Mountain shrub

The mountain shrub vegetation community produces only a small percentage of the overall forage base in the Decision Area. It is important, however, for wildlife because it is generally found in big game wintering areas. The mountain shrub communities appear to be retaining their overall good condition. Any disturbances, such as drought or extensive recreational use, including OHV riding, could place undue stress on this vegetation community.

Salt shrub

The health of these vegetation communities remains relatively constant, although the relatively sparsely vegetated understory can easily be damaged through overgrazing. Salt shrub communities respond to vegetation treatments if a supply of seeds is available from the natural seed bank. Otherwise, seeding would be required following vegetation treatment.

Native grasslands

The wet meadow grassland vegetation is generally in good condition. Wet meadows, however, require more intense management to maintain or improve the condition of the vegetation, because they receive heavier than average livestock grazing pressure. Meadows provide feed, are usually near water, are relatively flat in a mountainous area, and provide preferred areas for loafing. These meadows are also popular locations for recreational use, and provide important wildlife habitat.

Many projects have been designed to ease livestock pressure on meadows in the Decision Area. Vegetation treatments and water developments are used i to draw livestock away from the meadows. Fencing has also been used to protect important meadows. The fences are designed to exclude livestock, but to allow access for wildlife.

With continued monitoring, implementation of deferred and rest rotation grazing systems, and compliance checks, both the wet and dry grasslands should continue to be in good or better condition into the future. Areas where the vegetation is in less-than-desirable condition would be prioritized, and BMPs would be implemented. The overall goal is to have all of the grasslands complying with, or heading toward complying with, the Standards and Guidelines.

Riparian

While riparian areas and wetlands in the Decision Area comprise approximately 1 percent of the acreage of the Decision Area, they are one of the most important ecological components of the environment. These areas, found along waterways and other wet areas, have adequate moisture and generally support lush vegetation. Livestock and wildlife tend to concentrate in these areas because they provide food, water, and shelter. Riparian areas and wetlands are also popular with recreationists. Sedges and rushes are common in the riparian and wetland complex, and are important because they are deep, fibrous rooted, grass-like plants that prevent bank erosion along streams. These areas also can support willows, trees, and other woody vegetation that is important habitat for birds and other arboreal species.

Some riparian areas and wetlands have weed problems as the result of historical livestock grazing practices, surface disturbances, irrigation ditches, roads, wildlife, and recreation. Outside of the Colorado River corridor, weeds in riparian and wetland areas generally are limited to thistles. Weed control using Integrated Pest Management (IPM) techniques, such as mechanical, biological, and chemical control, can be effective in riparian areas and wetlands. The positive water regime found in these areas allows them to recover relatively quickly following disturbance. If aggressive annual weeds dominate a site, however, it could take a significant amount of time for the area to recover, even with a weed control program in effect.

Riparian improvements in the Decision Area began in the late 1980s, when allotments were reprioritized to focus on riparian management. Improvements have continued with the initiation of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a). Appropriate actions are being implemented to improve grazing practices and the quality of the riparian areas and wetlands throughout the Decision Area. Ecological conditions of the riparian areas and wetlands would continue to improve as more intensive livestock grazing practices, such as rest or deferred rotation, are implemented to limit the amount of time livestock spend in these areas. In renewing livestock grazing permits or in developing grazing plans, utilization levels in the riparian or wetland areas are used to help determine the need for additional management. Utilization levels may be used to determine the grazing period in a pasture, to ensure sufficient stubble height remains after grazing, in order to promote a healthy vegetation community. The KFO continues to focus on areas not meeting PFC, and uses adaptive management to achieve desired plant communities and overall long-term health.

Continued population growth in the surrounding areas has increased the use of BLM-managed public lands, which threatens riparian areas and wetlands. New trails, paths, and road crossing, or travelling within riparian areas and wetlands, can disrupt hydrology, introduce weeds, and compact or rut soils. The continued population growth and land sales may result in more agricultural water rights being converted to municipal and industrial uses, or used in ways that do not offer indirect benefits to riparian areas or wetlands. There are water rights that are leased to agricultural users until they are needed by municipal and industrial users. Changes in use may greatly affect the hydrology of streams, riparian areas and wetlands on BLM-managed public lands, as there are several acres of public wetlands that are supported or created by the current private irrigation practices.

The condition of riparian areas and wetlands is improving as the result of better livestock control, grazing systems with deferment or complete rest of the riparian areas, and weed control along riparian corridors. Livestock grazing in the past was the major cause of poor quality riparian areas and wetlands.

Weeds

The Programmatic Weed Management Plan for the KFO was initiated in February of 2008. Efforts of BLM staff to prevent the establishment of tamarisk and other invasive species along the upper Colorado River have been successful. Populations have been targeted and removed at Wolford Mountain Reservoir, and in the North Park area.

3.2.5 Fish and Wildlife Resources

Aquatic Resources

Fish and other aquatic resources are critical resources to humans and, as such, have influenced the development, status, and success of social and economic systems in the western U.S. Aquatic organisms, such as insects and other aquatic invertebrates, provide food for fish. The health of fish and other aquatic organisms is often indicative of the health of the watershed.

Wildlife and Terrestrial Habitat

Public lands in the Planning Area sustain an abundance and diversity of wildlife, including insects, birds, and mammals, and wildlife habitat. These public lands provide a permanent or seasonal home for numerous species of amphibians, reptiles, birds, including migratory birds protected under the Migratory Bird Treaty Act, and mammals. Wildlife populations are found in areas where their basic needs, such as food, shelter, water, reproduction, and movement, are met. The area in which the needs of a particular population are met is referred to as habitat. Many animals have special behaviors and physical traits that allow them to successfully compete with other animals in only one or a few habitats; many Threatened and Endangered Species fall into this category. Other animals, such as mule deer, coyote, and American robin, are less specialized, and can use a wider range of habitats.

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

- **structure –** shape, height, density, and diversity of the vegetation and other general features of the terrain.
- **vertical layers –** layers of vegetation (such as herbaceous, shrub, and forest canopy).
- **horizontal zones –** vegetation and other habitat features that vary across an area.
- **complexity –** an integration of vertical layers and horizontal zones.
- **edge –** the area where two types of vegetative communities meet (such as a forest and shrub community).

- **special features –** unique habitat features needed for survival or reproduction, including snags (dead trees), water, and rock outcrops (Cooperrider 1986).

BLM-managed public lands in the Planning Area are important habitat for many types of wildlife, including some Threatened, Endangered, or Sensitive Species. Wildlife, and their habitat, are impacted by a variety of uses (such as timber harvesting, grazing, recreation), and by natural events (such as wildfire and insects). Special management attention may be needed in order to restore, maintain or enhance priority species and their habitats. Integrating habitat management with other resource programs requires careful planning to minimize impacts to wildlife species and to their habitats.

The BLM is responsible for managing habitats for fish and wildlife communities; the BLM is not directly responsible for managing fish and wildlife populations. Responsibility for direct population management belongs to USFWS and to the Colorado Parks and Wildlife (CPW). The BLM is indirectly responsible for the health and well-being of fish and wildlife populations that are supported by the habitats under the management of the BLM. The BLM works cooperatively with the USFWS and the CPW to manage wildlife habitats on BLM-managed public lands. In addition, the BLM is mandated to ensure that Special Status Species are protected in accordance with the Endangered Species Act (ESA), the BLM's Land Use Planning Handbook (BLM 2005a), BLM Manual 6840, Special Status Species Management (BLM 2008o), and all other applicable laws, rules, regulations, policies, standards, and guidelines. This goal is furthered through a Memorandum of Agreement (MOA) with USFWS and the USFS.

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

Guidelines for Livestock Grazing Management are the management tools, methods, strategies, and techniques (such as BMPs) designed to maintain or achieve healthy public lands as defined by the standards. Currently, the only guidelines for BLM Colorado that have been developed in concert with the RACs are livestock grazing management guidelines. See Appendix J for a complete description of each of the eight guidelines.

Proper Functioning Condition (PFC) is another method used to evaluate habitat of streams and water bodies. Information on the condition of these riparian areas and wetlands is available from PFC assessments that have been conducted since 1993. Many of these PFC assessments have been conducted as part of land health assessments on various landscapes in the Decision Area. The PFC assessment approach is discussed in Section 3.2.4 Vegetation Resources.

Current Conditions

Fish and Aquatic Wildlife

Coldwater Sport and Native Fish

The Planning Area contains many cold-water species of fish, including the mottled sculpin, mountain sucker (*Catostomus platyrhyncus*), creek chub (*Semotilus atromaculatus*), Johnny darter (*Ethostoma nigrum*), fathead minnow, long-nose dace (*Rhinichthys cataractae*), bluehead sucker (*Catostomus discobolus yarrow*), the flannelmouth sucker *(Catostomus latipinnis*), and round-tailed chub (Gila robusta).

Middle Park and North Park contain several large reservoirs, including Lake John and Delaney Lakes in North Park, that provide important recreational fisheries. Rainbow trout (*Oncorhynchus mykiss*) and kokanee salmon (*Oncorhynchus nerka*) are the two major fish species that occur in the reservoirs. Other sport fish found in the reservoirs are lake trout (*Salvelinus namaycush*), brown trout (*Salmo trutta)*, cutthroat trout (*Oncorhynchus clarki*), Northern pike (*Esox lucius*) and splake (*Salvelinus namaycush*). Lake John and Delaney Lakes contain populations of brown trout, rainbow trout, and cutthroat trout. Most of these sport fish populations are maintained by CPW stocking programs.

Of the five trout species found in the Planning Area, two are native species: the Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) and the Greenback cutthroat trout (*Oncorhynchus clarki stomias*). The Greenback cutthroat trout is federally Threatened, and the Colorado River cutthroat trout is listed as a BLM Sensitive Species. These species are discussed further in Section 3.2.6 Special Status Species.

Invasive/Non-native/Competitive Fish

The other three species of trout (brook trout, rainbow trout, and brown trout), are considered competitive non-native species in the Planning Area. Rainbow trout are especially prevalent in the reservoirs located in the Planning Area, as discussed above. The three trout species are all cold-water species. The long-nose sucker (*Catostomus catostomus*) and white sucker (*Catostomus commersonii*) are found in warm and cool water habitats, and are also considered invasive, non-native, or competitive species in the Planning Area.

Amphibians

Four species of amphibians are found in the Planning Area: the Western Chorus Frog (*Pseudacris triseriata*), wood frog (*Rana sylvatica*), boreal toad (*Bufo boreas boreas*) and the northern leopard frog (*Rana pipiens*). All but the Western Chorus Frog are Special Status Species, and are discussed in Section 3.2.6 Special Status Species.

Aquatic habitats in the Planning Area consist of both lentic (ponds and lakes) and lotic (streams and rivers) systems. Not all of the perennial aquatic habitats support fish, although it is likely that most of the perennial waters in the Planning Area support an abundance of aquatic insects. The Decision Area contains 181 miles of perennial streams; 2,100 acres of lakes; and 800 acres of wetland systems. Of the 181 miles of perennial streams, 151 miles are fish-bearing streams and rivers. In addition, 1,200 miles of fish-bearing streams are located on State, private, National Wildlife Refuge, and National Forest System lands in the Planning Area. In these aquatic systems, the diversity of habitats and differing elevations where the aquatic systems are found dictate the presence of a diverse array of fish and amphibian species. The fisheries in the Planning Area are depicted on Map 3-5, Fisheries.

Wildlife

The terrestrial wildlife species are primarily birds, amphibians, and mammals. Adequate populations of terrestrial invertebrates are assumed when populations of the vertebrate groups that prey on invertebrates are healthy. The land health assessments, as well as data from the Rocky Mountain Bird Observatory, the Colorado Natural Heritage Program (CNHP), and GIS data maintained by the CPW, provide information on the distribution of terrestrial wildlife in the Planning Area. In addition, the CPW maintains statistics on big game harvests, recreational use days, and population trends. Wildlife species of primary interest in the Decision Area are provided in Table 3-10.

Table 3-10: Wildlife Species of Primary Interest in the Decision Area

Species	Rationale for Priority Designation
Birds	
Golden eagle	High interest and protected by law
Upland game birds	Economic and recreational value
Great blue heron	Protected by law and uses concentrated nesting areas
Ducks, geese, and other waterfowl	Economic and recreational value
Migratory birds	High interest and protected by law
Other raptors (prairie falcon, red-tailed hawk, goshawk)	High interest; protected by law, apex predators
Mammals	
Bighorn sheep	High economic and recreational value
Black bear	High interest, economic and recreational value
Elk	High interest, economic and recreational value
Moose	High interest, economic, and recreational value
Mule deer	High economic and recreational value
Mountain lion	High interest, economic and recreational value

Table 3-10: Wildlife Species of Primary Interest in the Decision Area

Species	Rationale for Priority Designation
Pronghorn antelope	High economic and recreational value
River otter	High interest and protected by law

Source: BLM 2007k

Waterbirds

The numerous streams, rivers, reservoirs, ponds, and associated riparian area and wetlands vegetation provide excellent habitat for a wide variety of waterfowl and shorebirds. Great blue herons (Ardea Herodias), mallards (Anas platyrhynchos), pintails (Anas acuta), gadwalls (Anas strepera), green-winged teal (Anas crecca), and American wigeon (Anas Americana) are common throughout the aquatic habitats in the Planning Area. Waterfowl production also occurs throughout the Planning Area. North Park is especially important because it is second only to the San Luis Valley in its annual production of ducks (USFWS 2004). Killdeers (Charadrius vociferus), American avocets (Recurvirostra americana), willets (Tringa semipalmata), and Wilson's phalaropes (Phalaropus tricolor) are among the more common species found in the Planning Area.

Upland Game Birds

Upland game birds common to the Planning Area are dusky grouse (Dendragapus obscurus), Columbian sharp-tailed grouse (Tympanuchus phasianellus columbianus), and Greater Sage-Grouse (Centrocercus urophasianus). Dusky grouse are widely distributed throughout the woodlands and mountain meadows at higher elevations. Population estimates are unavailable at this time, because dusky grouse are extremely difficult to count accurately. Greater Sage-Grouse (Centrocercus urophasianus) occupy the sagebrush-dominant rangelands at lower elevations throughout the Planning Area. Columbian sharp-tailed grouse and Greater Sage-Grouse are discussed further in Section 3.2.6 Special Status Species.

Migratory Birds

The Planning Area supports a wide variety of migratory bird species during the summer and winter, or as they migrate through the area. The habitat diversity provided by the broad expanses of sagebrush, mixed mountain shrub, aspen, pinyon-juniper woodlands, coniferous forests, and riparian areas and wetlands support many species. The most abundant species found in the Planning Area include the mourning dove (Zenaida macroura), common nighthawk (Chordeiles minor), horned lark (Eremophila alpestris), sage thrasher (Oreoscoptes montanus), green-tailed towhee (Pipilo chlorurus), sage sparrow (Amphispiza belli), and Brewer's sparrow (Spizella breweri). Populations of some of these species are declining for many reasons, including habitat loss and fragmentation. Land use and management practices, occurring on both public and private lands, that lead to permanent changes in habitat could, in part, be responsible for population declines.

Raptors

Raptors in the Planning Area include eagles, falcons, hawks, and owls. Raptors serve as important indicators of overall ecosystem health because they are apex predators and are, therefore, present in smaller numbers than their prey. Prairie falcons (Falco mexicanus), red-tailed hawks (Buteo jamaicensis), osprey (Pandion haliaetus), northern harriers (Circus cyaneus), golden eagles, and Swainson's hawks (Buteo swainsoni) are the more common raptor species breeding and nesting in the Planning Area. Precipitous rock formations, large trees, and mountain meadows provide suitable nesting habitat for these species, and the numerous songbirds and small mammal populations provide the primary prey base. Woodland nesting species, such as goshawks (Accipiter gentilis), Coopers hawks (Accipiter cooperii), and sharp-shinned hawks (Accipiter striatus), are common in the forested areas.

Cavity-Nesting Birds

Cavity nesting species are those species of birds that excavate nesting holes, and use existing cavities from decay, or cavities created by other species in dead or decaying species. Historically, dead or decaying trees (called snags), have been considered undesirable by forest managers. They are now, however, being recognized as important components to forested areas. Some 85 species of birds are considered cavity nesters, including migratory birds, raptors, and waterfowl (Scott et al. 1977). Some of the cavity nesters known to occur in the Planning Area include the tree swallow (Sialia Mexicana), barn owl (Tyto alba), and the common goldeneye (Bucephala clangula).

Big Game Species

The three primary big game species found in the Planning Area are Rocky Mountain elk (Cervus elaphus nelson), pronghorn antelope (Antilocapra Americana), and mule deer (Odocoileus hemionus). Bighorn sheep (Ovis canadensis) and moose (Alces alces) occur in more limited numbers, and habitat is not extensively managed for these species. Table 3-11 depicts big population status by management areas in the KFO.

Table 3-11: Big Game Population Status in the KFO

Species	DAU	DAU Plan Year	GMUs	Population Estimate*	Population Trend	Male: Female Estimate*	Population Objective	Male: Female Objective
Mule Deer	D3 North Park	2002 (data updated 2012)	6, 16, 161, 17, 171	4,067	Decreasing	44:100	5,400-6,000	30-40:100
	D4 Red Feather/ Poudre Canyon	2006	7, 8, [9, 19, 191]	7,300	Stable	34:100	10,000-12,000	25-30:100
	D8 State Bridge	2009 (data updated 2011)	15, 36, 361 [35, 45]	14,757	Decreasing	30:100	13,500-16,500	26-30:100
	D9 Middle Park	2009 (data updated 2011)	18, 181, 27, 28, 371	15,353	Stable	42:100	10,500-12,500	30-35:100
Elk	E3 North Park	2008 (data updated 2012)	6, 16, 161, 17, 171	8,101	Stable	29:100	4,000-4,500	20-23:100
	E4 Red Feather/ Poudre Canyon	2009	7, 8, [9, 19, 191]	3,750	Decreasing	40:100	3,600-4,200	30-35:100
	E7 Gore Pass	2004	15, 27	4,133	Decreasing	18:100	4,000-5,000	24-28:100
	E8 Trouble-some	2010 (data updated 2011)	18, 181	4,915	Decreasing	26:100	3,600-4,300	21-26:100

Table 3-11: Big Game Population Status in the KFO

Species	DAU	DAU Plan Year	GMUs	Population Estimate*	Population Trend	Male: Female Estimate*	Population Objective	Male: Female Objective
	E12	1998 (data updated 2011)	36, [35, 361]	3,761	Not Available	34:100	2,950	16:100
	E-13 Williams Fork	2010 (data updated 2011)	28, 37, 371	5,023	Decreasing	38:100	4,700-5,500	21-31:100
Moose	M1 North Park	2008 (data updated 2012)	6, 16, 17, 161, 171	589	Increasing	82:100	500-600	60-70:100
	M2 Laramie River	2006	7, 8, [19, 191]	150-200	Increasing	55:100	200-250	70-85:100
	3 Middle Park	(data updated 2011)	18, 28, 36, 37, 181	350	Not Available			
Pronghorn	A3 North Park	2004 (data updated 2012)	6, 16, 161, 17, 171	989	Decreasing	32:100	1,500-1,600	30-40:100
	PH36 Laramie River	2009	7, 8	600	Stable	22:100	600	20-25:100
	A37 Middle Park	1999 (data updated 2011)	18, 181, 27, 28, 37	620	Stable	33:100	630	40:100

Table 3-11: Big Game Population Status in the KFO

Species	DAU	DAU Plan Year	GMUs	Population Estimate*	Population Trend	Male: Female Estimate*	Population Objective	Male: Female Objective
Rocky Mtn Bighorn Sheep	RBS-2 Never Summer	Pending	S19	200 inside RMNP, 25 outside RMNP available to hunters	Decreasing	Not enough data to estimate	Pending	Pending
	RBS-37 Zirkel	None	S73	50-75	Increasing	75:100 (2012)	None	None
	RBS-1, RBS-2	Not Available	S1, S18, S37, S40	Not Available				

*Post-hunting season estimate (modeled) using the best available data. Numbers can change from year to year. Units in [ ] are outside the KFO.
Source: CDOW 2012.

During the summer, mule deer and elk occupy higher elevations, usually forested habitat. In the winter, they migrate to sagebrush-dominant ridges and south-facing slopes at lower elevations. BLM-managed public lands provide most of the winter range available to deer and elk. Critical winter ranges for elk, mule deer, and pronghorn antelope are essential to the survival of these species in the Planning Area. Typically, mule deer concentrate in the winter along Sheep Mountain, North Sand Hills, the western foothills of the Medicine Bow Mountains, and in the lower elevations of Middle Park. Antelope use the sagebrush-dominant ridges and valleys, and usually occupy BLM-managed public lands in North Park and Middle Park year-round. In the winter, pronghorn concentrate in the lower elevations of Middle Park, east of Wolford Mountain, north of the Arapahoe National Wildlife Refuge (around Cowdrey), and in the Laramie River Valley. Summer, winter, and critical winter ranges in the Planning Area for these species are shown on Map 3-6, KFO Elk Summer Range and Calving Areas; Map 3-7, KFO Elk Winter Range; Map 3-8, KFO Mule Deer Summer Range; and Map 3-9, Mule Deer Winter Range.

There is overwhelming evidence that deer experience competitive interactions with livestock and elk. The magnitude of these impacts, in terms of deer productivity, is poorly understood. The extent to which cattle, sheep, or elk may be responsible for observed declines in deer populations is unknown. The need for additional understanding of simultaneous foraging relationships among deer, elk, and livestock is evident from several studies published within the past few years. Beck and Peek (2005) evaluated interactions among cattle, sheep, deer, and elk on summer range in northeastern Nevada. Dietary overlap was lowest between deer and cattle, consistent with past research. Deer diets comprised 30 percent browse; 64 percent to 72 percent forbs; and 2 percent to 5 percent grasses. Cattle diets comprised less than 92 percent grasses. The potential for competition was higher between deer and sheep, and deer and elk. Overall, the potential for ungulate forage competition was highest for forbs in aspen communities. As a result, monitoring forbs was identified as the key component of a multi-species grazing management system in this area. In Wyoming, Torstenson *et al*. (2006) found elk and cattle diets to be dominated by grasses, while mule deer consumed more forbs and shrubs. The greatest dietary overlap during spring occurred between mule deer and elk, and between elk and cattle during multiple seasons. Findholt *et al.* (2004) observed considerable dietary overlap among mule deer, elk, and cattle, indicating a potential for competition. Overlap between elk and deer was consistently around 60 percent under various grazing history scenarios. Sandoval *et al.* (2005) evaluated elk and mule deer diets in north-central New Mexico where livestock grazing had been absent for 60 years. They observed an overall dietary overlap of 64 percent between deer and elk, indicating a high potential for competition.

Mule deer in the Planning Area are managed under CPW Data Analysis Units (DAUs) 3, 4, 8, and 9. Most of the DAUs are meeting the objectives set forth by the CPW. The exception is DAU 4, where the population of mule deer is approximately half of the population objective. Elk in the Planning Area are managed by the CPW in DAUs 3, 4, 7, 8, 12, and 13. These populations are all stable, or increasing, and meet the population objectives.

Moose and bighorn sheep occur in more limited numbers in the Planning Area. Moose concentrate in the Laramie River Valley area, northeast Grand County (along major streams and water bodies, including the Colorado River, the Williams Fork River, Troublesome Creek, and the Upper Muddy Creek), and in Jackson County (along major rivers and their tributaries, such as the Michigan River and the Illinois River,) See Map 3-10, Moose Range. Bighorn sheep occur primarily on National Forest System lands and National Park Service (NPS) lands in Rocky Mountain National Park, although this species is known to use BLM-managed public lands in certain areas. Habitat that supports bighorn sheep is primarily pinyon-juniper woodlands and adjacent mountain shrub habitat, where topography plays the most important role in the locations used by this species. See Map 3-11, Bighorn Sheep Range.) In 2009, habitat on BLM-managed public lands and State lands along Trough Road (near Inspiration Point) were improved in preparation for the release of bighorn sheep. In January 2009, 14 sheep were released (all but one were fitted with radio collars). Releases will continue, depending on the availability of animals, until herd objectives are met. In addition, Bighorn sheep have been reintroduced into the Red Canyon area in North Park and may use portions of Sheep Mountain. Moose are managed in the Planning Area by the CPW in DAUs 1, 2, and 3. These populations are increasing, and are within the population objective range.

Other Priority Mammal Species

Several other priority mammal species are found in the Planning Area. They include black bear (Ursus americanus), mountain lion (Felis Concolor), and river otter (Lutra Canadensis). Black bears and mountain lions occur within all habitat types, and the documented overall range for black bears encompasses much of the Planning Area See Map 3-12, Black Bear Range. Summer and fall concentrations in North Park occur between Owl Mountain and Gould Mountain, and in most of northwest Larimer County, especially around Bull Mountain. In the Middle Park region, summer concentrations are along Rabbit Ears Range, Fort Creek, and Willow Creek. In the fall, they migrate to various areas in Middle Park, including, the Troublesome, Grouse Mountain, Drowsy Water, McQuery Gulch and Tyler Mountain. The overall range of the mountain lion is mapped as the entire Planning Area, with the exception of the interior of Jackson County. See Map 3-13, Mountain Lion Range. River otters occur in all major rivers and most of the tributaries in the Planning Area. See Map 3-14, River Otter Range.

Other predatory species known to reside in the Planning Area include coyotes, bobcats, and fox. These species occur within all habitat types, with coyotes being the most habitat-general species. Additionally, an undetermined number of small mammals reside in the Planning Area, including ground squirrels, mice, chipmunks, rabbits, skunks, and raccoons. Many of these small mammals provide the main prey for raptors and larger carnivores.

Habitat Used

Terrestrial Habitats

Terrestrial species use all the vegetation types discussed in Section 3.2.4, Vegetation Resources, and, except for species that are associated with a narrow habitat type (extreme habitat specialists), they tend to respond to the aspect and character of a habitat. Habitat is shaped by vegetation, topography, precipitation, soil type, and elevation, which ranges from 7,000 feet to 11,000 feet. The Planning Area is composed of the following eight primary habitat types:

1. sagebrush, which covers approximately 247,064 acres (65 percent) of the Planning Area;
2. coniferous forest (including lodgepole and Ponderosa pine, Engelmann spruce, Douglas-fir, and subalpine fir), which covers approximately 76,743 acres (21 percent) of the Planning Area;
3. aspen habitat, which covers approximately 20,996 acres (6 percent) of the Planning Area;
4. pinyon-juniper woodlands, which cover approximately 17,256 acres (5 percent) of the Planning Area;
5. grasslands, which covers approximately 6,881 acres (2 percent) of the Planning Area;
6. developed or barren habitats, which cover approximately 3,861 acres (less than 1 percent) of the Planning Area;
7. mixed mountain shrub and oak, which covers approximately 451 acres (less than 1 percent) of the Planning Area; and
8. riparian areas/wetlands habitat, which covers approximately 108 acres (less than 1 percent) of the Planning Area.

The current condition of wildlife habitats varies across the landscape. Some habitat is altered by power lines, pipelines, fences, public recreation use, residential and commercial development, vegetative treatments, livestock and wild ungulate grazing, oil and gas development, and roads (authorized, unauthorized, paved, and unpaved). These human uses contribute to the degradation of habitat quality, the fragmentation of habitat for several species, and the expansion of areas that support noxious and exotic vegetative species. Natural geology also plays a role in some areas, as do regional climatic conditions. Areas with favored browse species (such as bitterbrush, aspen regeneration, snowberry, serviceberry, and winterfat) or that are important big game winter range, have heavier use levels or poorer vigor than areas where these features are lacking or inaccessible due to steep slopes or snow depths. The extreme cold temperatures and arid climate of the Planning Area are not conducive to cold-blooded animal survival. These species are apparently widespread in distribution, but few in numbers. The discussions of aquatic and terrestrial habitat below identify attributes of these resources that are especially important to their role in providing fish and wildlife habitat.

In summary, the condition of wildlife habitat varies across the Planning Area. In some areas, habitats have been fragmented and degraded by human encroachment and activities. In other areas, wildlife habitat is in good condition, providing productive habitat for several wildlife species. Many sagebrush stands, which also provide important critical winter habitat for big game, are in good condition. In 2009, approximately 70 percent of BLM-managed public lands in the Planning Area had been evaluated for Public Land Health Standard 3 (healthy plant and animal communities). The areas not evaluated include Category C allotments and areas not included in grazing allotments. Both of these areas will be a focus for evaluation in the future. As a result, the discussion in this section, which is based upon the land health assessments, may not entirely reflect habitat conditions throughout the entire Planning Area.

Sagebrush – Sagebrush steppe vegetation is widely recognized as an important vegetative type for a variety of wildlife species, providing year-long habitat for some species and critical winter habitat for others. Numerous species of songbirds, small mammals, and birds of prey depend upon the sagebrush during the breeding season; others, such as mule deer, Rocky Mountain elk, and pronghorn, obtain food and cover during critical winter periods.

Many of the lower-elevation, Wyoming big sagebrush communities, which comprise the bulk of mule deer winter range, are old and decadent with moderate to severe hedging and have poor-to-fair diversity of cover of herbaceous species. Higher-elevation sagebrush sites (Mountain big sagebrush and subalpine sagebrush) may be even-aged and have a dense canopy cover in much of the KFO, but are generally not decadent and still support a good cover and composition of herbaceous species. Wildlife hedging, combined with drought and other stress factors, contributes to the decadence and lack of recruitment in many sagebrush communities. Other sagebrush communities are at risk from invading pinyon pine and juniper trees that will eventually crowd out the shrubs. Pinyon and juniper encroachment is occurring mostly in the Radium Basin and is not a threat on most of the BLM-administered public lands in Middle Park or North Park**.** Lack of fire, or other disturbance, seems to be contributing to a condition of extensive homogeneous stands of mature to over-mature shrubs and trees, with a decline in cover and productivity of shrubs and herbaceous vegetation. Habitat quality and usability for sagebrush-dependent species have declined in these areas. These sites are still meeting Public Land Health Standards, although some type of treatment to remove encroaching pinyon and juniper trees will be necessary in the near future in order to sustain the health of the land.

Pinyon-Juniper Woodland – Pinyon-juniper woodlands provide important foraging and nesting habitat for some raptor species, as well as for many migratory songbirds. They also provide security, forage, and thermal cover for a variety of small game, big game, and non-game wildlife. Pinyon-juniper habitats vary in condition in the Planning Area. Many sites consist of mature-to-old trees with a sparse herbaceous understory. Other stands have a fairly good cover of native grasses and forbs. Understory shrubs are also lacking in many areas and, where present, are generally in poor-to-fair condition. Shrubs are old, decadent, and severely hedged with little or no recruitment. Localized areas have light-to-moderate cheatgrass infestations, which are closely associated with surface disturbances, such as roads or areas that have been logged.

Mixed Mountain Shrub – Mixed mountain shrub are important to turkey, black bear, mule deer, and elk, among other wildlife species. Generally, mixed mountain shrub habitats exhibit good-to-excellent diversity and productivity of shrubs, grasses, and forbs. Many sites are almost completely covered by vegetation or litter. Generally, understory vegetation is diverse and productive, with a good native perennial grass and forb component.

Aspen – Aspen are important habitats for a variety of species, including big game, turkeys, dusky grouse, black bears, and rabbits. Aspen provide security, forage, and thermal cover, as well as birthing and nursing habitat for big game, and nesting habitat for some species of raptors and cavity-nesting birds. Generally, aspen stands are in good condition, with good productivity in the herbaceous understory. Some stands are dominated by older trees, with low recruitment or regeneration of clones. Fire suppression is likely one of the main factors that has limited regeneration of aspen.

Coniferous Forest – Lodgepole pine and spruce-fir stands provide security, thermal cover, and bedding habitat for big game; and are important for cavity-nesting birds, some raptors, and many owl species. Snowshoe hare, red squirrels, and many other species of small mammals, as well as Canada lynx, prefer these habitats. Mapped Canada lynx habitat exists within the conifer portions of the Planning Area. See Section 3.2.6 Special Status Species.

.

Conifer stands in the Planning Area have been heavily infested with bark beetles. In particular, mature lodgepole stands have been hard hit by the MPB, with approximately 85 percent to 95 percent of the trees either dead or dying. Within 15 years, approximately 90 percent of the trees killed by the MPB will have fallen, making it difficult for larger animals to move through the stands. In areas that are accessible to wildlife, increased forage due to lack of competition and increased sunlight will have a notable impact on big game and the grazing of livestock. Future conditions of stands affected by MPB will be similar to previous harvested stands. As the seedlings grow, the trees will have little vertical diversity, and will be of a similar age and size class. In those cases, the understory is usually less productive due to the closed canopy, which reduces sunlight and limits plant growth in the understory.

Riparian – Riparian areas and wetlands consist of plant communities associated with streams and rivers. The structure, food, and water provided in riparian areas and wetlands make them the single most diverse and productive habitat for wildlife. Where site potential allows, multi-canopy riparian areas and wetlands with trees, shrubs, grasses, forbs, sedges, and rushes are exceptionally valuable as habitat for a wide array of wildlife species, including neo-tropical migrant birds (species that breed in North America and over-winter in Central and South America). Riparian areas and wetlands dominated by herbaceous communities, and with low potential for multi-canopy structure, are nevertheless important as water and succulent food sources for wildlife. Generally, the presence of multiple-aged classes of woody and herbaceous vegetation indicates healthy wildlife habitat conditions. Riparian habitats or wetlands in non-functioning (NF) or functional-at-risk (FAR) condition provide decreased wildlife habitat values, as a result of erosion, lowered water table, or degraded vegetation composition or structure.

Grasslands – Grasslands are important for many ground-nesting and burrowing birds, such as burrowing owl and vesper sparrow. In addition, small mammals such as the northern pocket gopher and western harvest mouse, use grasslands for forage and burrows. Birds of prey, such as prairie falcon and Swainson's hawk, forage on the small mammals in this habitat (Wildlife Action Plan Team 2006; NatureServe 2008).

Developed and Barren – The conversion of native habitat to developed lands creates many adjustment challenges for the native wildlife community, and most often results in eventual displacement. Developed landscapes are, however, repopulated by new wildlife communities capable of exploiting the ancillary benefits of human civilization. Lizards and snakes populate suburban open space through corridors leading to the wildland urban interface (WUI) margin, and common amphibians have adapted to developed landscapes where ample water is present (Wildlife Action Plan Team 2006; NatureServe 2008).

Agricultural lands contribute to wildlife conservation in three basic conditions: flooded fields, unharvested hay, and fallow fields. Flooded fields are visited by a host of bird species that feed on the invertebrates displaced or drowned by the flooding. Unharvested hay, whether grass or alfalfa, is used by nesting birds, such as vesper sparrows. Generally, fallow fields tend to attract ground squirrel colonies and, if left undisturbed for long periods, experience a build-up in the rodent population that attracts a host of predatory raptors, including prairie falcon and ferruginous hawk (Wildlife Action Plan Team 2006; NatureServe 2008).

Roosting and nesting swallows, swifts, golden eagles, and prairie falcons, along with many other bird species, use rock complexes in mountainous areas. These rocks also provide important cover for large mammals (such as bighorn sheep, mountain lions, and bobcats) and for small mammals (such as ground squirrels, wood rats, rabbits, and marmots).

Characterization

Indicators

Primary indicators of health of terrestrial animals are their population numbers, the condition of the individuals that make up these populations, the age structure represented within the population, and the population's distribution relative to its historic range. These are the types of information that the CPW tracks for species of game animals and, increasingly, for key non-game species. The BLM, in managing the habitat for these populations, uses a different set of metrics, such as the condition of shrubs, forbs, and grasses that make up the habitat used by animal species. Indicators of condition include estimates of overall vegetation cover (in absolute terms) or a relative comparison between portions of the habitat that are available and unavailable to foraging animals. The vigor and production of individual plants and various plant indicators may also be evaluated. In evaluating plant indicators, species composition is assessed, as is the form of forage plants. The assessment of Public Land Health Standard 3 considers the presence of noxious weeds and other undesirable species, species composition, species and successional stage diversity, age, spatial distribution, and habitat connectivity and fragmentation for native plant and animal communities.

Trends

Fish

The Colorado Parks and Wildlife is the lead agency responsible for fisheries management of public waters in the State of Colorado. While some areas in the KFO are stocked by CPW, other areas are managed as wild, self-sustaining fisheries. The population of cold-water sport fish varies greatly across the Planning Area, although fish surveys and management reports generally indicate a stable to increasing population.

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

Wildlife

The Kremmling RMP was approved and implemented in 1984; wildlife population trends will be addressed using 1984 as a benchmark. Population estimates for l984 for a variety of important wildlife species are included in the 1984 RMP (BLM 1984b). The CDOW provided these estimates, which will be used as a baseline to establish population trends for the species for the period of 1984 through 2007, where data are available.

Certain species are of high interest to the CPW due to their economic and recreational values. The CPW, as a result of this high interest, maintains accurate population estimates for these species. Population estimates for other wildlife, such as Greater Sage-Grouse, are maintained due to the current interest in this species, and because its numbers are relatively easy to estimate each year as compared with other species (CDOW 2004). All of the species discussed below depend upon public land habitat managed by the BLM for at least part of their annual life cycle.

Waterbirds – Waterfowl and shorebird populations fluctuated greatly between 1984 and 2007 due to a variety of factors, including drought and loss of irrigated land, both of which influence the availability of wetland habitat. This group of birds is more dependent upon annual moisture than any other wildlife because they depend upon wetlands and open water habitat for breeding. Waterbird populations have been high during wet years and low during dry years. Due to these fluctuations, the population trend is stable, with no large measurable differences in 1984 and 2007 levels.

Upland Game Birds – The three important upland game bird species that inhabit the Planning Area are dusky grouse, Columbian sharp-tailed grouse, and Greater Sage-Grouse. Dusky grouse populations generally increase in years with favorable weather during the nesting season, and decrease during cold and wet nesting seasons. Habitat for this species has changed drastically since 1984 due to the mountain pine beetle epidemic. Dusky grouse winter in the high country, roosting and feeding in stands of Douglas fir and lodgepole pine. Thus, the Mountain Pine Beetle has caused a significant change in the winter habitat of this species. The current population of dusky grouse in the Planning Area is unknown; trends cannot be determined. Greater Sage-Grouse and Columbian sharp-tailed grouse are discussed further in Section 3.2.6 Special Status Species.

Migratory Birds – Migratory bird populations include all birds not considered in other narratives in this Section, and primarily involve songbirds that inhabit all habitat types in the Planning Area. Most information collected since 1984 was gathered from the sagebrush steppe habitat type. Since 1984, four intensive inventory efforts to assess bird species composition and use of the sagebrush steppe have occurred in Middle Park. Results of these efforts have indicated that the trend of migratory birds and their habitat is stable. The obligate bird species expected to be found in the sagebrush-habitat-type were documented in sufficient numbers to indicate a stable, or increasing, trend. Habitat conditions for these species were also stable. The vegetative composition and structure necessary to sustain breeding populations of the birds that use these habitats were present during the inventories, and continue presently.

Raptors – The Planning Area supports a variety of birds of prey, including kestrels, prairie falcons, peregrine falcons, Swainson's hawks, red-tailed hawks, Cooper's hawks, goshawks, and sharp-shinned hawks. The wide variety of habitats available in the Planning Area offers nesting and hunting habitat for these species. Inventory and monitoring efforts to assess the status of raptors in the Planning Area have been accomplished, periodically, since 1984. Nest sites have been located for most of the species listed, and then checked for nesting in subsequent years. Population trends for these species appear stable, with most suitable habitat occupied during the breeding season.

Golden eagles appear to be stable in numbers. Numerous active golden eagle nest sites occur on private and public lands in the Planning Area. In addition to breeding season, some golden eagles remain in the area year-round. Population levels throughout the Planning Area appear stable, as golden eagles can be readily observed in all vegetative types, especially during spring and summer.

Mammals – The CPW classifies all of the species described below as big game animals. These species are important due to the high level of public interest in them for their recreational value. The recreational opportunities provided by big game animals in the Planning Area equate to high economic value to the CPW, and to the economies of local communities.

Mule Deer – The Planning Area provides critical winter habitat for mule deer. Deer occupy nearly all public lands during part of the year, with winter use being the most significant. During winter, mule deer depend upon the sagebrush steppe and mountain shrub habitats for survival. Mule deer population levels grew from 1984 to 2007. Deer population levels were extremely low during the early 1980s, well below the carrying capacity of their habitat and below population objectives established by the CPW. In 1984, the mule deer population was estimated at approximately 3,000 in North Park; and at approximately 10,000 in Middle Park, including the Lower Colorado River drainage. In 2007, the mule deer population was estimated at approximately 6,140 in North Park and at approximately 16,260 in Middle Park, including the Lower Colorado River drainage. The 2007 population levels for deer are slightly above the CPW objectives for both North Park and Middle Park. The mule deer population in Larimer County was estimated at approximately 5,780 and was stable, but it is about half of the CPW objective.

Rocky Mountain Elk – As with mule deer, the Planning Area provides critical winter habitat for Rocky Mountain elk. Elk can tolerate deeper snow during winter, although most winter habitat is the sagebrush steppe-dominated lands where winter tends to be milder. Elk populations increased from 1984 to 2007. In 1984, the CDOW estimated the elk population at approximately 5,000 in Middle Park, and approximately 3,600 in North Park. By 2007, elk numbers had increased to approximately 10,140 in Middle Park; approximately 8,348 in North Park; and approximately 3,830 in Larimer County. Elk population numbers were somewhat higher in the late 1990s and early 2000, but liberal hunting seasons have helped reduce the numbers back down to the 2007 levels. The elk numbers are above the CPW objectives in Middle Park, North Park, and Larimer County. Due to the potential competition with domestic livestock for forage, the large increases in elk numbers from 1984 to 2007 were not always welcomed by the agricultural community, by land management agencies, or by the CPW.

Pronghorn – Pronghorn numbers steadily increased in the Planning Area from 1984 to 2007. Pronghorn have historically occupied North Park, although they have been only been year-long residents in Middle Park since the late 1970s. Pronghorn historically occupied Middle Park but, their numbers were decimated by market hunters in the late 1800s, and only rarely visited the area until the late 1970s, when migrants from North Park began to stay in Middle Park year-round. In 1984, the CDOW estimated pronghorn numbers to be approximately 200 in Middle Park, and approximately 800 in North Park. In 2007, the CDOW estimated pronghorn numbers at approximately 620 in Middle Park; approximately 1,410 in North Park; and approximately 600 in Larimer County. In Middle Park, pronghorn numbers were slightly above the CDOW objectives, and were within objectives for North Park and Larimer County.

Moose – Moose were introduced into southeast North Park in the late 1970s, and this population has continued to expand both their range and their numbers. Moose use the Planning Area only occasionally, mostly in riparian areas and wetlands habitats on National Forest System lands. In 1984, the moose population was estimated at approximately 200 in North Park, and 0 in Middle Park. By 2007, the moose population had increased to approximately 640 in North Park, and approximately 260 in Middle Park.

Rocky Mountain Bighorn Sheep – Bighorn sheep were reintroduced into the Red Canyon area in North Park, and were released in Middle Park in 2009. Releases will continue, depending on the availability of animals, until herd objectives are met. The sheep in North Park occupy a tract of BLM-managed habitat in the western portion of North Park and may use portions of Sheep Mountain. In Middle Park, Bighorn sheep were introduced near the mouth of Gore Canyon, where they are likely to occupy BLM-managed public lands in the release site area during winter. The trend for this species is likely to be increasing, assuming the reintroductions are successful.

Black Bear and Mountain Lion – Population estimates for these species are lacking due to the difficulty in counting them accurately. Recently, biologists for the CPW indicated that populations of these species are stable, and likely increasing (Martens 2006; Yost 2006).

Trends

Habitat

The trends exhibited by wildlife habitat have a solid foundation in the public land health assessments that are being completed for nearly all of the landscapes in the Planning Area. Beginning in 1998, approximately 236,200 acres of public lands in the Planning Area have been evaluated using the BLM Standards (BLM 1997a). Application of these Standards is the primary tool for evaluating the condition and trend of wildlife habitat in the Planning Area. The land health assessments indicate that most of all public lands in the Planning Area were meeting the Standards for Public Land Health. Of the 236,200 acres of habitat assessed, only 12,800 acres, or 5 percent of the total assessed acreage, were not meeting the Public Land Health Standards. The team of BLM resource specialists who conduct the assessments concluded that livestock and wild ungulate overgrazing, primarily of grasses and forbs, was the primary reason that these Standards were not being met. These areas suffer a loss of vegetative diversity and productivity, which adversely affects wildlife habitat. Other reasons for failure to meet the Standards include the following:

- OHV and other human recreation use, which result in habitat fragmentation, loss of habitat, and wildlife abandonment in areas as a result of increased human activity;
- oil and natural gas development, which results in habitat fragmentation, loss of habitat, and wildlife abandonment in areas as a result of increased human activity;
- physical loss of habitats on private lands in the area resulting from development, which reduces the continuity and value of habitat located on BLM-managed public lands;
- lack of fire, which allows for juniper encroachment and loss of sagebrush habitat;
- drought, which results in poor productivity and vigor of vegetation; and
- dominance of undesirable and weedy species, most notably cheatgrass.

The trend of the assessed habitat in the Planning Area is stable, where most habitat is in a desirable condition or is at least headed in that direction. Most assessed lands were determined to be meeting public land health standards, based upon the composition, structure, and vigor of the vegetation. The species of wildlife, and their population levels, expected to occupy the assessed habitat were either observed during evaluations or were documented by discussions with the CPW, livestock operators, or with others familiar with the assessed areas.

3.2.6 Special Status Species

Special Status Species include animal or plant species that are formally designated by the USFWS as federally Endangered or Threatened, Proposed for listing, or are Candidates. They also include those species designated by the CPW as State Endangered or Threatened Species, and those identified as the BLM Sensitive Species in the State of Colorado.

The ESA requires that Federal agencies ensure, in consultation with the USFWS, that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any Endangered and Threatened Species, or result in the destruction or adverse modification of habitat of such species that is determined critical by the USFWS. There are three effect (impact) determinations for consultation:

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

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

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

Species discussed in this Section have been listed by the USFWS or by the State of Colorado, or have been placed on the BLM's Colorado State Director's Sensitive Species List. The USFWS manages Threatened and Endangered Species and designated critical habitat, in cooperation with other Federal agencies, to support recovery. The BLM cooperates with the USFWS to determine and manage habitats to support the species. Candidate species are managed in a manner designed to maintain viable populations, with the objective of preventing the need for them to be listed by the Federal government. Under the ESA, federally listed Threatened and Endangered Species require specific management. The ESA requires a consultation with the USFWS (a Section 7 Consultation) on any actions taken that are planned to occur where these species reside. There are 48 federally Endangered, Threatened, BLM Sensitive, and BLM Species of Concern in the Planning Area.

The BLM Special Status Species Manual (Manual 6840; BLM 2008l) defines Special Status Species as:

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

All Federal Candidate Species, Proposed Species, and Delisted Species in the 5 years following delisting, will be conserved as BLM Sensitive Species. Species designated as BLM Sensitive Species must be native species found on BLM-managed public lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either:

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

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

Current Conditions

The Planning Area contains suitable habitat for, and documented populations of, 48 Special Status Species. Information on these species, their habitats, and their listing status is included in Table 3-12.

Some fish, plant and bird species described in the sections below do not occur in the Planning Area. Their descriptions are included because water depletions in the South Platte River (Jackson County) or the Upper Colorado River Basin may affect the species or critical habitat in downstream reaches beyond the Planning Area or in other States. Refer to Table 3-12 for the species affected by these depletions.

The distribution of most of the Special Status Species in the Planning Area is known, generally, as the result of land health assessment comments, CNHP and CPW GIS data, the Rocky Mountain Bird Observatory, field surveys, and other reports. Inventories have been completed for some of the listed plant, fish, and wildlife species. Specific management direction to influence habitat components leading to species recovery is integrated into BLM management plans. No critical habitat has been designated for any species in the Planning Area.

Table 3-12: Special Status Fish, Wildlife, and Plant Species in the KFO Planning Area

Species	Status	Likelihood of Occurrence	Species	Status	Likelihood of Occurrence
PLANTS					
North Park phacelia	FE, G1/S1	C	Western prairie fringed orchid▲	FT, G3/S2	U
Osterhout milkvetch	FE, G1/S1	C	Harrington beardtongue	BLM-S; G3/S3	C
Penland alpine fen mustard	FT, G4/S1S2	U	Boat-shaped bugseed	BLM-S; G1?/S1	C
Penland beardtongue	FE, G1/S1	C	Pale blue-eyed grass	BLM-S, G2G3/S2	C
			Fragile rockbrake	BLM-S, G5/S2	C
BIRDS					
Bald eagle	ST; G5/S1B,S3N	C	Columbian sharp-tail grouse	BLM-S, SC	P
Least tern▲	FE, SE, G4/S1B, S3N	U	Ferruginous hawk	BLM-S, SC, G4/S2B,S4 N	P
Mexican spotted owl	FT, ST, G2/S1B	P	Greater sage-grouse	BLM-S, C, SC, G4/S4	C
Piping plover▲	FT, ST, G3S1B	U	Long-billed curlew	BLM-S, SC, G5/S2B	P
Whooping crane▲	FE, SE, G1/SNA	U	Mountain plover	PT, BLM-S, SC, G2/S2B	P
Western yellow-billed cuckoo	BLM-S, C, SC, G5/SNA	P	Northern goshawk	BLM-S, G5/S3B	C
American peregrine falcon	BLM-S, SC G4T4/S2B	C	White-faced ibis	BLM-S, G5/S2B	P
Black swift	BLM-S, G4/S3B	P	Western snowy plover	BLM-S, SC, G4/S1B	P
Burrowing owl	ST, G4/S4B	P	American white	BLM-S,	C

Table 3-12: Special Status Fish, Wildlife, and Plant Species in the KFO Planning Area

Species	Status	Likelihood of Occurrence	Species	Status	Likelihood of Occurrence
			pelican	G3/S1B	
Brewer's sparrow	BLM-S, G5/S4B	C			
AMPHIBIANS					
Boreal toad	SE, BLM-S, G4/S1	C	Northern leopard frog	BLM-S, SC; G5/S3	C
Wood frog	SC	C			
FISH					
Bonytail*	FE, SE; G1/SX	P	Greenback cutthroat trout	FT,ST; G4/S2	C
Colorado pikeminnow*	FE, SE; G1/S1	P	Colorado River cutthroat trout	BLM-S, SC; G4/S3	C
Razorback sucker*	FE, SE; G1/S1	P	Roundtail chub	BLM-S, SC; G3/S2	C
Humpback chub*	FE,SE; G1/S1	P	Flannelmouth sucker	BLM-S; G3G4/S3	C
Pallid Sturgeon ▲	FE, SE; G2/S1	P	Bluehead sucker	BLM-S	C
MAMMALS					
Black-footed ferret	FE, SE; G1/S1	P	White-tailed prairie dog	BLM-S, G4/S4	C
Canada lynx	FT, SE; G5/S1	C	Townsend's big-eared bat	BLM-S, SC, G4/S2	P
Gray wolf	FE, SE	P	North American Wolverine	C, SE, G4S1	C

Source: CNHP 2008

▲ These species do not occur within the planning area, but water depletions in the South Platte River may affect the species or critical habitat in downstream reaches in other States.

*These species do not occur within the Planning Area; however, water depletions in the Upper Colorado River and San Juan River Basins may affect the species and/or critical habitat in downstream reaches and in other States.
BLM-S = BLM Sensitive Species SC = State Species of Concern
FE = federally Endangered Species SE = State Endangered Species
FT = federally Threatened species ST = State Threatened species
FC = Federal Candidate for listing as Threatened or Endangered
CNHP: G = global ranking; S = sub-national ranking
G1/S1 = critically imperiled; usually fewer than 5 known occurrences or few remaining individuals

G2/S2 = imperiled; usually between 5 and 20 occurrences, or with many individuals in fewer occurrences
G3/S3 = vulnerable; usually between 20 and 100 occurrences; may have fewer occurrences but with many individuals
G4/S4 = apparently secure; uncommon, but not rare
G5/S5 = secure; common widespread and abundant
B = conservation status refers to the breeding population
N = conservation status refers to non-breeding population
NA = not applicable
PT = Taxa proposed to be listed as Threatened
X = presumed extirpated
? = inexact numeric rank
C = confirmed populations of species within the Planning Area
P = potential habitat found within the Planning Area, however, no individual occurrences have been recorded
U = species is unlikely to be found within the Planning Area

Special Status Plants

Special Status Species of plants identified by the State of Colorado and by the Colorado BLM are treated similarly. The BLM, the USFWS, and the State of Colorado have developed formal and informal agreements designed to guide the management of species in the Planning Area. Consultation is required on any action proposed by the BLM, or by any other Federal agency that affects a listed species or that modifies critical habitat.

Of the species listed in Table 3-12, Harrington penstemon (Penstemon harringtonii), North Park phacelia (Phacelia Formosula), Osterhout milkvetch (Astragalus osterhoutii), Penland beardtongue (Penstemon penlandii), Boat-shaped bugseed (Corispermum navicula, Fragile Rockbrake (Cryptogramma stelleri), and pale blue-eyed grass (Sisyrinchium pallidum) have been documented as occurring in the Planning Area.

Federally Listed Threatened, Endangered, and Candidate Plant Species

The USFWS lists four plant species in the Planning Area as Endangered, Threatened, or Candidate, which are discussed below.

Penland alpine fen mustard (Eutrema penlandii) – This species is listed as threatened and occurs at the extreme southern boundary of the Planning Area on National Forest System lands, approximately 40 miles from public lands managed by the KFO. Furthermore, this species requires alpine tundra habitat above 12,000 feet, none of which occurs in the Decision Area.

Western prairie fringed orchid (Platanthera praeclara) – This species is listed as threatened and is found in Minnesota; Iowa; Missouri; Nebraska; North Dakota; and Manitoba, Canada. This species is associated with sedge meadows, primarily within the tallgrass prairie biome and is generally found in fire- and grazing-adapted grassland communities. This species is not known to occur in the Planning Area, as no suitable habitat exists. No critical habitat has been designated this species. Nevertheless, this species remains of concern due to North Platte River water depletions.

North Park phacelia (*Phacelia Formosula*) – This species is listed as endangered and occurs in central Jackson County and northwest Larimer County, primarily in the Planning Area. It grows on barren exposures where the Coalmont Formation forms outcrops of sandy

soil or ledges. The species grows most abundantly on steep, sparsely vegetated, and erodible slopes, such as on the sides of deep ravines (USFWS 1986).

Osterhout milkvetch (*Astragalus osterhoutii*) and Penland beardtongue (*Penstemon penlandii*) – Both species are listed as endangered, are indigenous to Grand County, and are found entirely in the Planning Area. Osterhout milkvetch prefers selenium-rich clay soils derived mostly from Niobrara and Pierre shale. The plants occur in alkaline clays between 7,500 feet and 7,700 feet, and typically grow on relatively flat areas and barren knolls (USFWS 1992). Optimum habitat for Penland beardtongue appears to be in run-off channels shaded by deeply cut banks.

BLM Sensitive Plant Species

Four plant species on the Colorado BLM State Director's Sensitive Species List are known to occur in the Planning Area, and are discussed below.

Boat-shaped bugseed (*Corispermum navicula*) – This species is known only from the cold climate dunes in Northern Colorado, entirely in the Planning Area. It is not clear if the bugseed found in the dunes at the North Sand Hills is truly a unique species, C. navicula, or a variety of the common bugseed, C. americanum.

Fragile Rockbrake (*Cryptogramma stelleri*) – This species is a tiny, fragile, and rarely seen fern that occurs in cool, moist, sheltered calcareous cliff crevices and rock ledges, typically in coniferous forest or other boreal habitats. It is extremely widespread, with a high number of occurrences, although its abundance may not be great at any single occurrence. This species' distribution in the Planning Area on BLM-administered public lands is unknown.

Pale blue-eyed grass (*Sisyrinchium pallidum*) – This species is found in northwest Jackson County on National Forest System lands and in northwest Larimer County (NatureServe 2006). Pale blue-eyed grass prefers fens, wet meadows, and stream edges. This species distribution in the Planning Area on BLM administered lands is unknown.

Harrington penstemon (*Penstemon harringtonii*) – This species is the only BLM-listed Sensitive Species in the Planning Area with reliable distribution information. It is in the southwestern part of the Planning Area between Grand, Summit, and Eagle Counties. This species is found, primarily, in open sagebrush on rocky loam and rocky clay loam soils from 6,800 feet to 9,200 feet (NatureServe 2006).

Special Status Fish

Native Cutthroat Trout Species

The cutthroat trout is the most diverse trout species in North America, and its historical distribution covers the broadest range of any stream-dwelling trout in the Western Hemisphere. The rugged topography of their range has led to isolation, which in turn has given rise to 14 recognized subspecies. Four of these evolved in Colorado:

- Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) in drainages west of the Continental Divide;

- Greenback cutthroat trout (*Oncorhynchus clarkii stomias*) in the South Platte and Arkansas River drainages;
- the Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) in streams that drain into the San Luis Valley; and
- the extinct yellowfin cutthroat trout (*Oncorhynchus clarkii macdonaldi*) that was, historically, found in Twin Lakes at the headwaters of the Arkansas drainage.

The three remaining subspecies in Colorado have seen dramatic reductions in their range, precipitated primarily by the introduction of non-native salmonids. Rainbow trout hybridize with native cutthroat trout, and brook and brown trout tend to out-compete them in streams and rivers. In an effort to preserve the legacy of these fish, multi-agency conservation teams have been established for each subspecies. All three Colorado subspecies look very similar, and all are Special Status Species. (Greenback cutthroat are federally listed as Threatened; Rio Grande cutthroat are candidates for listing under the ESA; and Colorado River cutthroat are BLM Sensitive Species).

Previously, these three cutthroat subspecies could not be reliably identified visually, or with traditional genetic techniques, although their historic range was used to distinguish them. Colorado River cutthroat trout were considered to inhabit streams located on the west slope of the Continental Divide, and Greenback cutthroat trout were considered to inhabit the east slope of the Continental Divide. Recent advances in genetic techniques have allowed biologists to confidently identify the three subspecies. The new genetic findings are challenging the current paradigm on the heritage of cutthroat trout in the State. The studies confirm the existence of three genetically distinct subspecies in Colorado, but they also suggest that some key Greenback cutthroat trout populations in eastern Colorado may actually be descendants of Colorado River cutthroat trout possibly stocked east of the Continental Divide in the late 1800s. Conversely, several core conservation populations of Colorado River cutthroat trout on the west side of the Continental Divide appear to be more closely related to Greenback cutthroat trout.

Deoxyribonucleic acid (DNA) isolated from museum specimens collected between 1860 to 1890, is currently being evaluated in the hope of accurately delineating historic ranges of the Colorado subspecies of cutthroat trout. Comprehensive genetic assessments of current populations in Colorado are also underway to relate current distributions to historic ranges to possibly infer the influence of historic undocumented stocking on present distribution. Until additional information clarifies the relationship between the two subspecies, biologists are recognizing two distinct lineages of cutthroat trout within the range of Colorado River and Greenback cutthroat trout. These lineages have been tentatively called lineageCR (for Colorado River cutthroat trout) and lineageGB (for Greenback cutthroat trout). To date, 37 populations of lineageGB fish have been identified west of the Continental Divide.

Two streams in the Planning Area are currently identified as being lineage GB: Antelope Creek and Spruce Creek. This is considered outside of their “native range.” Based upon the best available science, these lineageGB populations are considered Greenback cutthroat for the purposes of ESA compliance. Further genetic testing on existing populations, and results from genetic tests on historic museum specimens, will hopefully help clarify the relationship between the two sub-species.

Greenback cutthroat trout (*Oncorhynchus clarkii stomias*) – The greenback cutthroat trout is a small salmonid fish native to the headwaters of the South Platte River and Arkansas River drainages, and to a small segment of the South Platte drainage in Wyoming. It is one of three sub-species of cutthroat that currently reside in Colorado. Adult greenbacks are greenish brown-to-olive colored on the back, with silvery to yellow sides and a white belly (red during spawning). They have a crimson slash under each side of the lower jaw, and low numbers of large spots concentrated toward the caudal fin.

Greenback cutthroat trout, like all cutthroat subspecies, inhabits cold-water streams and lakes with adequate spawning habitat present in the spring. Generally, spawning occurs when water temperatures reach 5° C to 8° C. Greenback feed on a wide variety of organisms, but their primary source of food is aquatic and terrestrial insects. Size and growth of greenbacks varies, based upon elevation and population size. Greenbacks, typically, do not reach a large size (1 pound to 2 pounds maximum).

Greenback distribution, and numbers of fish, declined rapidly beginning in the 1800s. By 1973, when the ESA became law, Greenback were believed to only exist in three small headwater streams (Como Creek and South Fork, and the Cache La Poudre River). The subspecies was listed under the ESA as Endangered in 1973, and then down-listed to Threatened in 1978. Cooperative efforts between the CPW, the USFS, the BLM, the USFWS, and the NPS (Rocky Mountain National Park) have led to a large recovery effort for the Greenback cutthroat trout. This recovery effort has started hatchery-based restoration stocking programs for the Greenback cutthroat trout. Stocking of adult and juvenile Greenback cutthroat trout has occurred since the 1960s in alpine and montane lakes, and in many streams throughout the South Platte and Arkansas River basins. Two streams in the Planning Area contain greenbacks: Spruce Creek (primarily on BLM-managed public lands and private lands) and Antelope Creek (on State and National Forest System lands, immediately upstream and adjacent to BLM-managed public lands).

Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) – The Colorado River cutthroat trout (CRCT) is a native trout species of the Colorado River Basin. It is one of three sub-species of cutthroat that currently reside in Colorado. Adult CRCT, like the Greenback, are greenish brown-to-olive colored on the back, with silvery to yellow sides and a white belly (red during spawning). They have a crimson slash under each side of the lower jaw, and low numbers of large spots concentrated toward the caudal fin. Visually, they are very hard to distinguish from the Greenback.

The CRCT, like all cutthroat subspecies, inhabit cold-water streams and lakes with adequate spawning habitat present in the spring. Generally, spawning occurs when water temperatures reach 5° C to 8° C. CRCT feed on a wide variety of organisms, but their primary source of food is aquatic and terrestrial insects. Size and growth of CRCT varies, based upon elevation and population size. Typically, this species does not reach a large size (generally 5 pounds maximum).

The CRCT is designated as a Species of Concern by the CPW. In addition, the Colorado River cutthroat trout is classified as a Sensitive Species by the BLM in Colorado. See Table 3-12. Historically, this fish occurred in portions of the Colorado River drainage in Wyoming, Colorado, Utah, Arizona, and New Mexico (Behnke 1992). In Colorado, this species was found in most of the larger rivers, including the White, Yampa, Colorado, Gunnison, and San Juan Rivers. Today, remaining Colorado River cutthroat trout populations are primarily limited to small headwater streams and lakes within their historic range.

Declines in CRCT distribution have been documented in a number of reports (Behnke and Zarn 1976, Binns 1977, Martinez 1988, Young 1995). Young (1995) determined most lotic populations reside in streams with average daily flows less than 0.85 m3/s [30 cubic feet per second (cfs)]. Stream gradients usually exceeded 4 percent, and all populations were found above 7,500 feet (2,290 m). Behnke (1979a) stated that CRCT occupy less than 1 percent of its historical range, although a more rigorous assessment indicates that the true number lies closer to 14 percent (Hirsch et al. 2005).

There are two streams in the Planning Area that harbor this species: Little Muddy Creek and Kinney Creek. Both streams are considered conservation populations, with Kinney Creek being a core conservation population (99 percent genetically pure or better). Both streams are important for conservation of the species. Threats to this species include introduction of non-native trout species, poor livestock grazing practices, natural gas development, and water diversions, among others.

Colorado River Endangered and BLM Sensitive Fishes
Endangered Species

Bonytail (*Gila elegans*) – The Bonytail is a large cyprinid fish endemic to the Colorado River Basin (Valdez and Clemmer 1982). Bonytail are medium-sized (less than 600 mm) fish in the minnow family.

The bonytail is the rarest native fish in the Colorado River. Little is known about its specific habitat requirements, or about the cause of species decline. This is due to the fact that the bonytail was extirpated from most of its historic range before extensive fishery surveys. It was listed as Endangered on April 23, 1980, under the ESA, as amended. No documented self-sustaining populations exist in the wild. Formerly reported as widespread and abundant in mainstream rivers (Jordan and Evermann 1896), its populations have been greatly reduced. Presently, remnant populations occur in the wild in low numbers in Lake Mohave, and several fish have been captured in Lake Powell and Lake Havasu (USFWS 2002a). These native fish are threatened by large mainstem dams, water diversions, habitat modification, non-native fish species, and degraded water quality (Miller 1961; Minckley and Deacon 1968).

This species is not known to occur in the Planning Area. These fish reside far downstream in the mainstem of the Colorado River, near the Colorado-Utah border in the Black Rocks area. Designated Critical Habitat for these fish is located outside of the Planning Area. [Designated Critical Habitat is located in the Colorado River from Black Rocks (river mile 137; in T. 10 S., R. 104 W., Section 25; 6th Principal Meridian) to Fish Ford (in T. 21 S., R. 24 E., Section 35; Salt Lake Meridian).]

Colorado pikeminnow (*Ptychocheilus lucius*) – The Colorado pikeminnow (*Ptychocheilus lucius*) is the largest cyprinid fish endemic to the Colorado River Basin (Tyus 1991). The common name for this species was changed from Colorado squawfish by the American Fisheries Society (Nelson et al. 1998). The Colorado pikeminnow is listed as Endangered under the ESA, as amended.

Colorado pikeminnow live in warm-water reaches of the Colorado River mainstem and larger tributaries, and require uninterrupted stream passage for spawning migrations and dispersal of young. The species is adapted to a hydrologic cycle characterized by large spring peaks of snowmelt run-off and low, relatively stable base flows. High spring flows create and maintain in-channel habitats, and reconnect floodplain and riverine habitats, a phenomenon described as the spring flood-pulse (Junk et al. 1989; Johnson et al. 1995). Throughout most of the year, juvenile, subadult, and adult Colorado pikeminnow utilize relatively deep, low-velocity eddies, pools, and runs that occur in near-shore areas of main river channels (Tyus and McAda 1984; Valdez and Masslich 1989; Tyus 1990, 1991; Osmundson et al. 1995;). In spring, however, Colorado pikeminnow adults use floodplain habitats, flooded tributary mouths, flooded side canyons, and eddies that are available only during high flows (Tyus 1990, 1991; Osmundson et al. 1995). Such environments may be especially beneficial for Colorado pikeminnow because other riverine fishes gather in floodplain habitats in order to exploit food and temperature resources, and may serve as prey. Such low-velocity environments also may serve as resting areas for Colorado pikeminnow. River reaches of high habitat complexity appear to be preferred. These native fish are threatened by large mainstem dams, water diversions, habitat modification, non-native fish species, and degraded water quality (Miller 1961; Minckley and Deacon 1968).

Colorado pikeminnow are restricted currently to the Upper Colorado River Basin, and inhabit warm water reaches of the Colorado, Green, and San Juan Rivers and associated tributaries. Most of Lake Powell is not suitable habitat for Colorado pikeminnow, and is not designated critical habitat. The total designated miles is 1,148, which represents 29 percent of the historical habitat for the species.

This species is not known to occur in the Planning Area, as no suitable habitat exists in the Planning Area. These fish are found far downstream in the mainstem of the Colorado River. Designated Critical Habitat is located in the Colorado River and its 100-year floodplain from the Highway 13 Bridge at Rifle, Colorado, to Lake Powell.

Razorback sucker (*Xyrauchen texanus*) – The razorback sucker (Xyrauchen texanus) is a large catostomid fish endemic to the Colorado River Basin (Minckley et al. 1991). The razorback sucker is listed as Endangered under the ESA, as amended.

Razorback suckers were found historically in the mainstem of the Colorado River and major tributaries in Arizona, California, Colorado, Nevada, New Mexico, Utah, Wyoming, and Mexico (Minckley et al. 1991). Bestgen (1990) reported that this species was once so numerous that it was commonly used as food by early settlers. Commercially marketable quantities were caught in Arizona as recently as 1949. In the Upper Colorado River Basin, razorback suckers were reported in the Green River to be very abundant near Green River, Utah, in the late 1800s (Jordan 1891; Tyus 1990).

In the Upper Colorado River Basin, above Glen Canyon Dam, razorback suckers are found in limited numbers in both lentic (lake-like) and riverine environments. The largest populations of razorback suckers are found in the upper Green and lower Yampa Rivers (Tyus 1987). In the Colorado River, most razorback suckers occur in the Grand Valley area near Grand Junction, Colorado, but they are increasingly rare.

This species is not known to occur in the Planning Area, as no suitable habitat exists within the Planning Area. These fish are found far downstream within the mainstem of the Colorado River. Designated Critical Habitat for these fish is located outside of the Planning Area.

Humpback chub (*Gila cypha*) – The humpback chub (*Gila cypha*) is a large cyprinid fish endemic to the Colorado River Basin (Miller 1946). The humpback chub is listed as Endangered under the ESA, as amended.

Today, the largest populations of this species occur in the Little Colorado and Colorado Rivers in the Grand Canyon, and in Black Rocks and Westwater Canyon in the upper Colorado River. Hybridization with roundtail chub (Gila robusta) and bonytail, where they occur with humpback chub, is recognized as a threat to humpback chub. A larger proportion of roundtail chub have been found in Black Rocks and Westwater Canyon during low flow years (Kaeding et al. 1990; Chart and Lentsch 2000), which increase the chances for hybridization.

This species is not known to occur in the Planning Area. These fish reside far downstream in the mainstem of the Colorado River near the Colorado-Utah border in the Black Rocks area. Designated Critical Habitat for these fish is located outside of the Planning Area.

BLM Sensitive Species

Flannelmouth sucker (*Catostomus latipinnis*) – Flannelmouth sucker reside in mainstem and tributary streams. Elements of flannelmouth habitat include deep murky pools with little to no vegetation, and deep runs and riffles (McAda 1977, Sigler and Sigler 1996, Bezzerides and Bestgen 2002). Substrates used by the flannelmouth consist of gravel, rock, sand, or mud (McAda 1977, Sigler and Sigler 1996).

Flannelmouth sucker partition habitat use by life stage, with young fish occupying quiet, shallow riffles and near-shore eddies (Childs et al. 1998), and adults occupying deep riffles and runs. Many authors report that flannelmouth sucker do not prosper in impoundments (McAda 1977, Sigler and Sigler 1996, Bezzerides and Bestgen 2002). Historically, however, some lakes in the Upper Green River drainage in Wyoming supported large flannelmouth sucker populations (Baxter and Stone 1995). Flannelmouth sucker are opportunistic, benthic omnivores consuming algae, detritus, plant debris, and aquatic invertebrates (McAda 1977; Sigler and Sigler 1996; Osmundson 1999; Bezzerides and Bestgen 2002). Food consumed depends upon availability, season, and the individual's age class (McAda 1977; Sigler and Sigler 1996). Larval and early juveniles consume mostly invertebrates (Childs et al. 1998).

Seasonal migrations are made in the spring to suitable spawning habitat (Suttkus and Clemmer 1979; Sigler and Sigler 1996; McKinney et al. 1999; see also Chart 1987, Chart and Bergersen 1992). There are documented long-range movements (ca. 98-231 km) among adult and sub-adult fish; the roles these movements play in life history are unclear and need further investigation. Obstructions to movements (such as dams) may also be an important consideration in the conservation of flannelmouth suckers. Generally, flannelmouth suckers spawn for 2 to 5 weeks over gravel.

The flannelmouth sucker is on the BLM' Colorado State Director's Sensitive Species List and the CPW list as a Species of Concern. Threats to the flannelmouth sucker include water quality impairment, disease, competition and predation by non-native fishes, hybridization with other *Catostomid* sp., flow reductions, and physical changes and losses of important habitats.

This species is found in the Planning Area primarily in the mainstem of the Colorado River from State Bridge upstream to Radium. In the spring, these fish may also use some of the larger tributary waters as spawning sites.

Bluehead sucker (*Catostomus discobulus*) – Bluehead sucker tend to use swifter velocity, higher gradient streams than those occupied by either flannelmouth sucker or roundtail chub. These fish are found in warm-to-cool streams (20 °C) with rocky substrates (Sigler and Sigler 1996; Bestgen 2000). Bluehead sucker do not do well in impoundments (Sigler and Sigler 1996; Bezzerides and Bestgen 2002). Bluehead sucker partition habitat use by life stage [adult, juvenile, young-of-year (YOY)]. Larval fish inhabit near-shore, low velocity habitats (Childs et al. 1998). As they age, they move to deeper habitats that have more cover, further away from shore (Childs et al. 1998).

Larval and early-juvenile bluehead sucker eat mostly invertebrates (Childs et al. 1998). At later life-stages, they are more opportunistic omnivores, consuming algae, detritus, plant debris, and, occasionally, aquatic invertebrates (Sigler and Sigler 1996; Osmundson 1999; Bestgen 2000). This species feeds in riffles or deep rocky pools (McAda 1977; Sigler and Sigler 1996).

The bluehead sucker is on the BLM's Colorado State Director's Sensitive Species List and the CPW list as a Species of Concern. Threats to the bluehead sucker include water quality impairment, disease, competition and predation by non-native fishes, hybridization with other *Catostomid* sp., flow reductions, and physical changes and losses of important habitats.

This species is primarily found in the Planning Area in the mainstem of the Colorado River from State Bridge upstream to Radium. In the spring, these fish may also use some of the larger tributary waters as spawning sites.

Roundtail chub (*Gila robusta*) – Roundtail chub use slow moving, deep pools for cover and feeding. These fish are found in the mainstem of major rivers and smaller tributary streams. Roundtail chub use a variety of substrate types (silt, sand, gravel and rocks) and prefer murky water to clear water (Sigler and Sigler 1996; Brouder et al. 2000). Roundtail chub partition habitat use by life stage (adult, juvenile, YOY).

Juveniles and YOY are found in quiet water near the shore or backwaters with low velocity and frequent pools, rather than in glides and riffles. Juveniles avoid depths greater than 100 cm, and YOY avoid depths greater than 50 cm. Juveniles use in-stream boulders for cover, while YOY are found in interstices between, and under, boulders or the slack-water area behind boulders (Brouder et al. 2000).

Generally, adults do not frequent vegetation and avoid shallow water cover types (overhanging and shoreline vegetation) (Sigler and Sigler 1996; Brouder et al. 2000). Adults are found in eddies and pools adjacent to strong currents, and use in-stream boulders as cover (Sigler and Sigler 1996; Brouder et al., 2000). Adults occupy depths greater than 20 cm, and select for velocities less than 20 cm/s. Adults may range 100 m or less over the course of a year, often in search of pool habitats (Siebert 1980; Brouder et al 2000).

Roundtail chub are carnivorous, opportunistic feeders. Documented food items include aquatic and terrestrial insects, fish, snails, crustaceans, algae, and, occasionally, lizards (Sigler and Sigler 1996; Osmundson 1999; Bestgen 2000; Brouder 2001).

The roundtail chub is on the BLM's Colorado State Director's Sensitive Species List and the CPW list as a Species of Concern. Threats to the roundtail chub include interactions of watershed changes (such as reductions in suitable habitat due to impoundment), channel down-cutting, water diversion, and groundwater pumping, with the invasion of non-native predatory and competitive species (NatureServe 2008).

This species is not known to inhabit the Colorado River in the Planning Area. There is a small, self-sustaining population in Wolford Reservoir that presumably originated from fish living in Muddy Creek before the reservoir was constructed.

North Platte River Endangered Fish

Pallid Sturgeon (*Scaphirhynchus albus*) – The pallid sturgeon is one of the largest (30 – 60 inches, 76 – 152 cm) fishes found in the Missouri-Mississippi River drainage, with specimens weighing up to 85 pounds (39 kg).

The pallid sturgeon is native to the Missouri and Mississippi Rivers and adapted to the predevelopment habitat conditions that existed in these large rivers. These conditions generally can be described as large, free-flowing, warm water turbid habitat, with a diverse assemblage of physical habitats that were in a constant state. Pallid sturgeons are found almost exclusively in the headwaters of the Missouri River (in the vicinity of Fort Benton and Great Falls, MT) downstream to the Mississippi River near New Orleans, LA. In addition, the pallid sturgeon is found in the Platte River near its confluence with the Missouri River.

This species is not known to occur in the Planning Area, as no suitable habitat exists in the Planning Area. These fish are found far downstream in the mainstem of the North Platte River. No Critical habitat has been designated for the pallid sturgeon.

Special Status Amphibians

Boreal Toad (*Bufo boreas boreas*) – The boreal toad is a Colorado Threatened Species that was once common in montane habitats between 7,000 and 12,000 feet in the southern Rocky Mountains. It has experienced dramatic population declines over the past two decades, and is listed as Endangered in Colorado. In 1995, the USFWS classified the southern Rocky Mountain population of the boreal toad as a Candidate Species, and found it to be "warranted but precluded" for Federal listing. In 2006, this designation was removed while the distinctness of the southern Rocky Mountain population is re-evaluated. Most boreal toads in the Planning Area occur at the periphery on National Forest System lands (NatureServe 2008). Very few occurrences have been recorded in the Planning Area over the last 10 years. These include Pole Creek in western Larimer County (last observed in 1998), and Pole Creek in east Grand County (last observed in 2004).

Northern leopard frog (*Rana pipiens*) – The northern leopard frog is on the BLM's Colorado State Director's Sensitive Species list and the CPW list as a Species of Concern. Typical habitats include wet meadows, and the banks and shallows of marshes, ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches (NatureServe 2008). Habitat for this species exists throughout the Planning Area. A well-documented population occurs along Antelope Creek and Muddy Creek, and at the Junction Butte Wetland in Grand County.

Wood frog (*Rana sylvatica*) – This frog is on the CPW list as a Species of Concern, and is found in the Planning Area. The wood frog is found in forest and woodland habitats, and at the edges of ponds and streams. It is known to occur in Grand, Jackson, and Larimer Counties (NatureServe 2008; AmphibiaWeb 2008).

Special Status Aquatic Wildlife

River otter (*Lutra Canadensis*) – The River otter is a Colorado Threatened species that most likely, was present in most, if not all, major drainages in Colorado. It had been extirpated from the State by the early 20th century. This species requires water year-round, and feeds on fish and crustaceans. River otters were extirpated in Colorado until 1976, when the CDOW began reintroducing them into major waterways, including the Colorado River. River otters on, or adjacent to, BLM-managed public lands in the Planning Area are generally found on most major drainages, including the Laramie, Illinois, Michigan, Colorado, Fraser, Williams Fork, and Blue Rivers. Several smaller creeks, primarily in Grand County, are also mapped as overall range for river otters. See Map 3-14**,** River Otter Range. Important winter range for this species is found on the Laramie, Colorado, Williams Fork, and Fraser Rivers (BLM 2007k).

Special Status Terrestrial Wildlife

Special status Species are those with populations that have declined to the point of substantial State or Federal agency concern. Species discussed in this Section have been listed by the USFWS or by the CPW, or have been placed on the BLM's Colorado State Director's Sensitive Species List. See Table 3-12. The USFWS manages Threatened and Endangered Species, and designated critical habitat, in cooperation with other Federal agencies, to support recovery. For listed species that have not had critical habitat identified and designated, the BLM cooperates with the USFWS in order to determine and manage habitats designed to support the species. Candidate Species are managed to maintain viable populations, thereby preventing them from being listed by the Federal government.

Species identified by the State of Colorado and by the BLM are treated similarly. The BLM, the USFWS, and the CPW have developed formal and informal agreements designed to guide the management of species in the Planning Area. Consultation is required on any action proposed by the BLM (or another Federal agency) that affects a listed species or modifies critical habitat.

There are 25 federally listed, State Species of Concern, or BLM Sensitive terrestrial wildlife species in the Planning Areas that have suitable habitat or documented populations. Of these 25 species, only the bald eagle, Peregrine falcon, Brewer's sparrow, Columbian sharp-tailed grouse, Greater Sage-Grouse, white-tailed prairie dog, American white pelican, northern goshawk, and Canada lynx are known to occur regularly in the Planning Area. The other species listed are addressed in this document because there is suitable habitat; there are historical or occasional sightings; or management actions taken in the Planning Area may affect these species elsewhere.

Birds

Of the birds listed in Table 3-12, only seven are regularly addressed in NEPA documents. These are the bald eagle, American white pelican, Peregrine falcon, Brewer's sparrow, Columbian sharp-tailed grouse, Greater Sage-Grouse, and northern goshawk. The least tern, piping plover, and whooping crane are not found in the Planning Area, although they are addressed for any actions that result in water depletions from the North Platte River in Jackson County. The remaining species in Table 3-12 are addressed, but are not likely to be found in the Planning Area because they are rare; there have only been historical occurrences; or they have no suitable habitat.

Bald eagle (*Haliaeetus leucocephalus*) – Bald eagles are listed as State Threatened Species. They were recently delisted from the Federal listings due to species recovery. They occur throughout the Planning Area on, or adjacent to, BLM-managed public lands near major rivers, lakes, and reservoirs with tall trees, such as cottonwoods. Bald eagles are yearlong residents and several active nests occur in the Planning Area, including along the Laramie, Illinois, North Platte, Colorado, Blue, and Williams Fork Rivers, and along Muddy and Troublesome Creeks. In Colorado, and in the rest of the lower 48 states, the bald eagle population has increased substantially. In 1974, there was one known nesting pair of bald eagles in the State. In 2001, that number increased to 51 breeding pairs. Major threats include habitat loss, disturbance by humans, biocide contamination (DDT), and illegal shooting (USFWS 2006). Listing under the ESA, and the banning of DDT and other harmful

organochlorine chemicals, has resulted in significant increases in the breeding population of bald eagles throughout the contiguous 48 States. The bald eagle was delisted in 2007; although, it is still protected under the Migratory Bird Treaty Act of 1918.

In Colorado, bald eagles are often found near reservoirs, especially where there are abundant fish. In addition to fish (self-caught or stolen from other birds), bald eagles eat sick and injured waterfowl, muskrats, squirrels, rabbits, and prairie dogs. They often eat carrion and road-killed animals, as well. Nests can be 7 to 8 feet across, usually in tall trees high above the ground. Bald eagles often choose dead limbs in tall trees, and nests are often found near water. Females lay one to three eggs, which are dull white. The incubation period is approximately 35 days. In 2001, there were an estimated 51 breeding pairs in the State. Colorado is a very popular wintering area for bald eagles. The annual mid-winter State count shows a stable population of up to 800 eagles (CDOW 2010a).

American Peregrine Falcon (*Falco peregrinus anatum*) – The American peregrine falcon occurs throughout much of North America, from the subarctic boreal forests of Alaska and Canada south to Mexico. The American peregrine falcon drastically declined in North America following World War II, largely due to pesticides, mainly DDT, applied in the United States, Canada, and Mexico. As a result, the American peregrine falcon was listed as endangered on June 2, 1970, under the precursor of the Endangered Species Act. Following restrictions on pesticides in the United States and Canada, and implementation of various management actions, including the release of approximately 6000 captive-reared falcons, recovery goals were substantially exceeded in some areas. On August 25, 1999, the American peregrine falcon was removed from the List of Endangered and Threatened Wildlife and Plants.

The peregrine falcon is listed as a BLM's Colorado State Director's Sensitive Species and a CPW Species of Concern. The peregrine falcon is protected from "take" by the MBTA, and is managed as a non-game species by the State. Peregrine falcons inhabit open spaces usually associated with high cliffs and bluffs overlooking rivers and coasts. Their diet consists of small rodents and small to medium-sized birds. In Colorado, the number of active sites and young birds produced increases annually. Several active nests are recorded in the Planning Area.

Mexican spotted owl (*Strix occidentalis lucida*) – Mexican spotted owls, a Federal and State Threatened Species, occupy large steep canyons with exposed cliffs and dense old growth coniferous forests (fir and pine). This species also uses canyons in pinyon-juniper woodlands with patches of Douglas-fir (Reynolds 1990). Threats include habitat loss and disturbance from recreation, overgrazing, road development, catastrophic fire, timber harvesting, and mineral development. They eat a variety of prey including small-to-medium-sized rodents (such as wood rats, mice and voles). They will also feed on bats, birds, lizards, snakes, and even spiders.

The highest number of owls ever counted in the State was 20, with seven breeding pairs in 1993. The owl's extremely low numbers, exacting habitat requirements, and low productivity make them susceptible to extirpation from the State (CDOW 2008c). Limited potential exists for Mexican spotted owl habitat in the Planning Area. To date, no Mexican spotted owls have been observed in the Planning Area. Critical habitat for the Mexican spotted owl has been designated in the State, although none exists in the Planning Area.

Western yellow-billed cuckoo (***Coccyzus americanus occidentalis***) **–** The western yellow-billed cuckoo is a Federal Candidate Species that has declined due to the loss of riparian habitat resulting from agricultural use, water use, road development, and urban development. Western cuckoos breed in large blocks of riparian habitats, especially woodlands with cottonwoods (*Populus fremontii*) and willows (*Salix sp.*). Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat in areas where the species has been studied in California. In Colorado, west of the Continental Divide, the species was probably never common (Bailey and Niedrach 1965; Kingery 1998) and is now extremely rare (Kingery 1998). The western yellow-billed cuckoo is an uncommon summer resident of Colorado. The available data indicates that cuckoos do not nest in this broad highlands region, and reveal few records of cuckoos at all in the mountainous region of the State. The MBTA is the only current Federal protection provided for the western yellow-billed cuckoo. The MBTA prohibits "take" of any migratory bird, which is defined as: "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." There are no provisions in the MBTA, however, preventing habitat destruction unless direct mortality or destruction of active nests occurs (USFWS 2008a).

No individuals have been recorded or confirmed to nest in the Planning Area. Habitat analysis shows that there are three identified sites as potential western yellow-billed cuckoo habitat in the Planning Area. Those sites total 83 acres of potentially suitable habitat at two sites; and 28 acres as potential habitat at one site. All three sites are located along the Colorado River.

Ferruginous hawk (*Buteo regalis*) – The ferruginous hawk is listed as a Colorado BLM Sensitive Species and a CPW Species of Concern. The ferruginous hawk is protected from "take" by the MBTA, and is managed as a non-game species by the State. Ferruginous hawk habitat consists of both grassland and shrubland ecosystems. These hawks commonly nest in trees, or similar elevated structures, and have been recorded to nest on the ground on hilltops or rock outcrops. Their primary prey consists of small mammals, such as rabbits, prairie dogs, and ground squirrels (Kingery 1998). Habitat loss, decline in prey species, and disturbances during the breeding season are threats to this species. The ferruginous hawk is common during winter throughout the eastern half of Colorado, with the northern extent of its range limited by the severity of the winter (Andrews and Righter 1992). Nest sites, or the actual physical location of nests chosen by ferruginous hawks, are variable throughout the breeding range. Of 2,119 nests described throughout this species' range, most (49 percent) were located in trees and shrubs, followed by cliffs (21 percent), utility structures (12 percent), on the ground or dirt outcrops (15 percent), haystacks (3 percent), and buildings (less than 1 percent) (Olendorff 1993). Olendorff's (1993) estimates do not include studies where artificial nesting structures designed specifically for raptors were used. Juniper is the most commonly used tree for nesting, especially in the juniper forest/shrub-steppe interface in States west of the Continental Divide. Ferruginous hawks have also used pine, willow, cottonwood, and sagebrush (Collins and Reynolds 2005). There are no recorded ferruginous hawk nests in the Planning Area.

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

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

Nesting habitat is primarily characterized by sagebrush communities that have 15 percent to 30 percent canopy cover, and a grass and forb understory. Residual cover of grasses is also important for nesting cover. Most nesting occurs within 4 miles of leks (Colorado Greater Sage-Grouse Steering Committee 2008).

In March of 2010, the USFWS concluded that the Greater Sage-Grouse warranted protection under the ESA. The Service determined that proposing the species for protection is precluded by the need to take action on other species facing more immediate and severe extinction threats. As a result, the Greater Sage-Grouse will be added to the list of species that are candidates for ESA protection. Habitat loss and fragmentation resulting from wildfire, energy development, urbanization, agricultural conversion, conversion of sagebrush to other vegetation types (such as pinyon-juniper woodlands), and infrastructure development are the primary threats to the species (USFWS 2010d).

The negative impacts of fragmentation on Greater Sage-Grouse are diverse, and include reduced courtship site persistence, courtship site attendance, winter habitat use, recruitment, yearling annual survival, and female nest site choice (USFWS 2010d).

Invasive plants are also a serious range-wide threat to Greater Sage-Grouse habitat. This is because they can out-compete sagebrush, and there are increasing wildfire frequencies, further contributing to direct loss of habitat. Once established, invasive plants reduce and eliminate vegetation essential for Greater Sage-Grouse food and cover. Sagebrush restoration techniques are limited and have been, generally, ineffective (USFWS 2010d).

Greater Sage-Grouse, a Federal Candidate Species, a BLM Sensitive Species, and a CPW Species of Concern, inhabit much of the Planning Area. See Map 3-16, Greater Sage-Grouse Range. Throughout the year, Greater Sage-Grouse will move between select habitats in the overall sagebrush habitat area. In Jackson County, there are approximately 54 active leks (2004 data), 31 of which are on BLM-managed public lands. In Grand County, there are 16 active leks and three inactive leks (2006 data). Eight of those 19 leks are on BLM-managed public lands. Sagebrush habitat in Jackson County is largely intact, and there is little threat of fragmentation. Currently, oil and gas development and related infrastructure is low. In 2006, however, there was an increased interest in coalbed methane exploration. In Grand County there is a high risk of habitat fragmentation and loss due to urban development and related infrastructure, especially at the east end of the County.

Three local Sage-Grouse working groups cover the Planning Area: Eagle/South Routt, North Park, and Middle Park. Each group developed a local Conservation Plan that sets forth a strategy for the long-term management of Greater Sage-Grouse in their area. The BLM administers 27 percent (approximately 26,189 acres) of occupied habitat in the Eagle/South Routt population area; 34 percent (approximately 140,025 acres) of occupied habitat in the North Park population area; and 29 percent (approximately 74,065 acres) of the occupied habitat in the Middle Park population area. The BLM is a partner in all three local working groups, and with the Colorado Greater Sage-Grouse Plan, and has agreed to implement the plans as fully as possible.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) – Columbian sharp-tailed grouse, a BLM Sensitive Species and a Colorado Species of Concern, is one of two races of sharp-tailed grouse found in Colorado: the plains sharp-tail and the Columbian. The Columbian uses the high mountain shrub-grassland community and associated edges. Sharptails are most commonly found in high elevation grassland areas interspersed with serviceberry, chokecherry, oak brush, sagebrush, snowberry, and aspen. Shrubs and small trees play an important role in sharp-tailed grouse ecology, especially in winter when they provide both food and cover.

Like Greater Sage-Grouse, sharp-tailed grouse breed on leks or traditional strutting grounds. Typically, sharptail leks are located on knolls or ridge-tops. Males begin displaying in late March or April. After breeding, females build a ground nest in grass or near shrubs. Broods are largely dependent for 6 weeks to 8 weeks, and then disperse. In late fall and winter, the birds form small flocks, and are dependent upon shrubs for food and cover. In spring, the males head toward the leks and the cycle begins again (CDOW 2008d).

Limited Columbian sharp-tailed grouse habitat exists in the Planning Area. Habitat has been mapped in central Grand County as a result of a recent introduction of Columbian sharp-tailed grouse. Portions of the Planning Area are also within the historic range of the species. In 2001, the population of Columbian sharp-tailed grouse in Colorado was estimated to have a minimum of 133 active leks. At the end of 2006, there were a total of 250 known leks, 89 percent of which occur on private land. Of the remaining 28 leks on public land, only four occur on BLM-managed public lands (Hoffman and Thomas 2007). None of these leks occurred in the Planning Area in 2006.

In the fall of 2006 and the spring 2007, the CDOW reintroduced 39 males and 44 females to private lands in Middle Park. In the spring of 2011 approximately 20 males on two leks were counted on private lands south of Kremmling. Also, in the fall of 2011, birds were seen north of State Highway 134. Additional monitoring will be required before any conclusions can be made regarding the success or failure of Columbian sharp-tailed grouse to establish a self-sustaining population in Grand County.

Brewer's Sparrow (*Spizella breweri*) – The Brewer's sparrow is a BLM's Colorado State Director's Sensitive Species. Most Brewer's Sparrows breed in the western U.S. in plains and foothills, primarily in the Great Basin. Populations of Brewer's Sparrows tend to fluctuate from year to year in any given locale. In suitable habitat, they are often abundant. Breeding Bird Survey data indicate that numbers of this species have decreased since the early 1960s, with more pronounced declines since 1980. Population trends range-wide show a pattern of significant long-term declines, likely due to changes in shrubland ecosystems. Threats to this species include habitat destruction, alteration, and fragmentation.

Brewer's Sparrows are considered a sagebrush/shrubland obligate, preferring dense stands broken-up with grassy areas. Adults return persistently to the same breeding sites each year. Breeding takes place in mid-April through early August, and can occur in high densities. The nest is placed on or near the ground, and the male often helps with incubation. In Colorado, Brewer's sparrows nest most commonly between 5,000 and 7,500 feet. They are also ranked as the twenty-sixth most numerous bird species in Colorado with the majority of breeding bird confirmations in the state's northwestern corner. Brewer's sparrows are summer residents on mesas and foothills of western Colorado, and local in lower mountains. They are fairly common in North Park and Middle Park.

Burrowing owl (*Athene cunicularia*) – Burrowing owls, a State Threatened Species, are found in short grass prairie and shrubland habitats. This species nests in rodent burrows, and it is often associated with prairie dog colonies. In Colorado, burrowing owls are considered locally uncommon to fairly common on the eastern plains, and rare to uncommon in mountain parks and on the western slope (Andrews and Righter 1992). Burrowing owls' average diurnal range has been estimated at 3.5 miles for individuals in Wyoming (Thompson 1984). Primary threats include habitat loss and fragmentation (NatureServe 2006). The Planning Area has few white-tailed prairie dog colonies, so it is unlikely that high numbers of burrowing owls would inhabit the area. There is a possibility that owls would use ground squirrel colonies, which are found in the Planning Area.

American white pelican (*Pelecanus erythrorhynchos*) – The American white pelican is a BLM Sensitive Species whose habitat consists of rivers, lakes, and reservoirs. This species is commonly observed on Walden and MacFarlane Reservoirs in Jackson County, and along the Colorado River in Grand County. It commonly nests on islands or peninsulas in brackish or freshwater lakes, isolated from mammalian predators. This species usually nests in open areas, often near vegetation, driftwood, or large rocks. The American white pelican feeds on fish of little commercial value (such as carp, perch catfish, suckers), although it may also eat tiger salamanders or crawfish. Breeding colonies have a low tolerance to disturbance, and are highly susceptible to predation and pesticide contamination. This species is also threatened by loss of breeding and feeding areas. Other threats include consecutive years of drought, which may lower water levels and allow predators access to breeding areas, as well as disturbance and shooting by humans.

Northern goshawk (*Accipiter gentilis*) – The northern goshawk is a BLM Sensitive Species that occupies coniferous and riparian forests and, occasionally, shrublands. Three active nest sites have been recorded in the Planning Area: one in southern Jackson County and two in Grand County, west of Kremmling and north of Hot Sulphur Springs. Probable sightings have also been reported north of Kremmling and east of Granby. Areas with suitable habitat in the Planning Area are surveyed annually in order to identify new nest sites.

Least tern (***Sterna antillarum***) – The interior population of least terns, which includes Colorado, is listed as Endangered both federally and by the State. Least terns nest on bare sandy shorelines of reservoirs, lakes, and rivers. Typically, least terns arrive on their breeding grounds in early-to-mid May, and begin to establish feeding and nesting territories. The primary threat to this species is the alteration of its habitat. Storage and supply of water for irrigation, power generation, and navigation have altered the natural hydrograph to which the least terns' breeding season was historically adapted. Extreme fluctuations can flood existing nests, inundate potential nesting areas, or dewater feeding areas. The least tern does not occur in the Planning Area, although actions in the Planning Area could result in water depletions in least tern habitat downstream. No critical habitat designations have been made for this species.

Piping plover (***Charadrius melodus circumcinctus***) – Piping plovers are listed as Threatened by the USFWS and by the State of Colorado. Piping plovers make their nests on open sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, as well as on beaches, sand bars, and dredged material islands of major river systems. Plovers arrive on breeding grounds during mid-March through mid-May, and remain for 3 to 4 months per year. They use beaches adjacent to foraging areas for roosting and preening. Small sand dunes, debris, and sparse vegetation within adjacent beaches provide shelter from wind and extreme temperatures. The primary threat to this species is the loss of breeding habitat due to recreational and commercial development, damming and channelization of rivers, and the withdrawal of water for irrigation and other purposes. No piping plovers nest in the Planning Area, although actions in the Planning Area could result in water depletions that affect the plover's habitat downstream. There is no critical habitat for piping plovers in the Planning Area.

Whooping crane (***Grus americana***) – Whooping cranes are listed as Endangered by the USFWS and by the State. They prefer shallow wetlands and poorly drained uplands dominated by rushes and various grasses. Threats to the species are primarily from the alteration and loss of habitat from the expansion of agricultural operations. Collisions with power lines have also been known to result in injury or death. As of 2010, there were only 100 breeding pairs of whooping cranes in the state of Colorado with a total of 260 individuals (150 in the wild and 110 in captivity). Several attempts to establish additional flocks have been made since 1975, including the Rocky Mountain Experimental Population. From 1975 through 1988, 289 whooping crane eggs were transferred to sandhill crane nests, and 85 chicks fledged. This population peaked at 33 birds in 1985. The last cross-fostered whooping crane died in the spring of 2002, and this population is now considered extinct. There have been no reported sightings of any individuals from the naturally occurring population in the Planning Area. Critical habitat has been designated for the whooping crane, but none exists in Colorado.

Black swift (***Cypseloides niger***) – The black swift is listed as a Sensitive Species by the BLM in Colorado. This species nests on steep cliffs near or behind high waterfalls and forages at high elevations over most montane and adjacent lowland habitats. Black swifts breed in scattered colonies in western North America, from southeast Alaska to central Mexico, and they migrate to the neotropics in winter. In Colorado, black swifts breed most commonly in the San Juan Mountains with scattered colonies in other mountain ranges, including the Gore. Abundance in Colorado is estimated at 700-800 pairs. There may be some habitat in the Planning Area, although there are no reported sightings of this species on BLM-administered public lands.

Long-billed curlew (***Numenius americanus***) – The long-billed curlew is listed as a BLM Sensitive Species in the State of Colorado, and a State Species of Concern. The long-billed curlew is one of nine grassland bird species that is endemic to the Great Plains. Breeding habitat consists primarily of short-grass or mixed-prairie habitat with flat-to-rolling topography. Habitats with trees, a high density of shrubs, and tall, dense grass generally are avoided. The loss of grasslands suitable for nesting is considered to be the greatest threat to the species. In Colorado, nesting habitat is found primarily on the eastern third of the State. Migrants may occasionally occur in the Planning Area, although there are no known reported sightings of this species in the Planning Area.

Mountain plover (***Charadrius montanus***) – Mountain plovers are proposed to be listed as Threatened by the USFWS. The mountain plover is listed as a BLM Sensitive Species in the State of Colorado, and a State Species of Concern. This species nests in flat dry landscapes characterized by very short sparse, vegetation, with 30 percent bare ground and a slope of less than 5 degrees (Graul 1973). Habitat preferences for the mountain plover include short-grass prairies and shrub steppe landscapes, dryland, cultivated farms, and prairie dog colonies. In Colorado, the mountain plover is commonly associated with heavily grazed blue grama or buffalograss on the eastern plains. They are also found in montane grasslands, sparse shrublands, and other heavily grazed grasslands in Colorado's mountain parks. Threats to this species are primarily the loss of suitable habitat due to conversion of short-grass and shrub-steppe habitats; changes in range management to emphasize uniform grass cover; and habitat loss and fragmentation caused by residential, commercial, and industrial development. Only a few occurrences of Mountain plover have been recorded in the Planning Area. CHHP records indicate three occurrences on private land: two in 1978, and one in 1997.

White-faced ibis (*Plegadis chihi*) – The white-faced ibis is listed as a BLM Sensitive Species in the State of Colorado. This species prefers large freshwater marshes, and typically nests in colonies in Montana, Oregon, Idaho, and Minnesota. This species forages in wet hay meadows, flooded agricultural croplands, marshes; and the shallow waters of ponds, lakes, and reservoirs (Ryder and Manry 1994). Threats to nests, eggs, and young include humans, overgrazing, pesticides, and heavy predation from magpies, ravens, and raccoons (Kingery 1998). Very little habitat occurs in the Planning Area, and few individuals have been observed.

Western snowy plover (***Charadrius alexandrinus nivosus***) – Western snowy plovers are BLM Species of Concern in Colorado, and a State Species of Concern. They commonly breed on barren-to-sparsely vegetated ground at alkaline or saline lakes, reservoirs, and ponds; as well as on riverine sand bars, and at sewage (occasionally), salt-evaporation, and agricultural wastewater ponds. Breeding has not been documented on salt flats devoid of water, although nesting can occur where a distant small seep is the only apparent surface water. Threats to the species include degradation of breeding habitat and disturbance at nest and roost sites. There have been no recorded nests of the western snowy plover in the Planning Area, but occasional or accidental migrants may fly through.

Mammals

Canada lynx (*Lynx Canadensis*) – Canada lynx are a federally Threatened and Colorado Endangered species. In 2000, the Canada lynx was listed under the ESA as a Threatened Species throughout its range in the contiguous United States. In February of 2008, the USFWS proposed to revise the amount of critical habitat designated under the ESA for the federally Threatened Canada lynx (USFWS 2008c). None of the existing or proposed critical habitat is in Colorado. The reintroduction of the animals in Colorado started in 1999. Cats were released in Colorado's southern mountains in 1999, 2000, 2003, 2004, 2005, and 2006. The cats were brought to Colorado from Alaska and Canada. A total of 116 lynx kittens are known to have been born in Colorado: 16 kittens in 2003; 39 kittens in 2004; 50 kittens in 2005; and 11 kittens in 2006 (CDOW 2010b).

The lynx is found in dense sub-alpine forest and willow-choked corridors along mountain streams and avalanche chutes; and in areas with deep snow and a high density population of snowshoe hares, its primary prey species (USFWS 2010a, CDOW 2010b). When snowshoe hare populations are low, lynx will consume a multitude of other prey species, including red squirrel (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus*, *Dendragopus* spp., *Lagopus* spp.), flying squirrel (*Glaucomys sabrinus*), ground squirrel (*Spermophilus parryii*, *S. richardsonii*), porcupine (*Erethrizon dorsatum*), beaver (*Castor canadensis*), mice (*Peromyscus* spp.), voles (*Microtus* spp.), shrews (*Sorex* spp.), and fish. Ungulate carrion may also be consumed (USFWS 2010a).

Lynx are active throughout the year; their large hind feet help them move across heavy snow (CDOW 2010b). Individual lynx maintain large home ranges, generally between 12 to 83 square miles. The size of lynx home ranges varies depending upon the abundance of prey, the animal’s gender and age, season, and the density of lynx populations. When densities of snowshoe hares decline, for example, lynx enlarge their home ranges to obtain sufficient amounts of food in order to survive and reproduce (USFWS 2010a).

Lynx breed in late winter, and after a gestation period of approximately 9 weeks, females produce a litter of about four kittens in April or May (CDOW 2010b). The male lynx does not help with rearing young (USFWS 2010a).

Timber harvesting, recreation, and related activities, such as road construction, are the predominant land uses affecting lynx habitat. Lynx movements may be negatively affected by high traffic volume on roads that bisect suitable lynx habitat, and in some areas, mortalities due to road kill are high (USFWS 2010a).

Lynx occurrences are scattered throughout the Planning Area, but they primarily occur on National Forest System Lands. Lynx reported in the Planning Area are generally just passing through to more suitable habitat. Habitat on BLM-managed public lands is on the edges, adjacent to National Forest System lands. Of the total habitat mapped on the National Forest System and BLM-managed public lands in the Planning Area (approximately 34,000 acres), only approximately 20 percent (approximately 7,265 acres) is designated as winter habitat; the remaining 80 percent (approximately 26,880 acres) is designated as other habitat. Denning and winter habitat consists primarily of coniferous forests dominated by Douglas-fir and lodgepole pine, and associated aspen stands, in the subalpine and upper montane zones. Other lynx habitat includes lodgepole pine forest, montane shrublands, semi-desert shrublands, and riparian areas and wetlands communities. Habitat for the lynx in the Planning Area is depicted in Map 3-17, Canada Lynx Potential Habitat.

Three lynx linkages occur in the Planning Area. These areas are large blocks of habitat that provide landscape connectivity between LAUs. An LAU is an area at least the size used by an individual lynx, roughly 25 square miles to 50 square miles. Cover (vegetation) in linkages needs to be sufficient in quantity and arrangement in order to allow for the movement of lynx.

Bats (Townsend's big-eared bat *[Corynorhinus townsendii])* – Overall, little is known about the population sizes and distribution of bats in the Planning Area. Townsend's big-eared bat, a Colorado BLM Sensitive Species and a Species of Special Concern, can be found throughout Colorado, except on the eastern plains. Habitat includes mines, semi-desert shrub lands, caves, and structures in woodlands and forests up to, and above, 9,500 feet. In the Planning Area, this species most likely occurs in parts of Larimer County, but its presence on BLM-managed public lands is not known. Populations of Townsend's big-eared bats, especially nurseries and places of hibernation, are highly susceptible to disturbance, and are reported to be declining.

White Nose Syndrome (WNS), first documented in New York in 2006, is a poorly understood condition resulting in many bat deaths. The condition is named for the white fungus observed on the muzzles and wings of affected bats. The affliction has been observed throughout many eastern states, and is rapidly moving westward, having killed an estimated 400,000 bats to date (USFWS 2009). As of July 2010, the USFS indicated that it would close caves on National Forests and Grasslands in Colorado, Kansas, Nebraska, and most of Wyoming and South Dakota. This would limit human access to caves, which would, hopefully, prevent further spread of the disease. Scientists believe that it can be transported from cave to cave on clothing, boots, caving gear, and other equipment.

Gray wolf (*Canis lupus*) – Gray wolves in the Northern Rocky Mountain Distinct Population Segment in portions of Idaho, Montana, and Wyoming have recently been removed from listing under the ESA. Gray wolves that may occur in the Planning Area would likely be individuals from those areas. Outside of the Northern Rocky Mountain Distinct Population Segment, gray wolves are still protected by the ESA, and by the State as Endangered. Gray wolves once inhabited Colorado, but were eradicated by the mid-1930s. Over the past decade, the USFWS has reintroduced gray wolves into Wyoming, Idaho, Montana, New Mexico, and Arizona. Wolves can disperse over long distances and some observers believe it is only a matter of time before wolves start migrating into Colorado from the north and south. In February of 2006, District Wildlife Managers with the CDOW sighted

what was probably a wolf approximately 10 miles south of the Colorado-Wyoming border, north of Walden in Jackson County. In the fall of 2008, a radio-collared female dispersed from a pack in southwest Montana through Wyoming, Idaho, and northern Utah. In spring 2009, she traveled near Vail, Colorado, and was soon thereafter found dead in northwest Colorado (USFWS 2010c). No critical habitat has been designated for the endangered population of gray wolves that may occur in Colorado.

Black-footed ferret (*Mustela nigripes*) – Black-footed ferrets, considered to be one of the most imperiled mammal species in North America, are listed as Endangered by the USFWS and by the State of Colorado. Black-footed ferrets, once ranging Statewide, seemed never to have been abundant in Colorado. Their habitat included the eastern plains, mountain parks, and western valleys in grasslands or shrublands that supported some species of prairie dog (the ferret's primary prey). No ferrets have been recorded in the past 50 years in the Planning Area. A few active white-tailed prairie dog towns exist in the Planning Area on BLM-managed public lands, private lands, and the Arapaho National Wildlife Refuge in Jackson County. These areas may be large enough to support reintroducing the black-footed ferret. If the USFWS adds ferrets to the Jackson County list, it is likely that the BLM will have to consider impacts on this species. To date, no critical habitat has been designated for this species.

Wolverine (***Gulo gulo***) – Wolverines are listed by the State of Colorado as an Endangered Species. Wolverines are mammals of the dense forest, although they may follow their considerable appetite into open country. In Colorado, historical and recent reports show that nearly all wolverines are from higher elevations in areas of heavy timber. In 2009, researchers from the Greater Yellowstone Wolverine program confirmed the first wolverine in Colorado in 90 years. A male wolverine, tracked by GPS-satellite collar, was confirmed in the north-central part of Colorado in Rocky Mountain National Park. Very little, or no, habitat exists on BLM-managed public lands in the Planning Area Wolverines would likely occur at the periphery of the Planning Area, on National Forest System or National Park Service lands.

White-tailed prairie dog (*Cynomys leucums)* – The White-tailed prairie dog is listed as a Colorado BLM Sensitive Species and are animals of open shrublands, semi-desert grasslands, and mountain valleys. White-tailed prairie dogs feed on a wide range of grasses, forbs, and woody plants. White-tailed prairie dogs inhabit northwestern and west-central Colorado, to elevations over 10,000 feet, although most records are from below 8,500 feet.

White-tailed prairie dog towns create unique vegetative conditions that provide potential habitat for mountain plovers, black-footed ferrets, and burrowing owls. The number of prairie dog towns increased on BLM-managed public lands in North Park from 1984 to 2005. This increase has been a result in the reduction of prairie dog poisoning on private lands, and the decrease in shooting prairie dogs for sport.

White-tailed prairie dog colonies are present on BLM-managed public lands in the interior of North Park and northwest Larimer County; none exist in Middle Park. The colonies are most abundant in the area surrounding the Arapaho National Wildlife Refuge. See Map 3-15, White-tailed Prairie Dog Colonies.

Characterization

Indicators

Primary indicators for Special Status Species are their population numbers, population viability, and habitat stability. The BLM Standards for Public Land Health address these indicators (See Appendix J). Indicators for Standard 3, plant and animal communities are:

- 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 and landscape potential and exhibit resilience to human activities;
- Appropriate plant litter accumulates and is evenly distributed across the landscape; and
- Landscapes composed of several plant communities that may be in a variety of successional stages and patterns.

Indicators for Standard 4, Special Status and Threatened and Endangered Species are:

- All of the indicators associated with the plant and animal communities' standard apply;
- There are stable and increasing populations of endemic and protected species in suitable habitat; and
- Suitable habitat is available for recovery of endemic and protected species.

Special Status, Threatened, and Endangered Species (State and Federal) and other plants and animals (and their habitats) officially designated by the BLM must be maintained or enhanced by sustaining healthy, native plant and animal communities. The Standards are being maintained or enhanced when the indicators listed above are met.

For most of the Special Status Species, habitat loss and fragmentation have been, and remain, the primary cause of their imperiled status. Some of these species have also suffered from historic efforts to extirpate them, and some suffer competition or predation from species that have expanded their range or that have been introduced. By definition, the populations of all Special Status Species have historically suffered downward trends. Management efforts by the BLM, the USFWS, the CPW, and others, have reversed the downward trend for a number of these populations, but none of the populations are near their historic levels. Most remain at levels that are biologically insecure, regardless of their legal status. In addition to continued threats from habitat loss and fragmentation, variability in habitat condition is an ongoing factor in the distribution and density of these Special Status Species. For example, population viability for Special Status plant, fish, and amphibian species varies with hydrologic

conditions. Soil conditions further influence the populations of plants. Drought has reduced the amount or quality of habitat in some areas, further stressing populations of these species.

Trends

Special Status Plants

Population data from 1984 through 2005 indicate that most species inhabiting the Planning Area are either stable or are experiencing an upward trend. Incomplete data for pale blue-eyed grass makes a trend determination difficult, and should remain "unknown" until further research and inventory efforts can establish a trend for this species. Population data collected by the BLM and the CNHP for all other species listed above indicate that these are stable or expanding in range and population numbers.

Whether Special Status plant species can increase, or at least remain stable in the long term, will also depend upon continued inventory and monitoring efforts by land managers to identify and eliminate threats to their habitat and populations. These efforts are also necessary in order to identify and protect new populations that are currently unknown. Future management challenges include the increase in demand for recreational opportunities, the increase in the potential for loss of habitat or fragmentation of habitat, and the increase in demand for development of energy resources on BLM-managed public lands.

Special Status Fish

The alteration of habitats due to construction and operation of large dams (which capture sediment, reduce water temperatures, change river morphology below the dams, and cut off migration corridors) is one of the major factors that have contributed to the decline of these Special Status fish species. Other factors include water quality impairment; disease; hybridization; flow reductions resulting from water diversions and other water-depleting activities; physical changes and important habitat loss; non-native predatory sport fish species, such as smallmouth bass (*Micropterus dolomieu*), northern pike (*Esox lucius*), and channel catfish (*Ictalurus punctatus*); and various trout species, such as the brown, rainbow, and brook trout. A recovery program for the four Colorado Endangered fishes, managed by the USFWS, has been underway for several years.

The population status of the native Colorado River cutthroat trout is stable, and increasing due to the recent interest in reversing the downward trend of the species in Colorado. In recent years, the CPW, in cooperation with the BLM and the USFS, has re-established Colorado River cutthroat trout populations in historical habitat throughout Colorado. Since the early 1980s, the BLM and the USFS have emphasized the protection of aquatic habitat over conflicting uses where this important species exists. In June of 2006, the CDOW put in place a Conservation Agreement for Colorado River Cutthroat Trout throughout the States of Colorado, Wyoming, and Utah (CRCT 2006).

Special Status Wildlife

Animals that have been classified as Special Status Species have experienced serious downward trends in their populations and habitats in recent times. Of the species listed in Table 3-12**,** the following wildlife species have been documented as occurring in the Planning Area: bald eagle; peregrine falcon; brewer's sparrow; Columbian sharp-tailed grouse; Greater Sage-Grouse; white-tailed prairie dog; American white pelican; northern goshawk; white- faced ibis; Canada lynx; river otter; Townsend's big-eared bat; and northern leopard frog. Population data for these species from 1984 to 2010 indicate they inhabit the Planning Area, and are generally stable or in an upward trend. Imprecise data for Townsend's big-eared bat make a trend determination difficult, and should remain "unknown" until further research and inventory efforts establish a trend for this species. Population data collected by the BLM and the CNHP for all other species occurring in the Planning Area indicate that these are stable or expanding in range and population numbers. Information for species possibly occurring in the Planning Area is lacking, and no conclusion can be drawn as to their current trend.

Greater Sage-Grouse

One of the most important wildlife species, if not the most important, that depends upon the sagebrush vegetative type is the Greater Sage-Grouse. The downward trend of Greater Sage-Grouse, and its sagebrush-dominated habitat, throughout its historical range has become a focus of wildlife managers and land managers in recent years. With the recent interest in the long-term well-being of Greater Sage-Grouse and the sagebrush ecosystem, both the CPW and the BLM have committed to ensuring that this species remains a high priority for management (BLM 2004a). Greater Sage-Grouse populations have fluctuated greatly between 1984 and 2005 in both Middle Park and North Park. The CDOW counted Greater Sage-Grouse males on strutting grounds annually during these years. According to these counts, 1984 populations were at their lowest levels recorded between 1984 and 2005. Sage-Grouse males counted in 1984 totaled 466 in North Park and 190 in Middle Park. In the years from 2000 through 2005, counts in North Park were above 1,000; in 2007, total populations were recorded at 912. In Middle Park, counts have varied from 215 to 313 since 2000, with a population of 215 in 2007. From 2006 through 2011, the general trend in Greater Sage-Grouse populations in the Planning Area was decreasing.

3.2.7 Cultural Resources

Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public or scientific uses. Cultural resources may include definite locations (sites or places) of traditional cultural or religious importance to specific social or cultural groups. Cultural resources are concrete, material places and things that the BLM locates, classifies, and ranks. The BLM manages cultural resources according to their relative importance to protect significant cultural resources from inadvertent loss, destruction, or impairment, and to encourage and accommodate the appropriate uses of these resources through planning and public participation.

Cultural resources are the material and physical remains of prehistoric and historic human activity, occupation, or endeavor. Natural features, such as mountains and rivers, of importance in human history may also be considered cultural resources. Overall, these resources, which are fragile and non-renewable, embody characteristics and information specific to the cultural group who lived in the area, produced these resources, and to the period during which they were created. As such, each unique resource is important in, and of, itself.

The protection of cultural resources on BLM-managed public lands is provided for by an extensive framework of laws, rules, regulations, policies, standards, guidelines, EOs, and formal agreements. These laws and regulations, which have evolved over the past century, create a complex and strong framework for managing cultural resources for public benefit. (See Table 3-13: Cultural Resource Mandates and Authorities.)

The National Historic Preservation Act (NHPA) specifically guides management policy with regard to cultural resource protection, preservation, and management. The NHPA established the National Register of Historic Places (NRHP), which is a national program that coordinates and supports public and private sectors in the identification, evaluation, and protection of historic and archaeological resources. The NRHP provides an official listing of the Nation's historic places deemed worthy of preservation.

Section 106 of the NHPA (16 USC 470f) specifically, requires Federal agencies, including the BLM, to take into account the effects (impacts) of their activities on significant cultural properties, and specifies the procedures for meeting the statutory responsibilities. Section 110 of the NHPA (16 USC 470h2) sets out the broad historic preservation responsibilities of Federal agencies, and is intended to ensure that historic preservation is fully integrated into the ongoing programs of all Federal agencies. Federal agencies are responsible for collecting information about cultural resource sites within a Planning Area, as well as for identifying sites eligible for nomination to the NRHP. Specifically, Section 110 requires Federal agencies, including the BLM, to identify, evaluate, and nominate to the NRHP significant cultural properties under Federal ownership or control. The significance of historic properties, the factor which determines whether management of a specific cultural resource site is mandated, is determined by evaluating the property against the guidelines established under 36 CFR 60. (For the full text of this citation, visit: http://ecfr.gpoaccess.gov/)

Under the NHPA, historic properties are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register. The term includes, for purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term 'eligible for inclusion in the National Register' includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria" [36 CFR 800.2(e)].

Significant cultural properties can also include Heritage Areas or Traditional Cultural Properties (TCP). A TCP is defined as a cultural property that is associated with cultural practices or beliefs of a living community that: a) is rooted in that community's history; and b) is important in maintaining the continuing cultural identity of the community. Culture (is) defined as a system of behaviors, values, ideologies, and social arrangements. These features, in addition to tools and expressive elements (such as graphic arts), help humans interpret their universe as well as deal with features of their natural and social environments. Culture is learned, transmitted in a social context, and modifiable. {Some synonyms for culture include "lifeways," "customs," 'traditions," "social practices," and "folkways."} (Parker and King 1998).

A property is significant, and therefore eligible for nomination to the NRHP, if the quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that meet the following four criteria:

- are associated with events that have made a significant contribution to the broad patterns of our history; or
- are associated with the lives of persons significant in our past; or
- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

Typically, only properties 50 years or older may be considered significant; however, a number of exceptions apply for properties of unusual or exceptional significance (36CFR 60) (For a full list, visit: http://ecfr.gpoaccess.gov/).

The determination of significance for NRHP eligibility, with regard to cultural resource sites, is an exceedingly important process within the context of BLM cultural resource protection programs. Only sites identified as eligible for listing in the NRHP, and sites that require additional data for significance evaluation as potentially eligible sites, are entitled to resource management considerations. Sites evaluated as eligible, or potentially eligible, are protected through site avoidance. If avoidance is not possible, a mitigation strategy is developed in order to mitigate adverse impacts to sites. Sites evaluated as not eligible for the NRHP (after complete identification, description, and significance evaluation) are eliminated from further resource management considerations. The BLM also has the responsibility to protect cultural

resources on non-Federal lands for certain Section 106 undertakings, but the BLM has no responsibility for their long-term protection. Any and all permitted actions by the federal government in accordance with the NHPA and its implementing regulations must have a cultural resource inventory, i.e. split estate, for oil and gas exploration. Cultural resource sites are owned by the landowner.

Ordinarily, in accordance with 30 CFR 60(d), cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years are not considered eligible for the National Register. Such properties, however, will qualify if they are integral parts of districts that do meet the criteria, of if they fall within the following categories:

- a religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- a building or structure removed from its original location, but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- a birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or
- a cemetery that derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- a property achieving significance within the past 50 years if it is of exceptional importance.

This evaluation criterion pertains to a site's potential for yielding scientifically valuable information. The measure of the importance of the scientific data is based upon research questions widely recognized as appropriate by the scientific community. Sites most likely to yield these important data are those with intact cultural deposits, where artifacts and features are relatively undisturbed. In addition to retaining contextual integrity, sites with the highest research value are those likely to contain cultural features. Hearths, storage, or habitation structures often yield charcoal for radiocarbon dating, in addition to macrobotanical remains (plant remains recovered from archaeological contexts that can be seen with the naked eye), palynological remains (pollens and spores), and faunal (or animal) remains that can provide information on subsistence practices. Associated datable artifact assemblages may also be obtained. Sites with artifacts diagnostic of a particular temporal period or cultural group are also, generally, regarded as having higher research potential than those lacking diagnostic artifacts. Sites attributable to a specific chronological unit can be used to address specific research questions, and are regarded as important resources. Chronological units typically

employed within the Planning Area include the Paleoindian era (11,400 B.C. to 7,400 B.C.), the Archaic era (7,400 B.C. to 250 B.C.), the Formative era (400 B.C. to A.D. 1300), and the Protohistoric era (A.D. 1300 to 1881). [A more complete description of these prehistoric units is provided in Colorado Prehistory: A Context for the Northern Colorado River Basin (Reed and Metcalf 1999); and for North Park, the context for the Platte River Basin. In addition, a complete analysis of the types of prehistoric sites present within the Planning Area is provided in recent Class I Cultural Resource overviews for the KFO (Reed et al. 2008a).]

Historic sites can meet any of the four criteria listed above for eligibility to the NRHP. Frequently, however, the focus is on architectural significance or on association with events or individuals of historical importance. After a historic site is identified, site-specific historical research is often warranted in order to determine whether it was associated with an important individual or event. Additionally, the value of historic sites as archaeological resources should not be overlooked. When considering a historic site's archaeological value, the condition of structures or burial of cultural deposits are not as important as whether the site can answer questions of particular interest about the past.

Generally, sites that can be confidently ascribed to a particular historic theme and subtheme are regarded as having more research value than sites that cannot be ascribed to a theme. Themes are the most effective way of identifying and nominating properties. This is because themes provide a comparative analysis of properties associated with a specific area of history (such as transportation, water control, settlements, agriculture, industry, or recreation). In order to make the case for significance, organizing resources by themes provides a historic context so that significance may be judged for a number of related properties. Significant historic archaeological resources are those that are relatively undisturbed, that can be attributed to a specific theme, and that retain sufficient artifacts and features to permit further study. Generally, linear cultural resources (such as roads, trails, and ditches) possess little archaeological value , but in some instances they may retain engineering significance or be associated with important historic events. In addition, they may have other historic site types associated with them that are important archaeological resources, and where proper interpretation may depend upon identifying the linear site. Major historic themes employed in the analysis of historic site importance include mining, rural agriculture, settlements, industry, U.S. government and military, transportation, public works, tourism and recreation, and ethnicity (Church et al. 2007). A comprehensive breakdown of historic site types in the Planning Area is provided in Class I Resource Overviews for the Planning Area.

In addition to the protection of historic properties, Federal agencies are also required to take into account the impacts of all undertakings on traditional cultural properties. There have been no comprehensive efforts to identify TCPs within the Planning Area; however, a number of resources of this type are known. Consultation with affected Native American tribes has indicated that public lands within the Planning Area include part of ancestral homelands, thereby increasing the potential of TCPs and sacred sites. A few cultural resource sites are known to have specific traditional cultural importance. There are known religious sites and culturally sensitive areas that are of interest to Native Americans.

Based upon a series of amendments to the NHPA, TCPs must now be identified prior to commencement of potentially destructive Federal undertakings, much as archaeological sites are, and their significance must be evaluated. TCPs may be eligible for nomination to the NRHP if there is reason to believe that they are significant to the cultural group with which they are associated. Significance is assessed based upon information obtained through consultations with elders and other knowledgeable individuals from within a particular cultural group. The tribal consultation process, although introduced by the 1966 NHPA, was substantially strengthened by the 1992 amendment to the Act.

In order to aid the BLM in managing cultural resources under its jurisdiction, all sites within the Planning Area have been classified into one or more of the BLM's Cultural Resource Use Categories (Reed et al. 2008). These Use Categories are:

Scientific Use – This category applies to any cultural property determined to be available for consideration as the subject of scientific or historical study at the present time, using currently available research techniques. Study includes methods that would result in the property's physical alteration or destruction. This category applies almost entirely to prehistoric and historic archaeological properties, where the method of use is generally archaeological excavation, controlled surface collection, and/or controlled recordation (data recovery). Recommendations to allocate individual properties to this use must be based on documentation of the kinds of data the property is thought to contain and the data's importance for pursuing specified research topics,. Properties in this category need not be conserved in the face of a research or data recovery (mitigation) proposal that would make adequate and appropriate use of the property's research importance;

Conservation for Future Use – This category is reserved for any unusual cultural property which, because of scarcity, a research potential that surpasses the current state of the art, singular historic importance, cultural importance, architectural interest, or comparable reasons, is not currently available for consideration as the subject of scientific or historical study that would result in its physical alteration. A cultural propertyincluded in this category is deemed worthy of segregation from all other land or resource uses that would threaten the maintenance of its present condition or setting, as pertinent, and will remain in this use category until specified provisions are met in the future;

Traditional Use – This category is applied to any cultural resource known known to be perceived by a social and/or cultural group as important in maintaining the cultural identity, heritage, or well-being of the group. Cultural properties assigned to this category are to be managed in ways that recognize the importance ascribed to them and seek to accommodate their continuing traditional use;

Public Use – This category may be applied to any cultural property found to be appropriate for use as an interpretive exhibit in place, or for related educational and recreational uses by members of the general public. The category may also be applied to buildings suitable for continued use or adaptive use, for example as staff housing or admistrative facilaities at a visitor contact or interpretive sire, or as shelter along a cross-country ski trail; and

Experimental Use – This category may be applied to a cultural property judged well-suited for controlled experimental study, to be conducted by BLM or others concerned with the techniques of managing cultural properties, which would result in the property's alteration, possibly including loss of integrity and destruction of physical elements. Committing cultural properties or the the data they contain to loss must be justified in terms of specific information that Experimental study should aim toward understanding the kinds and rates of natural or human-caused deterioration, testing the effectiveness of protection measures, or developing new research or interpretation methods and similar kinds of of practical management information. It should not be appleid to cultural properties with strong research potential, traditional cultural importance, or good public use potential, if it would significantly diminish those uses.

Use categories [which are fully defined in BLM Manual 8110, Identifying and Evaluating Cultural Resources (BLM 2004c] are a dynamic classification that can change for a specific site, as additional cultural information is gathered.

The sites in the various use categories are subjected to a variety of threats. Human activities involving ground disturbances comprise a major threat to sites in all categories, except for those placed under the "Discharge from Use" Category. When sites are on BLM-managed public lands, or are associated with a Federal undertaking, the Section 106 process requires consideration of the impacts of the Proposed Action on the integrity of the site, but it does not necessarily prescribe preservation or archaeological data recovery excavations. All forms of development, grazing, OHV use, wildfires, and vegetation treatments can result in impacts to sites through direct disturbance, access leading to vandalism or inadvertent damage, and/or through the acceleration of natural processes (such as erosion). Natural soil erosion is also a threat to sites; however, in most cases, it is too pervasive to treat.

Sites placed in the Conservation for Future Use Category that are especially fragile include perishable structures (such as wickiups and tree platforms). Brush structures are susceptible to destruction as the result of burning, vegetation treatments, livestock grazing, vehicle use, and natural deterioration. Brush structures, which are unlikely to last very long in the archaeological record, are important for understanding prehistoric sites where traces of perishable structures have disappeared. Preservation is important as scientific approaches that focus on the structures, and on their associated activity areas, continue to evolve. Some degree of protection can be ensured if cultural resources in areas of old growth pinyon and juniper forest are inventoried and mapped for avoidance.

Sites placed in the Traditional Use Category can include landmarks, vegetation communities, archaeological sites, wickiups, burial sites, rock art sites, vision quest sites, and the locations of important events for Native Americans. Maintaining the integrity of site setting for Native American uses, including reducing visual impacts and noise, is often more important for these resources than for other property types.

Sites placed in the Public Use Category can range from historic ditches, roads, and railroads, to prehistoric sites where pithouses have been found to standing historic architecture. These sites are often avoidable when planning ground-disturbing activities; however, they are more susceptible to inadvertent impacts resulting from public use, accelerated natural processes, inadvertent impacts, fire, and damage by vandals. (In relation to cultural sites, vandalism can be reduced through education, discouraging vehicular access, and by monitoring site conditions.)

Sites on private lands, where no Federal permitted undertakings occur, are not protected from action such as agricultural developments, urban expansion, and other ground-disturbing activities commonly occuring on private lands without regard to significant archaeological resources. For instance, if the action is a permitted action by the federal government such as oil and gas exploration on split estate, historic properties would be identified and evaluated for data recovery potential.

The impacts of BLM actions on cultural resources are addressed through compliance with the National Historic Preservation Act (NHPA), as implemented through a national Programmatic Agreement (Programmatic Agreement among the Bureau of Land Management, the Advisory

Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act), as well as State-specific protocol agreements with the SHPOs. The National PA and the Colorado Protocol give the BLM flexibility in identifying cultural resources that meet criteria for National Register eligibility, and in determining impacts without consulting the SHPO for each routine undertaking. The Protocol outlines how the BLM and the SHPO interact, cooperate, and share information on an ongoing basis in order to ensure that the alternate procedures are consistent with the goals of the NHPA.

The BLM meets its responsibilities for consultation and government-to-government relationships with Native American tribes by consulting with appropriate tribal representatives prior to taking actions that affect tribal interests. The BLM's tribal consultation policies are detailed in BLM Manual 8120 (Tribal Consultation under Cultural Resource Authorities) and Handbook H-8120-1 (Guidelines for Conducting Tribal Consultation).

Table 3-13: Cultural Resource Mandates and Authorities

Laws and Proclamations
Antiquities Act of 1906 (PL 59 – 209; 34 Stat. 225; 16 USC 431 – 433)
Historic Sites Act of 1935 (PL 74 – 292; 49 Stat. 666; 16 USC 461)
Reservoir Salvage Act of 1960, as amended by the Archaeological and Historic Preservation Act of 1974 (PL 86 – 523; 74 Stat. 220, 221; 16 USC 469; PL 93 – 291; 88 Stat. 174; 16 USC 469)
National Historic Preservation Act of 1966, as amended (NHPA) (PL 89 – 665; 80 Stat. 915; 16 USC 470)
National Environmental Policy Act of 1969 (NEPA) (PL 91 – 190; 83 Stat. 852; 42 USC 4321)
Archaeological and Historic Preservation Act of 1974 (AHPA) (16 USC 469 – 469C)
Federal Land Policy and Management Act of 1976 (FLPMA) (PL 94 – 579; 90 Stat. 2743; 43 USC 1701)
American Indian Religious Freedom Act of 1978 (PL 5 – 431; 92 Stat. 469; 42 USC 1996)
Archaeological Resources Protection Act of 1979 (ARPA) (PL 96 – 95; 93 Stat. 721; 16 USC 470AA et seq.), as amended (PL 100 – 555; PL 100 – 588)
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (PL 101 – 601; 104 Stat. 3048; 25 USC 3001)
Regulations
36CFR Part 7 – Special Regulations, Areas of the National Park System
36CFR Part 60 – National Register of Historic Places (NRHP)
36CFR Part 79 – Curation of Federally Owned and Administered Archaeological Collections
36CFR 800 – Protection of Historic Properties
43CFR Part 3 – Preservation of American Antiquities; implementing regulations for the Antiquities Act
43CFR Part 7 – Protection of Archaeological Resources
43CFR Part 10 – Native American Graves Protection and Repatriation Act [NAGPRA] Regulations; Final Rule
Executive Orders
Executive Order 11593 – Protection and Enhancement of the Cultural Environment
Executive Order 13007 – Providing for American Indian and Alaska Native Religious Freedom and Sacred Land Protections
Executive Order 13084 – Consultation and Coordination with Indian Tribal Governments
Executive Order 13195 – Trails for America in the 21st Century
Executive Order 13287 – Preserve America
BLM Cultural Resource Mandates
BLM Manual 8100 – The Foundation For Managing Cultural Resources
BLM Manual 8110 – Identifying and Evaluating Cultural Resources
BLM Manual 8120 – Tribal Consultation Under Cultural Resource

Table 3-13: Cultural Resource Mandates and Authorities

BLM Manual 8130 – Planning For Uses Of Cultural Resources
BLM Manual 8140 – Protecting Cultural Resources
BLM Manual 8150 – Permitting Uses of Cultural Resources
BLM Manual 8160 – Preserving Museum Collections
BLM Manual 8170 – Interpreting Cultural Resources for the Public
BLM Departmental Manual Part 411 – Museum Property Management
BLM Handbook H-8120-1 – General Procedural Guidance for Native American Consultation
BLM Emergency Fire Rehabilitation Handbook, H-1742
Agreements
Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers regarding the manner in which the BLM will meet its responsibilities under the NHPA (1997).
State Protocol Agreement between the Colorado State Director of BLM and the Colorado State Historic Preservation Officer (SHPO) regarding the manner in which BLM will meet its responsibilities under the NHPA and the National Programmatic Agreement (NPA) among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NCSHPO) (1998).

Current Conditions

Information regarding the current state of cultural resources n the Planning Area is accumulated through Cultural Resource Inventory projects completed prior to implementation of management projects involving ground-disturbing activities. In association with these cultural resource projects, cultural resource sites are recorded and evaluated for eligibility for listing on the NRHP. In the Planning Area, these projects have been motivated, in large part, by planned projects, including prescribed fires and vegetation treatments, oil and gas development, livestock grazing, land exchanges, and recreational land use. Following recordation of sites, information regarding site type and condition are submitted to a State wide database of inventory reports and cultural resource records.

In June of 2007, a Class I Cultural Resources Inventory of the Planning Area was compiled using data from the Colorado Historical Society's Office of Archaeology and Historic Preservation (OAHP) site database and KFO site data base (Reed et al. 2008). The purpose of this Class I Inventory was to characterize the sites within the Planning Area; to develop a GIS database for site and previous inventory information; and to map areas of high, medium, and low sensitivity for cultural resources. According to the Class I Inventory, the Planning Area now contains 5,533 cultural resources representing a variety of site types and chronological periods. Known cultural resources include 1,944 sites with prehistoric components and 1,940 sites with historic components. A total of 462 sites are listed, or are eligible for listing, on the NRHP; another 624 sites are considered "Need Data" sites, by policy these sites are treated as historic properties until further evaluation. In total, 138

eligible sites, and one site listed on the NRHP, are in the Planning Area; as well as 287 "Need Data" sites (Reed et al. 2008).

In the Planning Area, three landscape units have been defined: the Middle Park Unit, the North Park Unit, and the Larimer Unit. The Middle Park Unit, which covers approximately 1,632,800 acres, is the largest of the three units. This unit is bisected from southeast to northwest by U.S. Highway 40. In the Middle Park Unit, a total of approximately 157,900 acres have been inventoried for cultural resources, comprising 9.7 percent of the total acreage. A total of 3,784 cultural resources are known to occur in the Middle Park Unit, including 1,343 with prehistoric components; 920 prehistoric isolated finds; and 14 prehistoric isolated features. Additionally, there are 1,403 sites with historic components; 132 historic isolated finds; and 192 historic isolated features. Among the three landscape units in the Planning Area, the Middle Park Unit has the highest site density, with nine sites and isolated features per square mile inventoried.

The North Park Unit covers approximately 1,048,800 acres. A total of 122,388 acres in the North Park Unit have been surveyed, accounting for 11.7 percent of the total acreage. A total of 1,424 cultural resources have been recorded in the North Park Unit, including 477 with prehistoric components; 425 prehistoric isolated finds; and 12 prehistoric isolated features. Additionally, 435 historic components, 82 historic isolated finds, and 26 historic isolated features have been recorded within this Unit. The North Park Unit has a slightly lower site density than the Middle Park Unit, with an average of five sites and isolated features per square mile inventoried.

The Larimer Unit is the smallest of the three units, covering approximately 451,800 acres. This Unit is largely undeveloped. Only 25,248 acres of the Larimer Unit have been inventoried for cultural resources, representing 5.6 percent of the total acreage. A total of 325 cultural resources have been identified in the Larimer Unit, including 124 sites with prehistoric components and 102 sites with historic components, as well as 85 prehistoric isolated finds; 11 historic isolated features; and 13 historic isolated finds. The Larimer Unit has a much lower site density than the North Park Unit, likely reflecting the low level of cultural resource inventory that has occurred in this area.

In order to more thoroughly understand the distribution of prehistoric and historic sites in the Planning Area, analyses of trends in site distribution were included in the Class I Inventory (Reed et al. 2008). Data from this analysis divided estimated site sensitivity for sub-units in the Planning Area into areas of high, moderate, and low sensitivity. The data was based upon such factors as elevation, slope, aspect, vegetation community, deer populations, distance to water, and soil type. Estimated historic site sensitivity (which was also categorized by area as high, moderate, or low) is based upon such factors as known transportation corridors and proximity of BLM-managed public lands to private lands (Reed et al. 2008).

Characterization

Trends and Indicators

Overall, the KFO Cultural Resource Program is based upon the completion of Cultural Resource Inventories associated with development and land management projects. Based upon the results of these surveys, cultural resource sites continue to be identified and added to the site database. Significant sites with the potential to be affected (impacted) by projects are slated for project avoidance or mitigation measures. Cumulative impacts to sites are identified, and described, as sites are re-evaluated during subsequent inventories. It is not possible to provide a quantitative analysis regarding the condition of cultural resources in the Planning Area, but it is possible to identify some trends that characterize the condition of the resource as a whole.

In the Planning Area, increases in the frequency of recreational activity, especially OHV use, have resulted in substantial impacts to cultural resource sites. Other important trends include increases in oil and gas development, and increases in the frequency of vegetation treatments. In addition, livestock grazing and land exchanges have the potential to impact cultural resource sites.

In the Planning Area, OHV use has an extremely high potential to impact cultural resource sites. This is due to the increasing popularity of this pursuit in this area, and the capacity this activity has to damage cultural resources. OHV use is especially popular in Middle Park (north of Kremmling) and in North Park (near the North Sand Hills SRMA, which is managed for OHV use). Impacts resulting from OHV use are greatest when vehicle operators stray from designated routes and drive across sites; an activity that can result in serious damage to surface cultural remains. Additionally, the creation of unauthorized trails may improve the quality of access to remote areas, which, in turn, results in increasing levels of site vandalism (Nickens et al. 1981). User-created roads, and this type of occurrence, have become more frequent on BLM-managed public lands in the Planning Area as OHV use has increased, and ever-increasing numbers of routes are needed in order to accommodate recreationists. Recently, an effort has been made by KFO personnel to close or re-route OHV roads experiencing serious environmental impacts. In addition, the KFO plans to encourage compliance with travel regulations. These programs will, undoubtedly, result in beneficial impacts to sites threatened by OHV recreation.

In addition to OHV use, BLM-managed public lands in the Planning Area are increasingly being used for other recreational activities, including hiking, camping, mountain biking, horseback riding, hunting, and fishing. The numbers of recreational visitors to the Planning Area is increasing rapidly, as the Denver metropolitan area expands and visitors from this area come to the KFO for recreational opportunities. This trend will likely result in substantial negative impacts to cultural resources, as these types of activities result in increased numbers of visitors to public lands. Increased traffic across sites has the potential to create site disturbance from surface trampling or unauthorized collection. Disturbance is also likely to occur when campers move site features (such as rock walls or brush structures) to improve campsites.

The Planning Area has experienced only small and concentrated oil and gas development in the past, but the recent discovery of gas reservoirs in North Park suggests that similar development may occur in the future. Sudden growth in oil and gas development would result in major impacts to the cultural resource base in the Planning Area. The construction of well pads, pipelines, and access roads creates substantial surface disturbance, and improves the quality of access to remote sites. Improved site access, in turn, encourages site vandalism, including unauthorized artifact collection (Nickens et al. 1981). Environmental analysis, and the associated site documentation and mitigation measures, will alleviate certain impacts to sites, but the cumulative impacts to sites created by improved access are impossible to mitigate completely.

Vegetation treatments and prescribed burns have the potential to result in impacts to cultural resource sites. This is due, in large part, to the ground-disturbing mechanical equipment used to complete these projects. Mechanical treatment activities can include thinning, crushing, cutting, chipping, lopping, and chaining. Impacts from these activities are likely to include soil churning and uprooting of vegetation. Impacts from prescribed burns may include burning of wooden structures and spalling of rock faces. Excavation of fire lines can also create large linear areas of surface soil disturbance. Vegetation treatments have been conducted with increasing frequency in the Planning Are due to the MPB epidemic that Colorado is currently experiencing. Some vegetation treatment projects have been completed in order to minimize the inappropriate growth of understory vegetation. Many of these projects are being conducted in areas of wildland-urban interface (WUI), and are, therefore, expected to result in fewer impacts on cultural resource sites. Cultural Resource Inventories are conducted prior to project implementation in order to identify significant sites and to arrange for site avoidance or mitigation.

Wildfires occur infrequently in the Planning Area, but when they do occur, they can result in serious impacts to cultural resource sites. These impacts, which are similar to the impacts associated with prescribed burns, include burning of wooden structures, spalling of rock faces, and surface soil disturbance from fire line excavation. When fires do occur, Resource Advisors are sent to coordinate with suppression personnel in order to ensure site protection when possible.

Livestock grazing is another significant source of cultural resource site disturbance in the Planning Area. Grazing has been a vital part of the regional economy for many years, and the impacts resulting from this land use are relatively stable and predictable. The impacts from grazing, however, are significant. Grazing animals can disturb or destroy surface remains by trampling or by toppling standing structures. This disturbance is most pronounced where animals congregate in large groups, which tends to occur in areas surrounding water sources. As grazing allotments were leased prior to the implementation of current cultural resource management practices, in many cases, it is often difficult to protect cultural resources on grazed land. When permits are renewed, a cultural resource assessment is completed designed to determine the number and type of of historic properties, and to assess the potential for impacts to these sites in the allotments. Subsequently, areas of livestock concentration are inventoried, historic properties are treated, and historic properties are monitored to mitigate adverse impacts occurring from livestock grazing.

Land exchanges and sales are another source of impacts to cultural resource sites in the Planning Area. Land exchanges on the KFO have become less common than they have been in the past (such as during the 1990s), but they still occur from time to time. Land exchanges, while they do not result in site destruction *per se*, still function to remove sites from public management and protection, which may, in turn, lead to detrimental impacts. These impacts are managed by conducting Cultural Resource Inventories of tracts planned for exchange. Generally, impacts to significant sites that may be exchanged are mitigated through data recovery or, alternatively, protected through long-term conservation easements.

Overall, the general condition of the cultural resource base in the Planning Area has declined in recent years as more and more recorded sites experience the detrimental impacts of natural processes (such as those related to wind and water erosion) and human activities. Additional cultural resource sites will be discovered and recorded in the future, but disturbance to existing sites is cumulative and irreversible. This is because every site represents a unique entity.

The primary source of human-caused impacts to cultural resource sites in the Planning Area has involved the recreational use of BLM-managed public lands. Recreation-related impacts are especially difficult to control. This is because they often result from unpredictable and illicit actions. The KFO has experienced a dramatic rise, associated with increasing recreational development, in the availability of access to remote areas. These increases in access can have extremely damaging impacts to sites. Access improvements raise the number of visitors to sites and, consequently, significantly raise the potential for vandalism (Nickens et al. 1981).

Increasing development in the Planning Area emphasizes the need for increased site-protection measures, including monitoring of significant sites. Increasing levels of development have also resulted in beneficial impacts to sites. Project-driven Cultural Resource Inventories are, of necessity, focused on the locations where projects are expected to occur rather than on the locations where archaeological research questions may best be answered. The completion of numerous Cultural Resource Inventories, in addition to site testing and data recovery excavations, nevertheless leads to the accumulation of large amounts of cultural resource data. The KFO has also pursued partnerships with several academic institutions, including the University of Wyoming, the University of Northern Colorado, the University of Southern Florida, the Colorado School of Mines, and Colorado State University, to support regional research in archaeology. This collaboration serves to facilitate the dissemination of important information regarding cultural resources to the public.

3.2.8 Paleontological Resources

The BLM is responsible for managing the public lands, and their various resources, so that they are utilized in a manner that will best meet the present and future needs of this Nation. The western U.S. has a fossil record that includes almost all of the geologic periods from the Cambrian (500+ million years ago) to the Holocene (the last 10,000 years), and nearly every imaginable ancient environment. Many fossil deposits are of national and international importance, and many thousands of different kinds of fossils were originally made known to the scientific world from specimens first found in the West (BLM 2009h).

The BLM manages fossils as a natural heritage resource on BLM-managed public lands under the general guidance of the FLPMA and the NEPA. Paleontological resources constitute a fragile and non-renewable scientific record of the history of life on Earth. BLM policy is to manage paleontological resources for scientific, educational, and recreational values, and to protect these resources from adverse impacts. To accomplish this goal, paleontological resources must be professionally identified and evaluated. Paleontological data must be considered as early as possible in the decision-making process.

The BLM Potential Fossil Yield Classification (PFYC) system is used to classify paleontological resource potential to assess possible resource impacts and mitigation needs for actions involving surface disturbance, land tenure adjustments, and land use planning. (This system replaces the Condition Classification in BLM Handbook H-8270-1 for Paleontological Resource Management.)

The PFYC system provides a uniform method designed to assess the potential occurrences of paleontological resources, and to evaluate possible impacts using geologic units. Occurrences of paleontological resources are closely tied to the geologic units (such as formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at, or near, the surface. It is intended to be applied in broad approach for planning efforts, and as an intermediate step in evaluating specific projects.

Using the PFYC system, geologic units are classified based upon the relative abundance of vertebrate fossils, or scientifically significant invertebrate or plant fossils, and their sensitivity to adverse impacts. A higher class number indicates a higher potential. It is not intended to be applied to specific paleontological localities or to small areas within units. Occasionally, significant localities may occur in a geologic unit, but a few widely scattered important fossils or localities do not necessarily indicate a higher class. Instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment:

- **Class 1: Very Low –** Geologic units that are not likely to contain recognizable fossil remains (Igneous, metamorphic, or Precambrian rock units).
- **Class 2: Low –** Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils.
- **Class 3: Moderate or Unknown –** Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or sedimentary units of unknown fossil potential.

- **Class 4: High –** Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface-disturbing activities may adversely affect paleontological resources in many cases.
- **Class 5: Very High –** Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

Class 4 and Class 5 units may be combined as Class 5 for broad applications (such as planning efforts or preliminary assessments) when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation measures, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application. Field surveys by qualified Paleontologists are needed in order to assess local conditions prior to surface-disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions.

Under this system, management prescriptions for resource preservation and conservation through controlled access or through special management designation should be considered. Official designation of areas of avoidance, special interest, and concern may be appropriate. Onsite monitoring may be necessary during construction activities.

In the Planning Area, paleontological resources are integrally associated with the geologic rock units in which they are located. Caution must be exercised when comparing fossils to rock units because paleontological work is often conducted in certain areas. Other areas may also contain fossils, but they have not been examined and evaluated (Armstrong and Wolny 1989).

The greatest potential for impacts would result from actions that include direct large-scale disturbance of bedrock, weathered bedrock, or unconsolidated alluvial deposits that may include fossils of more recent geologic age. These actions include excavation and land-clearing activities associated with oil and gas development, mining, and road construction. BLM management actions regarding surface-disturbing activities will affect paleontological resources. In addition, vandalism and unauthorized collecting can directly destroy paleontological resources, or remove them from their context and availability for scientific study. Increased access associated with new development and increased recreation use leads to increased access to paleontological sites.

Current Conditions

A comprehensive Paleontological Inventory has not been carried out for the Planning Area, but many studies have been conducted. Over 1,000 paleontological localities have been documented in the Planning Area. Fossils recovered from these localities represent a diverse array of plants, invertebrates, and vertebrates. Scientific activity has occurred during the past several years, and there are active paleontological Special Use Permits issued for BLM-managed public lands.

The Planning Area contains 59 named formations at the surface, 23 of which are known to contain fossils (Armstrong and Wolny 1989). These formations, however, have differing potentials to contain significant fossils. Table 3-14: Geologic Formations within the Planning Area with Paleontological Resources presents formations classified as Class 3 or Class 5.

Table 3-14: Geologic Formations within the Planning Area with Paleontological Resources

Formation	Fossils	Fossils
Tbp, Browns Park	None known	Class 5
Tt, Troublesome	Mammals, including squirrels, rabbits, horned gophers, horses, camels, oreodonts (sheep-like ungulates), and coprolite (fossilized scat) with fossil rodent skulls, cats, insects, and hackberry seeds	Class 5
Tnp, North Park	Mammals, including horses	Class 5
Twr, White River	Mammals, including horses, brontotheres (rhino-like herbivore), squirrels, reptiles, and amphibians	Class 5
Jm, Jmr, Jme, Jms, Jmre, Morrison	Allosaurus and other dinosaur bones	Class 5
TRcc TRc, TRPcs, TRPcp, Chinle	None known	Class 5
Q, Quaternary	Shark teeth and other petrified sea and lake life (redeposited?), horse, large bovid, and snails	Class 3
Qg, Gravels and Alluviums (Pinedale and Bull Lake Age)	Same as Quaternary	Class 3
Qgo, Older Gravels and Alluviums	None known	Class 3
Qe, Eolian Deposits	None known	Class 3
Qd, Glacial Drift of Pinedale and Bull Lake Glaciations	None known	Class 3
Qdo, Older Glacial Drift	None known	Class 3
Ql, Landslide Deposits	None known PFYC 3	Class 3
Td, Dry Union	Mammals, rodents, and other vertebrates	Class 3
Tgv, Bouldery Gravel on Old Erosion Surfaces in Front Range	None known	Class 3
Tc, Coalmont	Fish, freshwater fish, fish bones and scales, beetles and other insects, plant remains, pollen and spores, leaf and seed pod imprints, seams of coal, but no petrified wood or fossil logs	Class 3
Tm, Middle Park Formation, Windy Gap Member	Plants	Class 3

Table 3-14: Geologic Formations within the Planning Area with Paleontological Resources

Formation	Fossils	Fossils
Mz, Mesozoic Rocks	Various	Class 5
MzPz, Mesozoic and Paleozoic Rocks	Various	Class 5
Kp, Pierre Shale, Undivided	Ammonites (marine mammals), baculites (marine mammals), nautilus, bivalves, clams, gastropods, mosasaurs, (marine reptiles), scaphites (cephalopod), and oysters	Class 3
Kc, Colorado Group - Niobrara Formation, Benton Shale, and Graneros Formations	Various	Class 3
Kn, Niobrara	Clams and oysters, fish scales, marine reptiles, mosasaurs, and ichthyosaurs	Class 3
Kc, Benton Shale	Clams, scaphites, baculites, and oysters	Class 3
Kcg, Kc, Kpg, Graneros	Forams	Class 3
Kdp, Kd, Dakota Sandstone	Dinosaur bones and tracks	Class 3
Kdp, Purgatoire	None known	Class 3
Jmr, Jme, Jmre, Ralston Creek	None known	Class 5
Jmse, Jmce, Entrada Sandstone	None known	Class 3
Jms Sundance	Ammonites, belemnites (cephalopod), and oysters	Class 5
TRPs, State Bridge	Brachiopods, vertebrates	Class 3
TRPjs, Jelm	None known	Class 3
TRPl, Lykins	None known	Class 3
TRch, TRcc, Chugwater	Fossil plants	Class 3
TRPjs, TRPennlf, Lyons	None known	Class 3
TRPjs, Satanka	None known	Class 3
TRPr, Triassic and Permian Rocks	Various	Class 3
PPennm, PPennwm Maroon	None known	Class 3
Pennmb, Pennmbe Minturn	Scientific invertebrates, shark teeth, and also conifer	Class 3
PPenncf, Casper	None known	Class 3
TRPennlf, PPennf, PPenncf, PPennif, Fountain Formation, Lower Part	None known	Class 3
MCamb, MDO, MD, MDCamb, MdCamb, Leadville Limestone	Algal layers and mixed invertebrate skeletal packstones from an intertidal environment	Class 3

Table 3-14: Geologic Formations within the Planning Area with Paleontological Resources

Formation	Fossils	Fossils
MCamb, MDO, DOCamb, Williams Canyon Limestone	None known	Class 3
MD, MDCamb, Gilman	None known	Class 3
MD, MDCamb Dyer	None known	Class 3
MD, MDCamb, DO Parting	None known	Class 3
DOCamb, OCamb, Manitou Limestone	None known	Class 3
MDCamb, Cambs, Sawatch Quartzite	None known	Class 3

*Formations were originally evaluated in accordance with the BLM Handbook H-8270-1, for Paleontological Resource Management. Class 3 is equivalent to Condition 2, and Class 5 is equivalent to Condition 1.

Source: BLM 2007f

Characterization

Indicators

Paleontological resources are indicated by both the presence of, and potential for, the presence of vertebrate and scientifically important fossils or physical or chemical records of past life or climates. In addition to the potential presence of paleontological resources in the formations listed above, there are known fossil locations in the Planning Area, including the Kremmling Cretaceous Ammonite Locality, which has been designated an Area of Critical Environmental Concern and State of Colorado Natural Area.

Trends

The Kremmling Cretaceous Ammonite Area of Critical Environmental Concern (ACEC) (approximately 198 acres) is managed for scientific and educational purposes. The ACEC, due to its designation, allows the BLM to manage for public use and enjoyment while, at the same time, protecting the site from casual collecting activities. The area is rather remote, and all visitors to the site must go to some degree of effort to find it. Locals and others who know that ACEC location do not request access information, and it is unknown how many of these visitors use the site yearly. Other visitors are required to contact the KFO in order to obtain maps and other information (which allows KFO personnel to discuss the protected status of the site, track visitor use, and provide some cautions regarding safety).

Interest in fossils and paleontology has been greatly stimulated in recent years, bringing new avocational and professional visitors to the known fossil locations, and increased exploration with the goal of discovering new fossil localities. This has, in turn, increased agency concern for potential impacts to the resource from vandalism and theft. The current trend of paleontological resource interest and scientific activity is likely to continue or increase slightly. Clearances and monitoring of surface-disturbing activities, land tenure adjustments, and scientific research are anticipated to be the primary means of identifying paleontological localities.

3.2.9 Visual Resources

The FLPMA mandates the protection of scenic values. In accordance with Section 102 of the FLPMA, public lands are to be managed in a manner that will protect the quality of scientific, scenic, historical, and archeological values. The BLM is also required to preserve and protect certain public lands in their natural condition. In accordance with Section 201 of the FLPMA, the BLM is required to prepare and maintain, on a continuing basis, an inventory of all public lands and their resource and other values. In response to these requirements, the BLM uses a process called Visual Resource Management (VRM). The BLM, using this process [Visual Resource Management (VRM)], systematically identifies and evaluates visual values to 1) determine existing scenic values in the human environment and 2) inform the development of VRM Class objectives that guide appropriate level of scenery (visual) management.BLM Handbook 8410-1, Visual Resource Inventory Handbook (BLM 1986a) sets forth the procedures for inventorying scenic values and establishing VRM objectives (referred to as Management Classes). The BLM's VRM process provides an objective and systematic method to a) scenic values to identify and evaluate existing conditions, b) determine the appropriate levels of management as VRM Class objectives, c) analyze potential visual impacts to the human environment, and d) apply visual design techniques to meet the designated VRM Class objectives. The objective of VRM is to manage BLM-managed public lands in a manner that will protect the quality of the scenic values.

The VRM system consists of four stages:

1. Inventory for visual values based on visual sensitivity, scenic quality, and distance zones, which are placed into VRI classes in accordance with the VRI Class Matrix (Handbook H-8410-1);
2. designate VRM classes with their respective objectives during the land use planning process;
3. analysis (visual contrast rating) during RMP implementation, which:
    a. analyzes environmental effects against the existing conditions baseline—as quantified under each of the three inventoried values of the VRI
    b. evaluates conformance with VRM class objectives—the administrative land use decisions within the RMP ROD.
    c. identifies adverse visual contrast and determine appropriate design treatments to reduce the adverse contrast.

4. Update the VRI reflecting changed conditions as a result of decisions made under the implementation of the RMP.

The inventory stage involves identifying the VRI values (i.e., visual sensitivity, scenic quality and distance zones) and placing BLM-administered public lands into one of the four inventory classes. [The process is described in detail in BLM Handbook H-8410-1, Visual Resource Inventory (BLM 1986a)] VRI Class II having the highest inventoried visual value, VRI Class IV having the lowest, and VRI Class I being reserved for those lands where a Congressional or administrative decision to manage for preservation was already established, such as a Wilderness Area. VRI provides the foundation for designating visual resources when management classes are established during the RMP process. (See Table 3-15: BLM Visual Resource Management Class Descriptions.)

Table 3-15: BLM Visual Resource Management Class Descriptions

VRM Class	Class Objective
I	Preserve landscape character. This class provides for natural ecological changes, but does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	Retain existing landscape character. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
III	Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.
Rehabilitation Areas	Areas in need of rehabilitation should be flagged during the inventory process. The level of rehabilitation is determined through the RMP process by assigning the VRM approved for that particular area.

Source: BLM 1986a

VRM management class decisions consider visual values established by the inventory, along with land use allocations, desired outcomes, and future desired conditions. The VRM management classes may differ from inventory classes, based upon management priorities for land uses and compatibility with land use allocations. For example, VRM Class IV does not necessarily imply low scenic quality, as would be the case with a VRI Class IV. There may be situations where a high visually valued area may be managed under the VRM Class IV objectives to meet certain land management priorities. The inverse may also occur. These area-specific objectives provide the standards for planning, designing, and evaluating future management projects. The VRM process provides a means to identify visual values; to establish objectives through the planning process for managing those values in conformance with other allocation decisions; and to provide timely inputs for proposed resource uses and management activities, to ensure the objectives are met.

The analysis stage, which is conducted during implementation of the Approved Plan, involves determining whether the potential visual impacts from proposed resource uses and management activities would meet the management objectives of VRM Classes established for the area through land use planning, or whether design adjustments would be required. A Visual Contrast Rating process is used that involves identifying a key observation point from where an analysis is done. [This process is described in BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986b).]

The analysis can be used as a guide for resolving visual impacts. The BLM may attach mitigation through stipulations, Conditions of Approval (COAs), or special design requirements to bring a proposal into compliance. The BLM may also work with the proponent to modify a proposal or relocate it, or may deny the proposal. According to Washington Office (WO) Information Bulletin Number 98-135, visual design techniques and BMPs must be incorporated in environmental documents and on-the-ground operational decisions to mitigate the potential for short-term and long-term impacts resulting from all resource uses and management activities. Since the overall VRM goal is to minimize visual impacts, mitigating measures should be prepared for all adverse contrasts that can be reduced. This includes reduction of contrast in projects which have met the VRM Class objectives (Visual Contrast Rating Handbook H-8431-1, III.D.4). Examples of management resource uses and activities include energy development, utility corridors, road construction, recreational activities and OHV use, mining, vegetation treatments, and increased urban infrastructure needs and associated development (e.g., roads, power lines, water tanks, and communication towers).

Current Conditions

The landscape in the Planning Area varies greatly, and includes mountains, ridges, narrow and broad river valleys, rolling hills, numerous lakes and reservoirs, and sand dunes. Two mountain parks dominate the Planning Area: North Park and Middle Park. North Park is predominately an open landscape composed of flat valleys and rolling hills. Volcanic activity, faults, landslides, and erosion have created the current landscape, and have produced ridges, isolated mountain peaks, rock outcrops, and waterways. Middle Park is a synclinal basin surrounded by mountain ranges. Vast amounts of volcanic activity, faulting, landslides, and erosion have altered the landscape, leaving features such as canyons, isolated mountain peaks, rocky outcrops, rounded hillsides, and flat valleys. These features, taken together with

vegetation, create a variety of landscape compositions. A great deal of the KFO landscape is highly visible, and has a high degree of sensitivity. Most of the valley bottoms are privately owned and within the foreground of the viewsheds, while adjacent public lands serve as important scenic backdrops and visual open space.

Portions of the Planning Area are still largely undeveloped. An increase in development and urbanization has changed the visual landscape since the 1984 KFO RMP (BLM 1984b) was written, which is most evident in Grand and Summit Counties. Development in the Planning Area includes, but is not limited to, public gravel pits, oil and gas development in North Park, and range improvements such as fencing and water developments. Changes to the Planning Area include, but are not limited to, the development of the Wolford Reservoir on the Muddy Creek drainage in Grand County; and an upgrade to the powerline corridor on the east side of Grand County, which is not expected to change the viewshed. A new utility corridor is being proposed through the southern section of Grand County.

In addition, impacts to the landscape are occurring due to the MPB outbreak, which affects tree health and longevity. The middle-ground viewshed is changing due to the removal of dead trees. Timber removal areas are designed to look like naturally occurring clearings to minimize the changes to the viewshed, although subdivisions in heavily forested areas are becoming more visible with tree removal. Impacts from tree removal will be noticeable until the areas are revegetated with trees.

The scenic quality of the Planning Area is of national significance, and is an important part of the local and State economy. Many people live and recreate in the Planning Area due, in part, to its remoteness and visual qualities. The visual setting is an important part of the lifestyle in both North Park and Middle Park.

The Planning Area contains two Scenic Byways: the Cache la Poudre-North Park (a State Scenic Byway), and the Colorado River Headwaters (which recently became a National Scenic Byway). The Cache la Poudre-North Park Byway begins east of Walden on Colorado Highway 14 and ends in downtown Fort Collins. The Colorado River Headwaters Byway starts in Grand Lake and ends at State Bridge and Colorado Highway 131. Tourists and local residents drive through the landscape expecting to see open mountain vistas, rushing water, high-forested slopes, and vast rolling sagelands. To most travelers, the scenery (visual resource) is an important part of their trip. Most of the BLM-managed public lands in the Planning Area provide the foreground and middle-ground landscapes of scenic mountain vistas. Development on these lands has affected the vistas seen when driving through the area.

When traveling through North Park, the views are predominantly of open rolling hills covered with grasses and sagebrush. The mountains surrounding North Park, and the foothills bordering North Park, draw the attention of travelers. The foothills offer vistas of open sagebrush on the southern exposure, and pine and aspen forests on the northern exposure. Throughout the center of North Park, water features and ridges break up the sagebrush hillsides. Creeks and rivers wind through the hills, displaying riparian vegetation communities and flowing water. Four lakes in the northwest portion of North Park give this area additional variety. The ridges that run across North Park are composed of rock outcrops and open sage grasslands. The rock outcrops and mountains break the line of the rolling rounded hills.

Other features in North Park are the result of human activities. The town of Walden is the center of activity for the North Park area, although there are a few other small towns in North Park, namely Rand, Gould, Coalmont, and Cowdrey. Some additional impacts that are the result of human activities include the oil and gas fields east of Walden and the power lines cutting across the landscape. From the major traffic routes, these activities and developments are visible; they do not dominate the landscape. Visitors still can see the countryside, get a feeling of remoteness, and enjoy the mountain vistas.

Middle Park has more landscape diversity than North Park. When traveling through the area, visitors observe a landscape that is constantly changing. Travelers see the open, rolling sagebrush hills, but these do not dominate all views. In the northwest, the rolling hills are interrupted by isolated mountain peaks that have rocky south faces and forested north faces. The Colorado River bisects Middle Park, flowing in an east- to- west direction, running through Byers Canyon in the east and through steep-walled Gore Canyon in the west. As the river flows out of Gore Canyon, it winds through hills composed of reddish-orange, rocky soils. Pinyon-juniper-covered hills provide a diversity of color and texture along the riverway. The main highway traverses Byers Canyon, allowing travelers to see the steep, dark, vertical canyon walls. Several major power lines, and a railroad, cut across the landscape.

The human-made features on the east side of Middle Park are mainly the result of tourism. The largest town is Granby; other communities include Hot Sulphur Springs, Grand Lake, Fraser, Tabernash, and Winter Park. The east side of Middle Park has ski areas, several subdivisions, gateway access to Rocky Mountain National Park, and recreational access to three large lakes. Many homes on this side of Grand County have been built in the forested areas, and serve mainly as recreational homes ("second homes"). The human-made features on the west side of Middle Park include the communities of Kremmling, Parshall, Heeney, Radium, Rancho del Rio, and State Bridge. The area also has several isolated communities or subdivisions, large ranches, and many new ranchettes, along with several dude ranches. Three large reservoirs are scattered throughout the west side of Middle Park, giving this area additional variety and interest.

In preparation for the planning effort, the Visual Resource Inventory (VRI) was updated in accordance with BLM Handbook H-8410-1. As stated above, the VRI process involves considering the scenic quality, sensitivity, and visibility of the landscape, and assigning VRI classes. Due to time and budget constraints during the planning process, the KFO only updated the sensitivity component of the inventory. A VRM assessment was conducted in 2007 (Otak 2007), which created a viewshed analysis of the major transportation corridors throughout the Planning Area. In addition to the viewshed analysis, the VRM assessment gathered data from communities, counties, and other land management agencies regarding sensitive viewsheds (Otak 2007). The results of this VRM assessment, combined with the North-Central Colorado Community Assessment Report (BLM 2007g), were used to update the sensitivity component of the inventory. Table 3-16: Visual Resource Inventory Classes for the KFO Decision Area summarizes the acreages of this updated inventory.

In addition to the viewshed analysis, the VRM update (Otak 2007) included outreach, and a data gathering process, with all towns and counties, the State, and adjacent National Forests (the White River and the Routt National Forests) in the Planning Area. Current information was collected regarding urban boundaries and zoning, as well as information relating how the community or agency addresses visual and scenic resources within its jurisdiction. The information gathered was compared with the BLM's existing VRM classes, and differences were identified. Those discrepancies and management conflicts were eliminated through changes in VRM classes to ensure that BLM objectives were aligned with neighboring communities and planning objectives of other agencies.

Table 3-16: Visual Resource Inventory Classes for the KFO Decision Area

VRI Class	Acres	Percent of Decision Area
I	0	0
II	185,148	49
III	150,130	40
IV	42,759	11

Characterization

Indicators

The three VRI components (scenic quality, visual sensitivity and distance zones) represent the relative quality of the visual resources. These components are then used to place BLM-administered public lands into four inventory classes. These classes provide the basis for considering visual values in the RMP process. Designation of the VRM classes are established during the RMP process. Designation of VRM classes enable managers to specify the a) degree of alteration of the characteristic landscape and b) noticeability of those alterations consistent with all MLR program objectives. Visual values are considered both during and after the RMP planning process.

Trends

According to the North-central Colorado Community Assessment Report for the KFO (BLM 2007g), community concerns and interests regarding visual resources in the Planning Area are as follows:

- recreation and scenic beauty were the most commonly cited reasons that people live in, or visit, the communities in the Planning Area;
- communities are concerned about impacts to forest visual resources resulting from the MPB infestation;
- communities are concerned about impacts to visual resources resulting from wildfires;

- communities are concerned about the proliferation of unauthorized routes on BLM-managed public lands because they are believed to result in erosion, scarring and deterioration of the scenic landscape, and in impacts to wildlife;
- communities indicated that BLM-managed public lands offer wide open spaces and scenic vistas that many communities consider a substantial benefit (being surrounded by a natural-looking landscape appeals to current residents, and is a reason that many choose to stay in these communities; several towns include pictures of the scenic BLM-managed public lands vistas in their marketing materials to attract recreation tourists and new permanent residents);
- communities indicated that maintaining the scenic viewshed on BLM-managed public lands is important, including maintaining a natural-appearing landscape by minimizing the number of modifications and visual impacts of any alterations made to the landscape;
- respondents in Hot Sulphur Springs indicated that scenic values are important; and
- respondents in Granby indicated that maintaining views, scenery, and open space is important around Granby.

The aforementioned trends were also supported in the VRM assessment (Otak 2007) and in the Final Report of the Kremmling Field Office Planning Area Visitor Study (Virden et al 2008).

While the population is not evenly distributed across the Planning Area, human influences have altered the visual landscape, especially with respect to land use and land cover. In some places, intensive human activities (e.g., mineral extraction and energy development) have significantly altered the natural visual landscape. Large, fast-growing towns also contain heavily altered landscapes, with urban sprawl spreading into what were recently relatively undisturbed landscapes.

Impacts to visual resources in the Planning Area are increasing. Growing pressure is being placed on the visual resources as a result of activities associated with fire management, utility corridors, roads and trails, communication sites, pipelines, livestock grazing, water tanks, and subdivisions. Public concern is also on the rise regarding preservation of visual and scenic quality for open space and scenic backgrounds in residential areas, and for recreational uses. According to the Scoping Summary Report (BLM 2007a), managing landscape characteristics, resource uses, and land use allocations should include the following:

- no modifications or changes (keep the landscape unchanged);
- more sensitive use of the landscape; and
- do not alter landscape, except for habitat improvements.

3.2.10 Wildland Fire Management

Over the last few decades, the policies of land management agencies, including the BLM, regarding the role of fire in the maintenance and enhancement of ecosystems has changed. In the past, fire was considered an undesirable occurrence to be controlled; it is now increasingly seen as having a natural role in the.

Fire suppression efforts and resource management activities over the last 100 years have influenced the structure and composition of forests and fuel conditions by changing the tree species composition, increasing stand density (trees per acre), vertical structure (understory and overstory vegetation), and the amount of dead-and-dying woody vegetation that remains on a site. The function and process of ecological systems has changed. Due to fire suppression, fire has not played as predominant a role as it once did, and tree species composition and density has led to increasing insect and disease problems impacting fuel loads. These factors have increased the risk and severity of fires on public lands.

In addition to fuel accumulations and structure, fire suppression has changed the vegetation patterns, structure, and composition of forests. In many locations where fires normally occurred in sagebrush and pinyon-juniper communities, for example, fire suppression has prevented substantial fire spread to mid- and upper-elevation forest zones. This decrease in periodic understory fire in forest stands has led to an increase in shrub biomass and subsequent creation of ladder fuels. (Ladder fuels help to spread ground fire through shrub canopies and into the forest canopy.) This results in higher intensity, more difficult to control fires. In mid- to upper- elevation aspen stands, the lack of low-intensity fire (short flame lengths) for many years has allowed conifers to replace aspen, thus creating a more flammable fuel profile. Within the upper elevation conifer forests, the lack of fire, coupled with insect and disease epidemics, has led to increased fuel loadings in the form of downed woody debris. The lack of fire and relatively older age class forests has created vast areas of highly flammable fuels that burn with high intensity (long flame lengths), and for long durations once they are ignited. As a result of fire suppression, the role that fire plays in these ecosystems has been altered.

In most cases, vegetation communities adapted to frequent fire are now, or shortly will be, outside of their historic fire-return interval. This can be attributed to aggressive fire suppression response. Current suppression resources are rapid, efficient, and highly mobile at the local, State, and Federal levels. This has effectively removed fire from these habitat types. Prescribed fire has been effective in reducing crown height and biomass in some areas, although most of the prescribed burns have not been located in WUI areas. Increasing development of private lands, combined with aggressive fire suppression activities, will only continue to limit fire’s role in these regimes.

Wildland-Urban Interface

New demands are being placed on public lands due to the accelerated growth in, and around, cities and towns in the Planning Area. Growth has changed the way communities relate to surrounding public lands, and their expectations of those public lands. The basic problem is providing effective public land management while, at the same time, meeting the increased demands for public land and resource uses. Considerations include providing for optimal air and water quality; preventing water-source depletion and fragmentation of wildlife habitat; providing for development patterns, and transportation and utility corridors; and meeting demands for open space and recreational uses, land tenure adjustments, and wildland fire prevention and management.

As communities continue to expand into the WUI areas, more private values are exposed to potential losses from catastrophic wildland fires. Counties in the Planning Area have established priorities for hazardous fuels mitigation in the WUI. In addition, some Fire Districts have completed Community Wildfire Protection Plans (CWPPs). The BLM will continue to use CWPPs, County priorities, WUI risk assessments, the Fire Management Plan, and the Approved RMP to guide hazardous fuels management, and to help determine the appropriate management response to each wildland fire incident.

Current Conditions

The current fire management program in the Planning Area includes suppressing wildfires when appropriate (to protect resource values), managing unplanned natural fire and prescribed fire (to achieve identified resource objectives), reducing accumulations of high risk fuels (to mitigate the risk from wildfire), and engaging in collaborative prevention and mitigation programs with local, County, State, and other Federal agencies, and Fire Districts (to improve local fire mitigation and response capabilities to protect public and private lands). Currently, the goal of the Fire Management Program is to take appropriate management action on all wildland fires based on considerations including firefighter and public safety; threats to private property; at-risk resources; potential resource benefits that can be derived from an incident, anticipated management costs, and economic and social concerns.

The complex regional topography in the Planning Area results in considerable variation in vegetation patterns, storm patterns, and burning conditions. There are six vegetation communities in the Planning Areas having different structure, density, fuel loading, and historic fire intervals. These vegetation communities are described below:

Spruce/Fir Forests

Fire intervals in spruce/fir forests are variable, ranging from decades to hundreds of years, with longer intervals being more typical. Fires in this type are generally stand-replacing, indicating that the overstory is often killed by the infrequent fires. Due to the long fire-return interval, wildland fire suppression activities in this vegetation type have not significantly changed the composition, structure, or function of these forests.

Mixed-Conifer Forests

The naturally cool, moist environment of these forests makes them relatively fire resistant. Under very dry conditions, fire is usually of high intensity due to the naturally high density of trees and high fuel loading on the forest floor. Historically, median fire-return intervals in the warm, dry mixed conifer forests were approximately 20 to 30 years. Fires can be either stand-replacing or not, sometime killing the overstory; sometimes killing smaller understory trees only, leaving the larger overstory trees. Fires play a major role in shaping the composition, structure, and function of these forests, and have a big effect on the abundance and distribution of overstory and understory plant species.

Aspen Forests

Aspen forests in the northwestern part of Colorado generally had historic mean fire-return intervals of 18 years to 60 years. The naturally cool, moist environment associated with these forests makes most fires die out quickly. Under very dry conditions, high-intensity fires occur, especially in stands with high amounts of ground fuels and a heavy conifer component. Aspen readily re-sprouts after fire. Unless aspen has been encroached by conifers due to fire suppression or grazing, aspen is fairly resilient to fire.

Pinyon-Juniper Woodlands

Frequent, light surface fires characterize pinyon-juniper woodlands, with fire-return intervals exceeding 25 years. Long-term fire intervals are characteristic for stand-replacing fires, and indicate that when these fires occur they tend to be large and very intense.

Lodgepole Pine Forests

These forests tend to support wildland fires on a large scale at a moderate-to-long fire return interval. The combination of fuel loadings in these areas, under weather conditions that would allow them to burn and an ignition source, is a fairly rare instance. The instance of fire returning to these areas is infrequent, thus the fuel loading tends to develop to a point where, when conditions are right, the fires that result are stand-replacing. Lodgepole pine forests are dependent upon heat for regeneration (for preparing seedbeds and opening cones). The origins of the current stands are thought to be a product of large intensity fires that occurred between 1890 and 1910.

Lodgepole pines generally live for 80 years to 120 years before fire or insects, or a combination of both, result in considerable mortality. Currently, the MPB is having a devastating impact on mature pines due to the advanced age of these stands, and the result is increased fuel loading. If those same areas burned today in large-scale high intensity fires, they could result in the loss of life, property, and resources. If a fire does not occur in these areas, high fuel loads will persist for 30 years or more, and spruce or mixed fir/pine forests will develop.

Sagebrush Steppe Community

Sagebrush steppe, the most predominant vegetation type in the Planning Area, has a fire history interval that is largely unknown. Recent fire occurrence data from 1981 to 2000 suggests that there is a lower rate of natural ignitions in this fuel type than in the lodgepole and woodland vegetation types. This vegetation type, in most instances in the Planning Area, needs specific weather regimes, in relation to the availability of the fuels, in order to burn.

Fire History

The fire season for the Planning Area generally extends from May through September. The most critical conditions setting the stage for potential fire begin as early as April, and can last until widespread fall moisture occurs. In recent history, the number and size of wildland fires in the Planning Area has been relatively small. The 20-year average for wildland fires (1981 to 2000) is 2.75 fires for 125 acres burned per year. Roughly 93 percent of these fires are less than 100 acres, and only 1 fire burned as much as 1,000 acres during this period.

Fire Regime Condition Class

Fire Regime Condition Class (FRCC) is a classification system that describes the amount of departure an area, or a landscape, has from the historic condition to the present condition. It is used to classify existing ecosystem conditions. (See Table 3-17: FRCC Definitions and Acreages in the Planning Area.) For example, most of the Planning Area is in a FRCC indicating that it would normally burn once in 35 years to 100 years. Due primarily to fire suppression activities that have occurred in the last 100 years, far fewer acres have burned on this schedule. As a result, 98 percent of the Planning Area is in FRCC 2, indicating that most of the area should have burned once, but has not.

Table 3-17: FRCC Definitions and Acreages in the Planning Area

Condition Class[1]	Fire Regime Example Management Options
FRCC 1 Acres: 71,400 19 percent of Planning Area	Fire regimes are within a 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. Where appropriate, these areas can be maintained within the historical fire regime by treatments (such as fire use).
FRCC 2 Acres: 243,000 64 percent of Planning Area	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). The change in frequencies result in moderate changes to one or more of the following: fire size, intensity and severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments (such as fire use and hand or mechanical treatments) i to be restored to the historical fire regime.
FRCC 3 Acres: 33,700 16 percent of Planning Area	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. The change in frequencies result in dramatic changes to one or more of the following: fire size, intensity, severity, and/or landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments (such as hand or mechanical treatments) before fire can be used to restore the historical fire regime.

Source: BLM 2007g
[1] Fire regime condition class for each vegetation type was estimated based on the description of the current condition in the Vegetation Resources Section and includes professional judgment.

Fire regimes (Table 3-18: Fire Regimes in the Planning Area) are used as part of the FRCC discussion, describing fire frequency (average number of years between fires) and fire severity (impact of the fire on the dominant overstory vegetation: low, mixed, or stand replacement). There are five historical fire regimes. These regimes reflect that natural fire conditions under which the vegetation has developed; they do not reflect the current fire history, which has been modified by fire suppression actions.

Table 3-18: Fire Regimes in the Planning Area

Fire Regime	Acres	Percent
Fire Regime I (0 year to 35 year frequency, and low to mixed severity: surface fires most common)	7,400	2
Fire Regime II (0 years to 35 year frequency and high severity: stand replacement fires)	0	0
Fire Regime III (35 years to 100+ year frequency and mixed severity)	116,000	31
Fire Regime IV (35 years to 100+ year frequency and high severity: stand replacement fires)	217,400	58
Fire Regime V (200+ year frequency and high severity: stand replacement fires)	33,700	9
Unclassified (water, barren, and alpine/tundra)	3400	1

Source: BLM 2007g

Fuel Conditions

The fuel structure in the Planning Area is gradually changing, due to management practices and the incursion of non-native annual grasses, such as cheatgrass *(Bromus tectorum)*. In areas where fuels are continuous, fires spread rapidly. Typically, much of this area is grouped in Fire Regime IV (sagebrush). Many of the pinyon and juniper stands have much older stand characteristics, which often have heavier fuel accumulations and experience stand-replacement fires. Many areas exist where sparse fuels and other natural barriers limit fire spread; most are dry sites where the age class distribution is moderate to old. Annual grasses have increased from historically inhabiting scattered pockets to becoming a dominant fine fuel component intermixed with sagebrush and pinyon-juniper stands.

In homogenous stands of mature lodgepole pine, mortality rates of 90 percent or more from MPB have created heavy fuel loadings. The dead trees have allowed grasses to encroach into the forest, and changed the fuel structure to a grass fuel type. When trees eventually fall (in 5 to 7 years), a heavy fuel loading is created, which is a fire hazard. The moderate to long fire-return interval, fire exclusion and other management practices, as well as increased human use and incursion into these areas, has rendered many of the forested areas susceptible to large, severe wildland fires.

Wildland Fire Management

BLM policies require that every area with burnable vegetation must have an approved Fire Management Plan (FMP). FMPs are strategic plans that define a program designed to manage wildland and prescribed fires based upon the area's Approved RMP. The FMP for the Planning Area (BLM 2012a) was developed using Federal fire policy as its guide. It tiers to the RMP of each of the distinct administrative units. Incorporation of these policies and plans provides clear direction for fire management activities. The KFO is part of the Northwest Colorado Fire Management Unit, and the Planning Area is in the eastern third of the area administered by the Unit. In the event of multiple wildland fire ignitions, or limited resources or funding, priorities are derived from local, State, and Federal guidance, using a rating system of low, moderate, and high for wildland fire suppression, unplanned natural fire use, fuels treatment, emergency stabilization and rehabilitation, and community assistance and protection.

Characterization

Indicators

The resource condition will be assessed using Fire Regimes, FRCCs, population influences (such as WUI), insects and disease, and resource management activities that would influence wildland fire management (such as timber harvesting, and WUI expansion).

Trends

The trend in FRCC is likely to continue as vegetation types move farther outside of their historic fire regime, as the result of such factors as fire suppression and the increase in non-native vegetation and mortality from infestations. A portion of FRCC I will move into FRCC II; and some of FRCC II will move into FRCC III. As human development and recreation use impinge on these Fire Regimes, increased ignition risks and the concern for protecting economic values will substantially affect fire management activities in these areas. As these vegetation types continue to age, fuel loadings will increase. This, in turn, will result in a larger number or percentage of high-intensity stand-replacement fires. These fires will be difficult, or impossible, to control with existing fire management resources.

3.2.11 Lands with Wilderness Characteristics outside Existing Wilderness Study Areas

Through the land use planning process, the BLM considers all available information to determine the mix of resource use and protection that best serves the FLPMA multiple-use mandate. The BLM has numerous authorities under the FLPMA to maintain inventories of all public lands and their resources, including wilderness characteristics, and to consider such information during land-use planning processes.

During the KFO RMP revision process, the BLM completed a review of its lands to determine whether or not they possess wilderness characteristics. This review includes only BLM-administered public lands and does not include portions of proposals on National Forest System lands or in existing WSAs. Proposals involving lands exclusively within existing WSAs will not be analyzed. Any additions to the WSAs (lands outside or adjacent to) have been assessed in a wilderness characteristics assessment (see below). All wilderness characteristic proposal areas that occur in existing designated WSAs would be managed to protect those wilderness characteristics under the BLM's WSA 6330 policy direction until Congress designates them as wilderness or releases them for other uses. See Section 3.2.21 Wilderness and Wilderness Study Areas. Wilderness characteristics are: size, naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. The detailed results of the wilderness characteristics assessment are in Appendix H.

Through this assessment, obligations are met for updating and maintaining an inventory of wilderness resources under Sections 102, 201, and 202 of the FLPMA. In addition, the BLM's Handbook, 1601-1 Land Use Planning Handbook, identifies broad-scale decisions that guide future land management actions and subsequent site-specific implementation decisions. Specifically, BLM Handbook 1601-1 Appendix C, Part K (Wilderness Characteristics) directs field offices to identify decisions to protect or preserve wilderness characteristics.

The wilderness characteristics assessment is designed to determine if an area meets the overall criteria for wilderness characteristics. The assessment reflects current conditions and will be used to update wilderness inventories. The process entails the identification of wilderness inventory units, an inventory of roads and wilderness characteristics, and a determination of whether or not the area meets the overall criteria for wilderness characteristics. Units found to possess wilderness characteristics are evaluated during the land use planning process to address future management. The following factors are documented in an assessment:

Size: An area has at least 5,000 acres of land, or is of sufficient size to make its preservation practicable and to be used in an unimpaired condition.

Naturalness: Lands and resources exhibit a high degree of naturalness when affected primarily by the forces of nature and where the imprint of human activity is substantially unnoticeable. An area's naturalness may be influenced by the presence or absence of roads and trails; fences or other developments; the nature and extent of landscape modifications; the presence of native vegetation communities; and the connectivity of habitats. Wildlife populations and habitat are recognized as important aspects of naturalness and would be actively managed.

Outstanding Opportunities for Solitude or a Primitive and Unconfined Type of Recreation: Visitors may have outstanding opportunities for solitude, or primitive and unconfined types of recreation when the sights, sounds, and evidence of other people are rare or infrequent; where visitors can be isolated, alone or secluded from others; where the use of an area is through non-motorized, non-mechanical means; and where no or minimal recreation facilities are encountered.

Supplemental Values: The area may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Activities that could affect lands with wilderness characteristics are those that would impair those characteristics. Examples include, but are not limited to, construction of new roads; an increase in recreational use that affects solitude and primitive recreation opportunities; and construction of structures. Actions that would have an effect on wildlife habitat and native vegetation communities would also adversely affect lands with wilderness characteristics.

Current Conditions

In conjunction with the RMP revision process, the KFO considered public scoping comments and conducted a preliminary review for the purpose of updating the original wilderness characteristics inventory. An intensive wilderness inventory was conducted in 1980 for all the public lands in the KFO. The review indicated that the 1980 intensive wilderness inventory remained largely valid, but that three of the areas merited assessment for wilderness characteristics.

In 1994, Colorado conservationists presented to the BLM the *Conservationists' Wilderness Proposal for BLM Lands*, which compiled numerous citizen wilderness inventories and area-by-area justifications for a statewide citizens' wilderness proposal. The 1994 citizens' proposal did not include any areas in the KFO. In 2001 and 2007, based on new citizen inventories, the citizens' proposal was expanded to include one area in the KFO, the Troublesome. In addition to the Troublesome area, the KFO identified two other areas from the 1980 intensive wilderness characteristic inventory to assess for Lands with Wilderness Characteristics Outside of WSAs. The Drowsy Water area was identified due to new information and meeting the 5,000-acre size criterion. The Strawberry (Behler Creek Unit) area was included for assessment based on scoping comments and that it meets the 5,000-acre size criterion as a result of land acquisitions since the original inventory. The preliminary review also indicated that the Yarmony Unit contained even fewer opportunities for solitude or primitive and unconfined recreation, primarily due to proliferation of more ways (see Appendix H). The results of that inventory are summarized in Table 3-19. Also, see Map 3-25.

Table 3-19: Lands with Wilderness Characteristics Outside of Existing WSAs

Name	Total BLM KFO Acres Included in Citizens' Proposal	Acres in Existing WSAs	Acres Analyzed for Wilderness Characteristics outside Existing WSAs	Acres with Wilderness Character-istics	Acres with No Wilderness Character-istics
Troublesome	11,771	8,158	3,613	2,345	1,268
Drowsy Water	0	0	7,508	7,508	0
Strawberry	0	0	5,834	5,834	0

Troublesome Inventory Assessment Area

The Troublesome citizens' wilderness proposal totals 11,771 acres, 8,158 of which are within the Troublesome WSA. The BLM's assessment (see Appendix H) is for the 3,613 acres outside the Troublesome WSA. The area is entirely BLM-administered public lands; 2,345 acres meet the overall required criteria for wilderness characteristics, as summarized below:

- The area is managed as VRM Class II.
- Motorized travel is restricted under a Temporary Travel Closure order.
- Existing Recreation Opportunity Spectrum physical settings show the area is 40 percent back country, 36 percent middle country and 24 percent front country.
- Livestock grazing occurs on two allotments. There are no known range improvements.
- Rabbit Ears Creek was evaluated for Wild & Scenic River eligibility in 2007 and found eligible.
- The area is open to oil and gas leasing, but no land is currently leased.
- There are no known water rights in the unit.
- The area's landscape has retained a natural appearance. Public access to the area is limited as a result of adjacent private lands. There is an old irrigation ditch in the northern part of the area, but its presence does not impact the area's overall naturalness; and
- The limited access to the area enhances the opportunities for solitude.

Drowsy Water Inventory Assessment Area

The Drowsy Water area has 7,508 acres. The area is entirely BLM-administered land. All 7,508 acres meet the overall criteria for wilderness characteristics, as summarized below:

- The northern half of the area is managed as VRM Class II, and the southern half of the area is managed as VRM Class IV.
- The area is managed as open to cross country travel with certain seasonal closures.
- Existing Recreation Opportunity Spectrum physical settings show the area is 14 percent back country, 65 percent middle country, and 19 percent front country.
- Livestock grazing occurs on three allotments. There are two developed springs in the area.
- There are three water rights within the unit.
- The area is open to oil and gas leasing, but no land is currently leased.
- The area's landscape has retained a natural appearance. Limited access as a result of both adjacent private lands and the area's topography has limited development in the area; and
- Limited access and the area's topography also enhance opportunities for solitude in the area.

Strawberry Inventory Assessment Area

The Strawberry area has 5,834 acres. The area is entirely BLM-administered land. The area meets the overall criteria for wilderness characteristics, as summarized below:

- The area is currently managed as VRM Class II.
- The area is designated as open to cross country travel with certain seasonal closures.
- Existing Recreation Opportunity Spectrum physical settings show the area is 6 percent back country, 40 percent middle country, 30 percent front country, and 24 percent rural.
- Livestock grazing occurs on one allotment. There are no known range improvements in the area.
- The area is open to oil and gas leasing, but no land is currently leased.
- There are six water rights in the unit.
- The assessed area does not include lands impacted from past timber sales. The assessed area has retained its natural appearance.
- There are two Potential Conservation Areas in the assessed area: Road End Seep and Behler Creek.
- Limited access exists as a result of adjacent private lands, the area's topography, the Fraser River, and USFS- managed lands that are limited to designated routes and do not provide connecting access routes to the area.
- Limited access points and the area's topography enhance opportunities for solitude in the area.

Old logging routes are outside of the assessed area or are cherry-stemmed and have been buffered from the assessed area. There are three cherry-stemmed roads in the assessed area that have not been maintained with the exception of Behler Creek Road which has bi-annual maintenance. Visitors to the area would not notice the cherry-stemmed roads from a short distance unless they were to cross them. While the three cherry-stemmed routes were likely created for access to timber resources, two of them are primarily within sagebrush and all were tank-trapped to prevent travel along them. If travel was effectively restricted, the routes would likely be part of the assessed area.

Characterization

Indicators

The indicators for lands with wilderness characteristics outside existing WSAs are the criteria for wilderness characteristics listed at the beginning of this section. If an area is no longer meeting those criteria, the area would not be considered as having wilderness characteristics.

Trends

All three areas have been impacted by the ongoing Mountain Pine Beetle epidemic. As public demand increases to reduce the wildfire risk associated with the beetle-killed trees, the naturalness of these areas could be impacted.

Limited access, topography, and management of adjacent National Forest System lands will continue to hinder development that could impact naturalness and opportunities for solitude in the Troublesome, Drowsy Water and Strawberry areas.

All three areas are open for oil and gas leasing. All three areas have been mapped as having low or no potential for oil and gas, with the exception of the southeast part of the Drowsy Water area, which is mapped as having moderate potential.

Current trends in motorized recreation have led to increased motorized use, but with limited proliferation of motorized trails in the Strawberry and Drowsy Water assessed areas, due to topography. This trend would be expected to continue under current travel management decisions. Impacts in the assessed areas are limited by topography, and by travel restrictions on adjacent USFS-managed lands that preclude access to BLM-administered public lands.

There are trespass issues and potential user-created routes associated with lands in the Troublesome area adjacent to the Bighorn Subdivision. The BLM is completing land surveys to address the trespass issues.

3.2.12 Cave and Karst Resources

Most caves are found in karst formations, which are geologic areas composed of soluble rocks (such as limestone or gypsum). This type of terrain may contain few, if any, surface streams, sinking streams, sinkholes, springs (resurgences), or caves. Groundwater recharge in these areas is both rapid and highly susceptible to contamination and pollution. Lava flows also contain some caves. These caves are known as lava tubes, and often contain many of the same resources as caves formed in karst lands.

Cave and karst systems are important to our nation for numerous reasons. Groundwater comprises the largest single freshwater resource, and approximately 25 percent of this groundwater is located in cave and karst regions. The protection and management of these vital water resources are critical to both public health and sustainable economic development.

Caves are also storehouses of information on natural resources, human history, and evolution. Therefore, many avenues of research can be pursued in caves. Recent studies indicate that caves contain valuable data that are relevant to global climate change, waste disposal, groundwater supply and contamination, petroleum recovery, and biomedical investigations. Caves also contain data that are pertinent to anthropologic, archaeological, geologic, paleontological, and mineralogic discoveries and resources. In addition, many caves act as natural traps for flora and fauna.

Cave and karst lands provide specialized habitats and environments. Animal species living in caves have special adaptations that help them survive in total darkness, such as extreme longevity and enhanced sensory perceptions. The adaptations reveal much about the evolutionary responses to past environmental changes and may provide valuable clues to current climate change (source: http://www.blm.gov/wo/st/en/prog/Recreation).

Existing, or potential, threats to cave and karst resources include unmanaged cave use, which could damage fragile and sensitive resources. Other threats could include contamination associated with mineral leasing or mining operations, and dewatering or pollution of karst systems from surface activities outside “known” areas as the result of urbanization, agricultural operations, fires, overgrazing or chemical spills.

There are no known cave or karst resources in the Decision Area.

3.2.13 Forestry

The practice of forestry is defined as the profession embracing the science, art, and practice of creating, managing, using, and conserving forests and associated resources for human benefit and in a sustainable manner to meet desired goals, needs, and values. Forest managers can apply a planned series of treatments (i.e., silvicultural systems) to achieve the desired stand conditions that would subsequently produce the commodity and amenity objectives identified for forested and woodland areas. Silvicultural systems can maintain or enhance resource values (e.g., wildlife habitat improvement, maintenance of aesthetic quality, reduction in susceptibility to insect infestation, etc.) while also providing wood products (e.g., timber for home construction, biomass for alternative fuels, etc.) on a sustainable basis.

Management decisions (actions) may affect the quantity and quality of forest products. For example, the establishment of ACECs and SRMAs, the identification and protection of lands with wilderness characteristics outside of existing WSAs, and other land use decisions can directly affect the quantity and quality of forest products by restricting or prohibiting tree harvest within designated areas.

Management decisions (actions) that affect the extent or intensity of harvest, the timing of activities, or the cost of harvesting operations, can indirectly impact the quantity and quality of forest products. For instance, transportation management decisions that affect access to forest and woodland areas can increase or decrease product transportation costs and, thereby, affect the economic viability of forest product harvest and extraction. Although by no means inclusive, the following list provides several more examples of decisions or actions made as part of the planning process that could also impact the quality or quantity of forest products that the Field Office could make available on a sustainable basis:

- strict management actions for wildlife, visual quality, water quality, cultural resources, etc., including survey requirements, that limit flexibility in harvesting systems and activity timing;
- limiting or increasing public access;
- increasing or decreasing the Probable Sale Quantity (PSQ); and
- decisions that increase or decrease the likelihood of insect and disease outbreaks or wildland fire.

PSQ is the average amount of timber, measured in millions of board feet (MMBF) that could be sold annually on BLM-managed public lands where commercial forest uses are considered appropriate. The PSQ is the allowable harvest level that can be maintained without decline over the long-term, if the schedule of intermediate treatments, harvests, and regeneration, are followed. A PSQ recognizes a level of uncertainty in meeting the determined level. Typically, this uncertainty is based upon other environmental factors that preclude harvesting at a particular time (e.g., due to watershed or habitat concerns). A PSQ is not a commitment to offer for sale a specific level of timber volume every year.

Current Conditions

A project to determine a sustainable timber harvest level for the Decision Area was conducted in 1993 (McCallie and Williams 1993). Parameters important to the analysis included the number of acres of available forest land, the productive capability of those acres, and the existing volume on those acres. Suitable commercial forestland available for intensive management was calculated by starting with the total forest and woodland acres, and then subtracting the following:

- acres of non-commercial species;
- acres of commercial species not capable of producing at least 20 cubic feet of wood fiber per acre per year;
- acres of commercial stands within the Troublesome Wilderness Study Area;
- acres of commercial stands identified for resource uses other than timber;
- acres of commercial stands with no legal access; and

- acres of commercial stands with average slopes greater than 35 percent.

The acreage that would be intensively managed, and from which the PSQ was generated, was determined to be approximately 30,500 acres, leaving the balance of 63,400 acres to more limited management.

All of the 30,500 acres that were identified as available for intensive management are occupied by lodgepole pine stands. Many of these stands are overstocked, and exhibit the smaller diameters indicative of stands in this condition. Most, if not all, mature and over-mature lodgepole pine stands have been severely affected by the MPB epidemic, and have mortality levels between 70 percent and 95 percent. In general, the mortality level varies with stand species, and size class, composition.

The 1993 project to determine the sustainable timber harvest level used a growth-and-yield model employing various silvicultural systems (prescribing various intermediate treatments and cutting methods) to calculate a PSQ from the 30,500 acres identified as available for intensive management. That analysis established a PSQ of approximately 2.3 million board feet per year. In the wake of the MPB epidemic and its impact on most, if not all, of the Decision Area's mature and over-mature lodgepole pine stands, a determination of PSQ by alternative is hypothetical at best, based on what was possible before the epidemic.

Annual timber harvest in the Decision Area has averaged 2.0 MMBF over the last 10 years, with fluctuations of 1.5 MMBF to 2.5 MMBF over the last 5 years. Lodgepole pine is the primary commercial species, with the occasional sale of Engelmann spruce and subalpine fir. Salvage sales on BLM-managed public lands have occurred on areas identified for intensive management, and on limited management areas containing commercial species where temporary easements were obtained. Decreases in timber quality, and poor timber markets, have resulted in less dead lodgepole pine sawtimber being used as dimensional lumber, and more being processed for other products, including wood pellets.

Special forest products are sold individually, and include posts and poles, Christmas trees, and landscaping transplants. These sales range from 150 trees to 500 trees annually in the Decision Area. The KFO has had varying success selling post-and-pole thinning units, as demand for those products has been sporadic.

Characterization

Indicators

The demand for timber (i.e., sawlogs), firewood, and biomass are changing in response to the regional economy. This demand for forest products, combined with insect and disease outbreaks, wildland fire, and resource demands (e.g., recreational use) will be used as indicators to prioritize harvest treatments and harvest amounts.

Trends

The sawlog market has decreased in Colorado over the past 15 years. Recent declines in the national housing construction level have further reduced regional demand for sawlogs. In addition, the MPB epidemic has killed almost all of the commercial timber in the Decision Area, although a few scattered, live trees remain. Larger diameter dead trees would continue to be salvaged and sold as sawlogs, although this would decline over time as wood volume recovery declines. As "time since death" increases, larger percentages of these dead trees will likely be utilized for other products.

Over the last 15 years, firewood demand has decreased. This is due largely to the availability of relatively cheap natural gas and burning limitations in the general area and along the Front Range. The supply of firewood, and woody material suitable for producing pellet fuel, is expected to increase in response to salvage and forest health projects.

Changes in technology have led to the emergence of a biomass industry, which could increase the demand for wood previously considered valuable only as firewood. A biomass industry is developing around the availability of small sawlogs and dead-and-dying timber, increasing woodland density, and increasing energy costs. Numerous projects and programs have been developed to identify and promote the use of small sawlogs and woody biomass in Colorado. Woody biomass products are a small portion of the KFO's timber program, although growth of this market sector is anticipated to continue, placing higher demands on small sawlogs and woodlands.

The USDOI collaborates with the Department of Energy (USDOE) and the USDA to encourage the use of woody biomass by-products from restoration and fuels treatment projects. Legislation in the Omnibus Appropriations Bill of 2003 expanded and extended the use of stewardship contracting and agreements by the BLM and the USFS (PL 108-7, Section 323). It granted the USFS and the BLM authority to enter into stewardship projects with private persons, or public or private entities, to perform services to achieve land management goals for the National Forest System lands and for BLM-managed public lands that meet local and rural community needs. The legislation authorizes the value of vegetative material to be applied as an offset against the cost of services received. In other words, the legislation allows the BLM to trade goods (e.g., biomass, sawlogs) for services (e.g., thinning, fuels reduction, or noxious weed control). Contractors purchase the goods generated by the project through conservation credits earned for completing services. This contracting vehicle provides additional incentive for the private sector to invest in forest health and restoration projects, aiding in development of the biomass market.

Historically, forest and woodland management of the public domain lands focused on the cultivation, sale, and utilization, of wood products. Today's management emphasizes the maintenance and restoration of forest health and the reduction of hazardous fuels, while still providing wood products to help address local and national needs. Stewardship contracts and agreements provide another avenue to accomplish these goals, in addition to the traditional methods used for implementing vegetative treatments (i.e., commercial sales, personal-use permits, service contracts, or by BLM crews), Under the Healthy Forest Initiative (HFI), the Healthy Forest Restoration Act of 2003 (HFRA), and the Tribal Forest Protection Act of 2004 (TFPA), the BLM has implemented stewardship contracting, and is implementing a biomass utilization strategy. The National Fire Plan established an intensive, long-term

hazardous fuels reduction program, including provisions to hasten hazardous-fuel reduction and forest-restoration projects.

3.2.14 Range Management (Livestock Grazing)

In managing livestock grazing on public rangelands, the BLM's overall objective is to ensure the long-term health and productivity of these lands, and to create multiple environmental benefits that result from healthy watersheds. The BLM manages grazing in accordance with the Taylor Grazing Act of 1934 (named after Rep. Edward Taylor of Colorado). The unregulated grazing that took place before enactment of the Taylor Grazing Act resulted in unintended damage to soil, plants, streams, and springs. As a result, grazing management was initially designed to increase productivity and reduce soil erosion by controlling grazing through both fencing and water projects, and by conducting forage surveys to balance forage demands with the land's productivity ("carrying capacity").

These initial improvements in livestock management, which arrested the degradation of public rangelands while improving watersheds, were appropriate for the times. However, by the 1960s and 1970s, public appreciation for public lands and expectations for their management rose to a new level, as made clear by congressional passage of such laws as the NEPA, the ESA, and the FLPMA. Consequently, the BLM moved from managing grazing in general to the protection of specific rangeland resources (such as riparian areas, Threatened and Endangered Species, sensitive plant species, and cultural or historical objects). Consistent with this enhanced role, the BLM developed or modified the terms and conditions of grazing permits and leases and implemented new range improvement projects in order to address these specific resource issues, promoting continued improvement of public rangeland conditions. *[Note: Rangeland is a type of land, not a use. Composed of soil, water, air, flora, and fauna, rangeland resources generate many values, uses, and activities. Directly and indirectly, rangelands contribute environmentally, economically, and socially from local to global levels. Rangelands provide protection to watersheds, quality water supplies, recreation, scenic beauty, and opportunities for enjoyment, relaxation, and solitude. Rangelands provide forage and habitat for many species of organisms, including insects, birds, wildlife, and wild horses by converting energy from the sun into food, fiber, and cover.]*

Qualifications to Hold a BLM Grazing Permit (43 CFR 4100)

(a) Except as provided under 43 CFR §§4110.1–1, 4130.5, and 4130.6–3, to qualify for grazing use on the public lands an applicant must own or control land or water base property, and must be:

- (1) A citizen of the United States or have properly filed a valid declaration of intention to become a citizen or a valid petition for naturalization; or
- (2) A group or association authorized to conduct business in the State in which the grazing use is sought, all members of which meet the citizen qualification; or
- (3) A corporation authorized to conduct business in the State in which the grazing use is sought.

(b) Applicants for the renewal or issuance of new permits and leases and any affiliates must be determined by the authorized officer to have a satisfactory record of performance under §4130.1–1(b).

(c) Applicants shall submit an application and any other relevant information requested by the authorized officer in order to determine that all qualifications have been met.

> *Note:* In some states, "base property" refers to water, not land. In the Kremmling Decision Area, "base property" is land.

Grazing permits and leases authorize use on the public lands and other BLM-managed public lands that are designated during the planning process as "available" for livestock grazing. Permits (Section 3 permits) are issued for public lands that were determined to be "chiefly valuable for grazing" within grazing districts established under the Taylor Grazing Act. Leases (Section 15 leases) are issued for public lands outside of grazing districts. Permits and leases specify the permitted use, including active and suspended use. These grazing permits and leases also specify applicable terms and conditions. The BLM must consult, cooperate, and coordinate with affected permittees and lessees, and other interested publics, before issuing or renewing grazing permits and leases. Grazing permits or leases convey no right, title, or interest held by the United States in any lands or resources (43 CFR 4130.2).

All grazing permits and grazing leases must specify permitted use. Permitted use includes active use and any suspended use. Active use is based upon the amount of forage available for livestock grazing (as established during the planning process).

In the Kremmling Field Office, the permitted use specified is attached to the base property supporting the grazing permit or grazing lease.

Allotments

After consultation, cooperation, and coordination with the affected grazing permittees or lessees, and the State, the BLM may designate and adjust grazing allotment boundaries. The

BLM may combine or divide allotments, through an agreement or by decision when necessary, for the proper and efficient management of public rangelands (43 CFR 4110.2-4).

When monitoring or documented field observations show that additional forage is available for livestock grazing, either on a temporary or sustained-yield basis, the BLM may apportion additional forage (increase use) to qualified applicants for livestock grazing use, consistent with multiple-use and sustained-yield management objectives specified during the planning process (43 CFR 4110.3-1). The BLM may also suspend active use (decrease use), in whole or in part, on a temporary basis in order to facilitate installation, maintenance, or modification of range improvements (43 CFR 4110.3-2).

When BLM-managed public lands outside of designated allotments become available for livestock grazing, the forage available for livestock may be made available to qualified applicants at the discretion of the BLM (43 CFR 4110.4-1). Where there is a decrease in public land acreage available for livestock grazing within an allotment, permits or leases may be cancelled or modified, as appropriate, to reflect the changed area of use (43 CFR 4110.4-2).

Grazing Standards and Guidelines

Standards for Public Land Health

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

Standards describe conditions needed in order to sustain public land health, and relate to all uses of the public lands. Standards, based upon their associated indicators, are applied on a landscape scale and relate to the potential of the landscape. Refer to Appendix J for the complete description of the Standards.

Guidelines for Livestock Grazing Management

Guidelines are the management tools, methods, strategies, and techniques (such as BMPs) designed to maintain or achieve healthy public lands as defined by the standards. Currently, the only guidelines for BLM Colorado that have been developed in concert with the RACs are livestock grazing management guidelines. Refer to Appendix J for the complete description of the Guidelines.

The Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM Standards) are directed at improving resource conditions for soils, riparian systems, upland vegetation, wildlife habitat, Threatened and Endangered Species, and water quality (BLM 1997a). The Standards are implemented through land health assessments, determination documents, environmental analysis documents, permit renewals, and other permit changes. The Standards pertain to impacts associated with livestock grazing, and to other rangeland impacts resulting from such activities as recreation, development, wildlife grazing, and wild horse management. Achieving sustainable livestock grazing and desired rangeland condition requires the collective management of forage, water, soil, and livestock by the BLM and by livestock owners and operators. An interdisciplinary approach ensures effective management of the multiple resource values and uses.

Management practices for livestock grazing have been focused on achieving BLM Standards and meeting objectives for other resources (such as those associated with vegetation and soils) established for allotments. This has been accomplished by improving conformance with the Guidelines for livestock management, such as changing the duration of grazing use and season of use, reducing AUMs, and improving grazing distribution. Generally, reducing the duration of grazing use, including rest or deferment grazing plans, and improving livestock distribution are the key to meeting rangeland objectives, especially those associated with riparian areas and wetlands. Grazing management has been improved by a variety of actions, such as adjustments in grazing permits or leases (including adding terms and

conditions designed to maintain or improve riparian zones and wetlands, utilization, herding and riding requirements, and placing salt and supplemental feed away from riparian zones), constructing water developments and pasture fencing, and ensuring compliance with maintenance of range improvements and requirements of grazing permits or leases.

Generally, impacts to livestock grazing occur as the result of activities that affect forage levels, livestock exclusion, or reduction of allotment acreage. Activities associated with land disposal, access, and mineral development impact grazing in the long term, while recreational events, wildland fire, and drought conditions impact grazing in the short term.

Current Conditions

Allotments

About 336,900 acres, or 89 percent, of BLM-managed public lands in the Decision Area are allocated for livestock grazing. These public ranges are permitted at a level of 36,686 AUMs of forage and 4,447 AUMs of suspended use, for a total allocation of 39,686 AUMs. Of the total 35,239 active AUMs, 4,514 are Section 15 AUMs (leases) and 30,725 are Section 3 AUMs (permits). (See Map 2-148, Grazing Allotments; see Appendix K for allotment and grazing use data for all allotments currently permitted for grazing use.)

About 40,700 acres, or 11 percent, of BLM-managed public lands in the Decision Area are not allocated for livestock use. There are six allotments that have been voluntarily relinquished or that are not attached to private base property: allotments 7561 Spruce Creek; 7573 Blue Valley; 7505 Sulphur Gulch; 7755 Selak East; 7522 Selak; and 7524 Fraser River. Allotments 07505 (Sulphur Gulch), 07561 (Spruce Creek), and 7573 (Blue Valley) are vacant. The other three allotments are unallocated because they are unsuitable for livestock grazing (due to a number of factors, including vegetation, topography, access, or a combination of these factors).

There are 254 allotments in the Decision Area, composed of 121 permittees and 143 permits or leases. In 2005, 99 percent of the AUMs were allotted for cattle grazing; and 1 percent allocated for sheep and horse grazing. A total of 251 of the allotments are grazed by individual operators; 3 allotments are grazed by 2 operators.

The season of use in the Decision Area is generally from May through October, with much of the use in spring (May and early June). Spring use occurs at lower elevations, and is designed to coordinate with the end of calving on private lands. Generally, summer and fall use (late June through October) occurs at higher elevations.

The BLM will continue to monitor allotments in order to determine stocking rates and changes in the new 10-year grazing permits, and to continue gathering monitoring data about existing allotments. Currently, the KFO uses six monitoring methods:

- key forage species method (utilization);
- photo trend;
- actual use;
- climatologically studies;

- canopy coverage method (Daubenmire); and
- quadrat frequency method.

These monitoring methods are all effective, although new and improved monitoring methods may become available that would provide results specific to new needs in management.

Potential new methods may include line point intercept, gap intercept, soil stability test, belt transect, and other approved BLM or interagency monitoring methods.

Livestock use adjustments based on monitoring would be implemented in accordance with 43 CFR 4110.3-3.

Allotment Management

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

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

These categories are designed to concentrate public funds and management efforts on allotments with the most significant resource conflicts, and the greatest potential improvement. The 254 grazing allotments in the Decision Area were prioritized for management according to one of the three levels. The criteria used for placing allotments in a Management Category were the presence of resource conflicts or problems and the potential for improvement, as outlined in the BLM's Selective Management Policy. A total of 20 allotments in the Decision Area are in the M category; 76 are in the I category; and 215 are in the C category. The status of this categorization is that allotments have been ranked, and adjustments would be made as monitoring data becomes available. There have also been a number of range improvement projects completed since the 1984 KFO RMP (BLM 1984b).

Partners

The KFO works with the Habitat Partnership Program, the Owl Mountain Partnership, private landowners, the State Land Board, and the USFS, among others agencies, groups, and organizations, to help develop and construct cost-effective rangeland improvements and vegetative treatments.

Characterization

Indicators

As stated above, Management Categories assigned to each allotment are used to prioritize funding and management efforts, to balance grazing with resource protection and other resource uses.

Trends

The trend in livestock grazing practices can be described from a quantitative standpoint, based upon changes in acres of grazing habitat available. Since 1984, there has been a decrease of 57 allotments and 21 permit or leases in the Decision Area. The decreases are due to consolidation and relinquishment of allotments, and to the sale or exchange of BLM-managed public lands. In addition, since 1984, records indicate a decrease of 18,846 acres of BLM-managed public lands in the Planning Area. The decrease is a result of improved technology (GIS) in determining the number of acres of BLM-managed public lands, and the sale and exchange of BLM-managed public lands.

3.2.15 Recreation and Visitor Services

BLM-managed public lands in north-central Colorado offer a variety of outdoor recreation opportunities, including land-based, water-based, and snow sports activities. Typical recreational activities in the Decision Area include camping, hiking, horseback riding, mountain biking, OHV use, and cross-country skiing. Migrating and resident wildlife provide plentiful opportunities for hunting, photography, and observation. Renowned local rivers (the Colorado and the Blue), streams, and lakes offer boating and cold-water fishing opportunities.

North-central Colorado is a world-renowned destination for outdoor recreation enthusiasts. Recreation visitors to the Decision Area come from three primary sources: national and international locations, the Denver metropolitan area and Colorado's Front Range, and locally. Most of the Decision Area can be easily reached by an easy 90-minute drive from Denver on Interstate 70 (I-70). Visitors from the Denver metropolitan area come to the region because it is an easily accessible weekend getaway with a diversity of outdoor activity offerings and recreation settings. Increased visitation to small towns and destination resorts, such as Winter Park, Rocky Mountain National Park, and the Summit County area, are also contributing to the increased use of BLM-managed public lands.

As the demand for BLM-managed public lands increases, so does the potential for conflicts among its users. OHV use in the Decision Area, although not statistically measured, is increasing. This type of use has the potential to conflict with other recreational opportunities (such as hiking, biking, and equestrian use) because these user groups use many of the same routes and trails. In addition, developing energy resources could conflict with recreation, as route densities increase and landscapes are altered, thereby affecting recreational experiences. Hunting, which often involves the use of motorized equipment (such as generators used in camping and engines associated with ATVs, OHVs, and other vehicles) is

also an important recreational activity that takes place in the Decision Area. This sport could conflict with recreation users seeking more quiet natural settings (such as hikers and those viewing wildlife). Hunting is one of the most important recreational activities to local economies (BLM 2007k). Management prescriptions designed to protect resources (such as protections in place for water, and archaeological or paleontological or wildlife resources) could also affect recreation.

Current Conditions

The KFO RMP (BLM 1984b) recreation objective has been to ensure the continued availability of outdoor recreational opportunities that the public seeks, and which are not readily available from other sources; to reduce the impacts of recreational use on fragile and unique resource values; and to provide for visitor safety. The 1984 RMP did not anticipate the rapid population growth in the intermountain west, the changing customer demand for a diversity of recreational opportunities and activities, or the increasing recreation-tourism demand.

Recreation-Tourism Elements

Community Growth Areas

A considerable, and growing, recreation demand is focused on BLM-managed public lands around, and between, communities in WUI areas with trail or road networks and aesthetic amenities. Community growth issues in the Planning Area abound, with 87 percent of the BLM-managed public lands within 1 mile of private lands. The towns of Granby, Hot Sulphur Springs, Kremmling, and Walden all have BLM-managed public lands bordering them, public lands that locals use as “backyard” recreation areas.

Colorado residents value the ability to conveniently access BLM-managed public lands near their homes for a variety of recreational activities. In a recent Community Assessment, recreation and scenic beauty were the most commonly cited reasons for why people live in, or visit, the communities in the Planning Area (BLM 2007n). A Field Survey conducted in 2006-2007, found that more than 83 percent of the visitors to the surveyed areas are from Colorado, and approximately 62 percent were repeat visitors to BLM-managed public lands (ASU 2008).

Outdoor Recreation Service Providers

Prominent recreation service providers in, or near, the Decision Area include the USFS and the NPS. The Planning Area includes the Arapaho-Roosevelt, White River, and Medicine Bow-Routt National Forests. All three national forests manage leases for ski area resorts: Winter Park on the Arapaho-Roosevelt; Arapaho Basin, Keystone, Breckenridge, Copper Mountain, Vail/Beaver Creek, and others on the White River; and Steamboat on the Medicine Bow-Routt. These ski area resorts have evolved into four-season resort communities that draw visitors for summer and winter outdoor recreational opportunities. The other prominent service provider in the Planning Area is the NPS, at Rocky Mountain National Park. Grand Lake and, to a lesser degree, Granby are gateway communities that

support Rocky Mountain National Park visitors. In 2009, visitation to Rocky Mountain National Park approached 3 million visitors (NPS 2010). Other outdoor destinations in the Planning Area include State Wildlife Areas and the Colorado Forest State Park near Gould, all managed by the Colorado Parks and Wildlife.

Tourism

Ease of access to the mountain communities is a relevant BLM planning factor. In addition to the ski area resorts, popular tourist attractions include multiple reservoirs (Shadow Mountain, Granby, Williams Fork, Green Mountain, and Wolford). The reservoirs attract visitors during the summer (for fishing and boating) and during the winter (for fishing and snowmobiling). The Colorado River Headwaters National Scenic Byway traverses the Planning Area, starting in Grand Lake and ending at State Bridge. The Byway offers touring opportunities through the pastoral landscape of the upper Colorado River, and includes the Trough Road (which is the primary access to the Upper Colorado River SRMA). The Cache la Poudre-North Park Scenic and Historic Byway connects Walden with Fort Collins.

Hunting

The nation's largest herd of elk attracts large numbers of hunters to Colorado during the fall big game hunting season, beginning in late August and lasting into December. Big game hunting alone accounts for over 370,000 participants State-wide; and over 197,000 hunter days in the Planning Area (CDOW 2006a). The most commonly cited economic benefit derived from BLM-managed public lands is contributions to the local economy made from hunting and wildlife-related tourism. Revenues from hunting seasons are so important that they sustain many businesses in the area throughout the rest of the year (BLM 2007f).

Recreation Management Areas

The BLM’s Land Use Planning Handbook (H-1601-1) requires BLM-managed public lands to be identified as either Special Recreation Management Areas (SRMA) or Extensive Recreation Management Areas (ERMA) (BLM 2005a). The BLM Manual 8320, published in March, 2011, calls for identification of three types of management areas – SRMAs, ERMAs, and RMAs – with updated management objectives. Recreation management areas established in the Approved RMP will be managed under that guidance. The following descriptions depict current management of the existing SRMAs and the ERMA.

Special Recreation Management Areas

SRMAs are areas where special or intensive recreation management is needed. SRMAs include congressionally recognized areas (such as WSRs, parts of the National Trail System, National Recreation Areas, and Wilderness Areas). In addition, administratively recognized areas where issues or management concerns may require special or intensive management are also designated as SRMAs. Areas where visitor use may result in user conflicts, visitor safety problems, or resource damage may also be designated as SRMAs. These more intensively used areas require direct supervision of recreational activities, and of commercial and BLM-regulated recreation operations.

The KFO manages two SRMAs, totaling approximately 13,650 acres. (See Table 3-20: SRMAs in the Decision Area, and Maps 2-158 and 2-159.) These lands are characterized by a diversity of natural resource settings and a range of recreational opportunities.

Table 3-20: SRMAs in the Decision Area

SRMA Name (acres)	Targeted Activity Opportunity	Management Summary
Upper Colorado River (12,200)	Rafting, Fishing, Kayaking, Canoeing, Camping	Identified as an SRMA in the 1984 RMP, amended in 1999. Intensive use for commercial outfitting; marketed by surrounding resorts and communities; and includes two recreation fee sites and campgrounds.
North Sand Hills (1,450)	OHV riding (sand dune environment)	Identified as an SRMA in the 1984 RMP. Managed for OHV riding and dispersed camping.

Extensive Recreation Management Area

Under the 1984 RMP, BLM-managed public lands not delineated as an SRMA were identified as an ERMA. In ERMAs, management consists primarily of providing basic information and access. Dispersed recreation occurs in ERMAs, and visitors have the freedom of recreational choice with minimal regulatory constraints. Significant public recreation issues or management concerns are limited in these areas, and nominal management suffices. Management, administration, marketing, information, education, and monitoring support actions in ERMAs are aligned in a manner designed to maintain participation in a variety of recreational opportunities, as well as to address use/user conflicts, visitor safety, or resource protection.

The Decision Area has one ERMA, which makes up 88 percent of the public lands in the KFO. The ERMA provides unspecified recreation settings that facilitate the visitors' freedom to pursue a variety of recreational opportunities and outcomes. Recreation users value the freedom of choice, remoteness, and naturalness associated with dispersed recreation use. Regardless of the activity, the opportunity to get away from day-to-day stresses, and to be with friends and family in a natural setting, are the primary benefits that motivate dispersed recreation visitors.

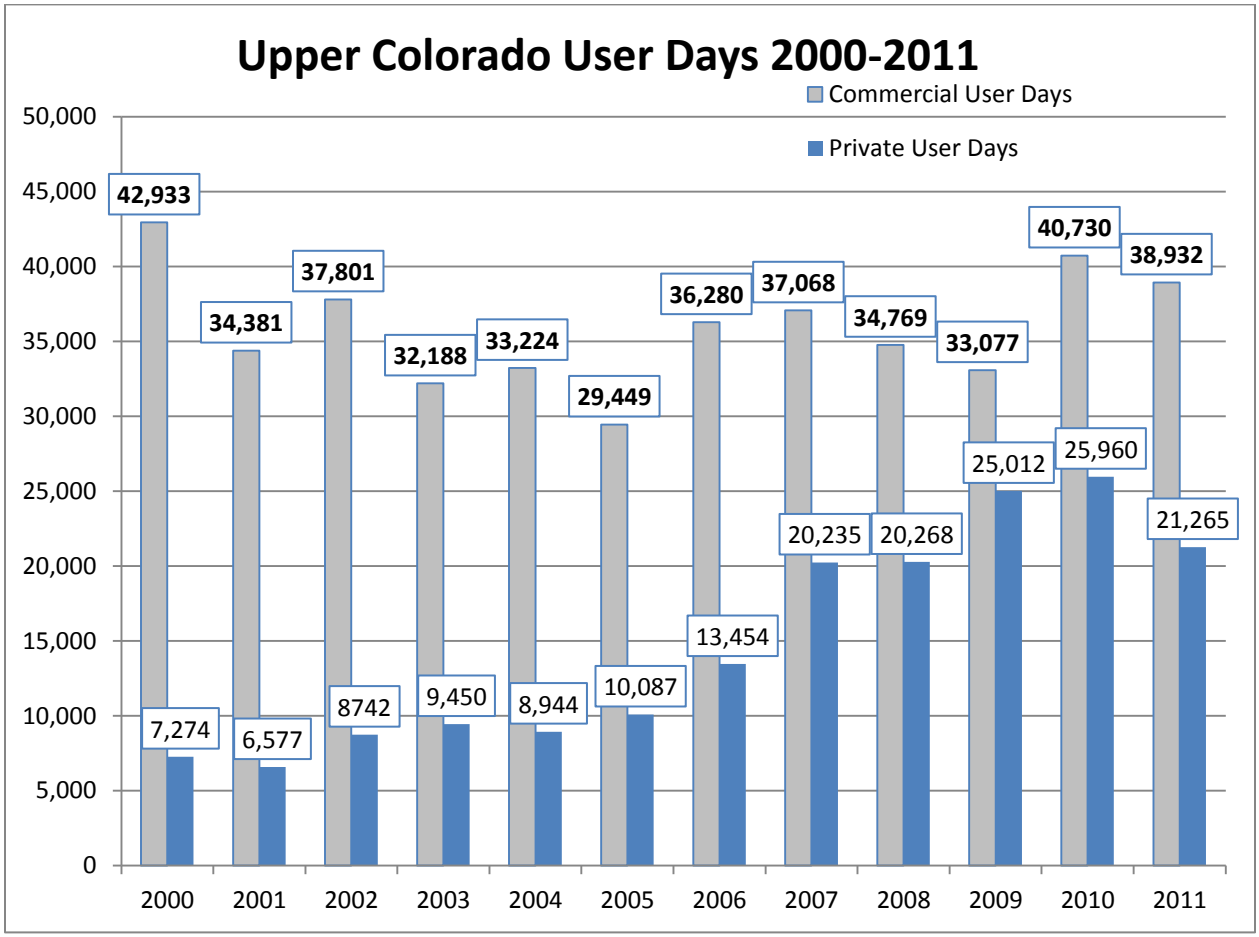
River Recreation Management

The KFO manages river-related activities along the Upper Colorado River, Fraser, and Blue Rivers, and along Muddy Creek. The BLM invests minimal management along the Fraser and Blue Rivers, and Muddy Creek, because the BLM controls very little shoreline along these streams. There is boating (rafting and kayaking) and fishing on the Blue and Fraser Rivers. The BLM does not own either the put-in area or the take-out area on the Fraser River. The USFS manages the put-in area for the Blue River. The BLM manages two take-out areas near the confluence of the Blue and Colorado Rivers, and an access site on Muddy Creek, which accommodates wade fishing.

The Upper Colorado River SRMA is heavily used during the summer season by commercial Outfitters and by private boaters (for rafting, kayaking, camping, and fishing). The BLM manages five walk-in fishing access sites between Parshall and Kremmling. Below Kremmling, the BLM manages three developed river access sites. Boating activities upstream of Kremmling are minimal. Byers Canyon (between Hot Sulphur Springs and Parshall) has a short whitewater section that is used for kayaking during spring run-off.

Below Kremmling there are two distinct sections of the river that are used for recreation. Gore Canyon is a nationally significant Class IV and V whitewater section. This section has little use by boaters until late summer, when flows drop on other Class V sections around the State and nation. The BLM permits an annual whitewater race, which attracts participants from across the country, takes place in the canyon in August. Anglers also use Gore Canyon for hike-in wade fishing. The vast majority of recreational use along the Colorado River occurs on the section of river between Pumphouse Recreation Site and Radium, or on to State Bridge. This section of river is the primary recreation attraction in the KFO. It is used for Class II and Class III whitewater boating, and for float fishing trips. Commercial outfitting accounts for the majority of use in this section, although there has been a trend starting in 2005 of increasing numbers of private visitors (see Figure 3-6).

Figure 3-6: Upper Colorado User Days 2000 – 2011



Developed Recreation Facilities

Developed recreation sites and facilities in the Decision Area have been constructed to enhance recreational opportunities, protect resources, manage activities, or to reduce recreation use conflicts. These infrastructure developments range from campgrounds to trailheads with simple bulletin boards to developed river access sites.

There are developed recreation sites in the Upper Colorado River SRMA and in the North Sand Hills SRMA. There are fee campgrounds along the Colorado River at the Pumphouse and Radium Recreation Areas. (See Map 3-18, KFO Recreation Sites.) The Pumphouse Recreation Area has 18 developed campsites, 2 group campsites, 1 campground host site, 3 boat launches, 2 visitor informational kiosks, 12 vault toilets, 3 double-vault toilet restrooms, and a potable water system. The Radium Recreation Area has 6 developed campsites, 2 group campsites, 2 visitor informational kiosks, 5 vault toilets, 1 campground host site, and a public phone. There are several campsites along the river corridor that have picnic tables, fire rings, and primitive toilets. On the upper section of the SRMA, there are several river access points with portable toilets available seasonally, and parking. The North Sand Hills SRMA has 13 developed campsites, two single-vault toilets, a double-vault toilet, and a visitor informational kiosk site. (One of the single-vault toilets is on Colorado State Land Board land, but it is maintained by the BLM.)

Recreation Administration

Cooperative Management

The BLM has established a number of active partnerships between entities for the management of public resources. Many of these partnerships are involved with facilitating local community events and developing trail systems, notably for OHV use.

The BLM has signed Memorandums of Understanding (MOU) with several local groups, including the:

- Kremmling Chamber of Commerce (to establish a cooperative relationship in hosting annual events on BLM-managed public lands in, and around, the Kremmling area);
- North Park Chamber of Commerce (to help educate the public, to establish a working relationship in managing the North Sand Hills SRMA, and to assist with the trail system on BLM-managed public lands);
- CDOW (to cooperate in the management and maintenance of the Mugrage Campground and the Radium Recreation Area); and
- Mountain Metal Mashers (to monitor and maintain the Sidewinder technical 4x4 route in the Wolford Mountain Travel Management Area).

Additionally, the North Sand Hills Working Group was created in 2005 (with the BLM, Jackson County, the CDOW, Colorado State Parks, the Colorado State Forest Service, The Nature Conservancy, the USFS, the Colorado State Land Board, and the Colorado Off-Highway Vehicle Coalition), to recommend management goals and policy for the North Sand Hills SRMA.

Stipulations

The Kremmling Resource Area – Oil and Gas Leasing and Development – Record of Decision and RMP Plan Amendment (BLM 1991c) identified stipulations designed to protect recreation values and areas. (See Table 3-21 and Appendix C.).

Table 3-21: Stipulations for Recreation Opportunities in the Decision Area

Stipulation	Name	Rational	Applicable Location
NSO	Colorado River SRMA	For the protection of the recreation values.	Colorado River SRMA
NSO	North Sand Hills SRMA	For the protection of the recreation values.	North Sand Hills SRMA

Special Recreation Permits

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

The BLM recreation permits authorize the use of public lands and waters for specified purposes. The use of public lands and waters is a privilege subject to the terms and conditions of the permits. Special Recreation Permits (SRPs) are the basis for the BLM's recreation fee program, and are used to implement the REA's Standard Amenity, Expanded Amenity, and Special Recreation Permit Fees (BLM 2006h). The SRPs are issued to authorize specified, and often time-restricted, recreational uses of the public lands and related waters. The SRPs are a tool for:

- authorizing specific types of recreational activities;
- managing recreation use;
- reducing user conflicts;
- protecting natural and cultural resources;
- informing users;
- achieving the goals and objectives of the Field Office's Recreation Program;
- gathering use information; and
- obtaining a fair return for commercial and certain other uses of public lands (BLM 2006h).

In accordance with 43 CFR 2932, the following activities require SRPs:

Commercial Use – Commercial use is defined as recreational use of the public lands, and related waters, for business or financial gain (financial gain includes gratuities, donations, gifts, bartering, etc.). Commercial use is also characterized in situations where a duty of care or expectation of safety is owed participants by service providers as a result of compensation. It may also be characterized by public advertising for participants.

Use by scientific, educational, or therapeutic institutions or non-profit organizations is considered commercial, and are subject to permit requirements when the above conditions exist. Non-profit status of any group or organization does not, in itself, determine whether an event or activity arranged by such a group or organization is non-commercial. Profit-making organizations are automatically classified as commercial, even if that part of their activity covered by the permit is not profit making. Examples of commercial activities include fund-raising activities, outfitters and guides, college back-packing course for credit, Jeep tours, horse trail and wagon train rides, and cattle drives.

Competitive Use – Competitive use means any organized, sanctioned, or structured use, event, or activity on public lands in which two or more contestants compete, and where either of the following elements apply:

- participants register, enter, or complete an application for the event; or
- a predetermined course or area is designated.

One or more individuals contesting an established record (such as speed or endurance) is also considered to be a competitive use. Examples of competitive events include OHV races, horse endurance rides, mountain bike races, rodeos, poker runs, orienteering, land speed records, and Eco-Challenge events. Competitive events may also be commercial.

Vending – Vendor permits are temporary, short-term, non-exclusive, revocable authorizations to sell goods or services on public lands in conjunction with a recreation activity. Vendor permits do not authorize permanent structures, and do not grant preferential rights for renewal or any possessory interests in real property on the public lands or related waters. The Authorized Officer places stipulations on the SRP to provide for the health and safety of visitors, and for the protection of natural resources.

Special Area Use – Permits may be required for individual (private, non-commercial) recreation use in Special Areas. Special Areas are areas officially designated by statute or Secretarial order, including components of the National Trails System; the National Wild and Scenic Rivers System; the National Wilderness System; National Conservation Areas; National Monuments; National Recreation Areas; areas covered by joint agreement between the BLM and a State Government, as provided for in Title II of the Sikes Act (16 USC 670a); or in areas where the Authorized Officer determines that the resources require special management and control measures for their protection and a permit system for individual use would achieve management objectives. Requirements for Special Areas can be found in 43 CFR 2932.5. Special Areas can be designated by the State Director through Supplementary Rules (43 CFR 2932.3).

Organized Group Activity and Event Use – Organized group or event permits are intended for group outdoor recreation activities or events that are neither commercial nor competitive.

The Authorized Officer determines when a permit is required based upon planning decisions, resource concerns, potential user conflicts, or public health and safety issues. A group is loosely defined as more than one person participating in a recreation activity or event. The threshold, if any, must be determined for each area (for example, 10 people in a sensitive riparian area may constitute an organized group, but a less sensitive upland area may be able to handle 200 people without the need for special management) (BLM 2006h). Examples of groups or events that may require a permit include a large scout campout, a fraternity activity, a large family reunion held at a BLM recreation site or participating in recreation activities on public lands, reenactments, or a dual sport event.

The BLM can issue SRPs for non-commercial use in certain special areas, including river, backcountry, and camping areas. Most SRPs issued by the KFO are related to river outfitting and upland hunting. Very few permanent camps or facilities in the Planning Area are authorized on BLM-managed public lands, because most camps are on private lands.

As of 2011, the KFO issued 58 commercial river permits, which include guided fishing, white-water rafting, kayaking, kayak instruction, vehicle shuttles, equipment rentals, and photography. In 2001, the KFO established a policy of not issuing new SRPs for river-related commercial recreation in the Upper Colorado SRMA. At that time, there were 72 permits issued by the KFO, and it was determined that the public demand for outfitter services was being adequately met. In spite of the reduction in the number of permits from 2001 to the present, the KFO maintains that the demand for commercial river-related services continues to be met. As a result, the policy of not issuing new river-related permits remains in place.

The KFO issued 23 upland permits, which include big game hunting, mountain lion hunting, horseback trail rides, jeep tours, camping, snowmobile tours, cattle drives, cross-country ski touring, hiking, mountain bike tours, and photography.

Competitive event permits include the Gore Canyon white-water race, multisport competitions, golf classic competitions, motorcycle trail races, and running races.

In addition to campground fees, individual use fees are charged at the Pumphouse and Radium Recreation sites. In 2011, the KFO collected over $145,000 in recreation fees (SRP fees and individual use fees combined). These fees are retained by the KFO for program administration, visitor services, on-site improvements, and monitoring.

Accessibility

The ability to participate in outdoor recreation can be restricted by age, disabilities, poor health; lack of appropriate facilities within an accessible distance; undesirable recreation settings; lack of information about recreational opportunities; poor transportation; or lack of convenience. The BLM improves facilities in order to make them more accessible to people with disabilities, and to provide better general access to, and information about, recreational opportunities. All construction conducted by the BLM is reviewed for compliance with Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act (ADA) Guidelines. As newer Accessibility Guidelines for Outdoor Developed Areas become final, they will also be followed.

Recreation Marketing, Information, Education

Marketing and Tourism

Tourism drives most of the local economies in north-central Colorado (Eagle County 2007). Access to the mountain communities is a key factor from a planning and tourism standpoint. Interstate 70 is a vital transportation corridor linking Denver International Airport, the Denver metropolitan area, and other Front Range population centers, to the Planning Area.

The Planning Area is in Colorado's northwestern tourism region (Colorado Tourism Office 2008). Generally, regional marketing focuses on skiing and resort towns, including Winter Park and those within Summit County. Marketing efforts also target the Colorado River, highlighting rafting, impressive canyons, and natural hot springs (such as those in Hot Sulphur Springs) (Colorado Tourism Office 2008). BLM-managed public lands tend to be marketed indirectly or in combination with other opportunities. Currently, outdoor recreation provides significant positive economic contributions to the local communities due to the fact that hunters, snowmobile riders, and other recreationists tend to purchase meals, food, fuel, sporting goods, gifts, and lodging locally. The BLM's limited role in marketing includes agreements with the Kremmling and North Park Chambers of Commerce to market outdoor recreational opportunities on BLM-managed public lands. The BLM's Colorado State Office provides information on recreation sites and other recreational opportunities through the BLM's travel information website.

Past personal experiences, maps, friends and relatives, and the Internet are the most used information sources for visitors (ASU 2008). The KFO provides basic recreational information. Maps are available through the KFO website for a few select areas. The Grand County website (http://www.grand-county.com) has maps and links to local outfitters. The Kremmling Chamber of Commerce website and business brochures market hiking and mountain biking trails in the Kremmling area (http://www.kremmlingchamber.com). Maps are also available on Single tracks.com (http://www.singletracks.com) and Trails.com (http://www.trails.com). Rafting and fishing Outfitters permitted on the Upper Colorado River also market recreational opportunities in the Planning Area.

Interpretation/Education

No formal education or interpretation program exists for the KFO. Education and interpretation on recreational opportunities and land stewardship is mostly done through brochures, signs, and the BLM website. The BLM staff participates in school programs and promotes resource protection through programs such as Tread Lightly! and Stay the Trail.

Discussions with local communities, as documented in The North-Central Colorado Community Assessment Report for the Bureau of Land Management (2007n), indicated that many communities would like BLM staff to engage in more education and outreach efforts regarding resource stewardship. This would involve an increased presence of BLM staff on the ground in an effort to engage users in discussions about sound resource use, as well as an active effort to teach the next generation of users, by going into local schools and teaching children about land use and stewardship ethics. The ongoing challenge, in an era of tight

budgets and limited staffing, is to find partners willing to help the BLM accomplish this outreach goal.

Recreation Monitoring and Evaluation

The BLM Recreation Staff, and Law Enforcement Officers, monitor all forms of recreation and public use for user conflicts, impacts to natural and cultural resources, visitor health and safety, and conflicts with adjacent private landowners. In addition, Recreation Staff members monitor management actions and objectives.

Recreation Setting Character Conditions

The contextual information provided by discussing recreation settings [rooted in the Recreation Opportunity Spectrum (ROS)] offer land managers both a descriptive tool and a prescriptive tool for recreation planning, management, and research (Clark and Stankey 1979). Since 2005, Recreation Setting Characteristic Conditions (RSCC) have been specifically described, and prescribed, for SRMAs (BLM 2005a). RSCCs can be described by attributes addressing the physical qualities of nature, social qualities associated with use, and operational conditions created by management.

The KFO adopted the ROS Management Classes in the 1984 KFO RMP (BLM 1984b). All three setting components (physical, social, and operational, which was formally managerial) were merged into one map emphasizing the physical setting. Recreation planners now find it more advantageous to discuss the distinctive differences between the physical, social, and operational setting components. The Physical, Social, and Operational setting components are futher categorized into attributes identifying prescribed conditions between Primitive and Urban Classiciations.

Physical Setting Character Condition

The BLM's ability to map the physical natural resource recreation settings across the KFO has improved considerably due to the improved availability of GIS data. As such, the physical recreation setting from 2008 is much more detailed than what was completed for the 1984 KFO RMP. In 1984, roughly 75 percent of the KFO was described as roaded natural, and 25 percent as semi-primitive non-motorized (BLM 1984b). Currently, the Decision Area is classified as 4 percent rural, 40 percent front country, 49 percent middle country, 1 percent back country, and 6 percent primitive (BLM 2008d). The fundamental physical setting character trends for the Decision Area are clear and predictable, realizing the physical changes in the region. Over the past 24 years, there has been an overall shift across the Decision Area toward a more developed physical setting condition. Unmanaged OHV use in some areas has shifted the character of these areas to more developed settings. Cumulatively, over 24 years, the natural resource recreation settings (remoteness attribute) have generally become physically less remote due to many factors, including adjacent private land development, urban growth, mechanized and motorized use on BLM-managed public lands.

Social Setting Character Conditions

BLM recreation visitation is roughly estimated, and the data is then input into the Recreation Management Information System (RMIS). (RMIS is a BLM-internal application that aggregates information pertaining to BLM-managed public lands used for public recreation purposes. Since 1984, RMIS has been the official record for outdoor recreation information on public lands managed by the BLM.) The Decision Area receives anestimated 600,000 recreation visitor days per year (RMIS 2012). The adjacent Arapaho-Roosevelt National Forest recorded more than 6.4 million recreation visitor days in 2007, and Rocky Mountain National Park recorded 2.9 million visitor days in 2007. The highest use of BLM-managed public lands occurs near communities and along the major rivers.

The evidence of humans in the Planning Area is much more noticeable and widespread on BLM-managed public lands. This is especially true near communities and popular destinations like the Colorado River and the North Sand Hills SRMA. Outside of hunting season, many upland areas, such as Dice Hill, Bull Mountain, Windy Gap, Mule Creek, Yarmony Mountain, and Owl Mountain, receive low levels of visitation. During hunting season, use greatly increases and the social settings in these areas are more often commensurate with the respective physical and administrative settings. Other upland areas, such as Wolford Mountain, Strawberry, and Kinney Creek, receive high use from motorized and mechanized use.

Operational Setting Character Conditions

Operationally, the KFO has had to limit motorized use by area (motor vehicle closures); limit motorized use by season (winter closures); increase signing, field staff, and visitor services; and apply more rules and regulations. These measures have been necessary to maintain natural resource settings, direct recreational use, provide for public safety, and protect resources.

Recreation Setting Character Condition Forecast

Population growth and changing land uses (including increased rural growth, visitation, mechanized and motorized use) indicate that the natural resource trends previously mentioned are likely to continue. Natural resource setting classes will likely continue shifting from more primitive to more developed setting classes, especially outside of SRMAs, where other resources and resource uses are being emphasized. Individually, most approved management actions did not change the mapped ROS physical setting classes adopted in 1984, although cumulatively, over 24 years, the physical natural resource settings have become generally less natural.

Experience and Benefit Outcome Preference

The most commonly identified benefit outcomes that communities currently receive (and hope to receive in the future) from BLM-managed public lands are related to benefits from participation in recreation. For residents, the proximity and diversity of leisure activities support an outdoor-oriented lifestyle, add to their quality of life, and foster quality time and positive experiences with their families (BLM 2007k). The 2006/2007 Arizona State University (ASU) Visitor Study identified the following as the highest rated desired experiences: enjoying access to outdoor physical activity, experiencing natural surroundings, getting physical exercise, enjoying the areas wildlife and scenery, and escaping everyday responsibilities. Increased satisfaction with life, restored mind from stress, improved physical fitness and health, and improved balance of work and play were identified as desirable personal benefits. The most desired community, environmental, and economic benefits were identified as: increased awareness and protection of natural landscapes; greater protection of fish, wildlife, and plant habitat; preserving the special landscape character of this place; strengthening relationships with family and friends; and lifestyle improvement or maintenance. These same items were reported as the top attained benefits, along with increased desirability as a place to live or retire, and greater family bonding (ASU 2008). The ASU Study measured participant outcomes only; the reader should not assume that the results of the survey reflect the preferences of communities or non-participants.

Characterization

Indicators

Indicators designed to measure trends in recreation include visitor use levels, user conflicts levels, impacts to resources, and compliance with commercial authorization.

Trends

Historically, the use of BLM-managed public lands emphasized commodity production It is clear that recreation has grown to become the predominant use of BLM-managed public lands. The north-central Colorado region has become a year-round place to visit, live, and work; BLM-managed public lands are absorbing increasing recreational use. Colorado's population has also grown 43.4 percent since 1990 (Colorado State Demography Office 2007a). An increasing number of people are living near, or seeking, local BLM-managed public lands for a diversity of recreational opportunities characterized by the "mountain resort or outdoor lifestyle." During the 1990s, eight of the 20 fastest growing counties in the nation were in Colorado (BLM 2008h).

Trends related to BLM-managed public lands include increasing demands for varied outdoor recreational opportunities from local communities, improving technology, recreation marketing, increasing bandit trails, funding shortfalls, developing resorts, maintaining access, changing demographics and expectations, and increasing energy development.

At the broadest level, the physical, social, and operational RSCC of the BLM-managed public lands in the Planning Area are changing from less natural to more developed, from less crowded to more congested, and from less restrictive to more regulated. These changes will impact the recreational opportunities that can be offered by land managers, and their partners, in the future.

3.2.16 Comprehensive Travel and Transportation Management

One of the BLM's greatest management challenges is providing reasonable and varied routes for access to the BLM-managed public lands, and also providing areas for a wide variety of both motorized and non-motorized recreational activities. The various landscapes, user interests, equipment options, weather conditions, transportation infrastructure, and resource constraints all must be considered through a holistic process described as Comprehensive Travel and Transportation Management (CTTM). The BLM manages travel on the lands it administers through the CTTM program.

Prominent among the travel management issues the BLM faces is the complex challenge in managing motorized activities on the public lands. The combined effect of population increases in the west, explosive growth in the use of OHVs, and the advances in technology, has generated increased social conflicts and resource impacts on the public lands related to motorized recreation and the impact on other recreation activities and resource uses.

By improving trail and travel management through the land use planning process, the BLM is minimizing impacts to wildlife habitat; reducing the introduction and spread of invasive weeds; lessening conflicts among various motorized and non-motorized recreation users; and preventing damage to cultural resources resulting from the expansion of roads and trails on public lands. Moving toward a rational system of a designated network of roads and trails through CTTM planning will protect, rather than inhibit, recreational access to the public lands. In the long run, these plans will provide the management foundation to prevent unnecessary closures or restrictions stemming from preventable resource damage or user conflicts. (Source:

http://www.blm.gov/wo/st/en/prog/Recreation/recreation_national/travel_management.html)

Travel and transportation are an integral part of virtually every activity that occurs on BLM-managed public lands, including recreation, grazing, wildlife management, vegetation management, commodity resources management, ROWs to private inholdings, electronic site maintenance, and overall public lands management and monitoring. CTTM is the proactive management of public access and natural resources in compliance with travel-related regulations, in accordance with the best land use management principles. It involves a comprehensive approach that considers various aspects of road and trail system planning and management, specifically natural resource management; road and trail design and maintenance; and recreation and non-recreation uses of roads and trails. Within this context, travel activities are evaluated as a means of access to public lands. They are also evaluated according to the impacts all forms of motorized and non-motorized travel have on public lands and resources and on the people who use them.

CTTM addresses all travel-related resource uses, such as recreational, traditional, casual, agricultural, commercial, and educational. It addresses all accompanying modes and conditions of travel as follows:

Modes of Travel – Historically focused on motor vehicle use, CTTM now encompasses all forms of transportation, including travel by foot, horseback and other livestock; travel by mechanized vehicles, such as bicycles; travel by motorized vehicles, such as 2-wheeled (motorcycles) and 4-wheeled (ATVs, cars, and trucks) vehicles; and travel by motorized and non-motorized boats.

Conditions of Travel – The BLM defines and categorizes its linear assets (travel routes) into the following 3 "Transportation Asset" designated categories: 1) roads, 2) primitive roads, and 3) trails. Further categorization includes low clearance, high clearance or single track; and conditions are monitored according to each route's "Maintenance Intensity" level.

There is considerable overlap between travel management and all other uses on BLM-managed public lands. For example, many users of public lands are there to recreate. For visitors, a route system may serve as either a route to a destination, or as the recreation location itself. For destination recreation, vehicle routes serve as the means to get to a starting point in order to then engage in the recreational activity (such as a parking area/trailhead). The route itself also can serve as the focus of the recreation activity (such as pleasure driving, 4-wheel driving, motorcycling, ATV riding, biking, horseback riding, hiking, snowmobiling, and cross-country skiing) (USFS 2008).

[*Note*: In order to reduce the duplication of narrative between travel management and the other sections of this document, this section addresses only public travel and access (OHV management area designations, route designations, types of travel, over-the-snow travel, and seasonal area limitations). The interrelated recreation component narrative, for example, is addressed under Section 3.2.15 Recreation and Visitor Services. The transportation component of CTTM that addresses administrative access, agricultural use, commercial use, commodity use, and road maintenance is addressed under Section 3.2.26 Transportation System.

Off-Highway Vehicle Management Areas

An Off-Highway Vehicle (OHV) is synonymous with Off-Road Vehicles (ORV). ORV is defined as any motorized/battery-powered vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding:

- any non-amphibious registered motorboat;
- any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes;
- any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved;
- vehicles in official use; and
- any combat or combat support vehicle when used in times of national defense emergencies (43 CFR 8340.0-5).

Generally, OHVs include dirt motorcycles, dune buggies, sand rails, jeeps, 4-wheel drive vehicles, snowmobiles, and ATVs.

A 4-wheel drive vehicle (4x4, 4WD) is a passenger vehicle or light truck having power available to all wheels. An ATV is a wheeled vehicle other than a snowmobile, defined as having a wheelbase and chassis of 50 inches in width or less; steered with handlebars; having, generally, a dry weight of 800 pounds or less; traveling on 3 or more low-pressure tires, and with a seat designed to be straddled by the operator. A motorcycle is defined as a motorized vehicle with 2 tires, and with a seat designed to be straddled by the operator.

In accordance with 43 CFR 8342.1, the BLM's regulations for OHV management, "the Authorized Officer shall designate all BLM administered lands as either Open, Limited, or Closed to [OHVs]." As such, all BLM-managed public lands within the Planning Area have been designated as follows:

Open Area Designations – These designations are used for areas where there are no special restrictions, or where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.

Limited Area Designations – These designations are used where travel must be restricted in order to meet specific resource/resource use objectives. For areas classified as Limited, the BLM must consider a full range of possibilities, including travel that will be limited to types or modes of travel (such as foot, equestrian, bicycle, motorized, etc.); limited to existing roads and trails; limited to time or season of use; limited to certain types of vehicles (OHVs, motorcycles, ATVs, high clearance, etc.); limited to licensed or permitted vehicles or users; limited to BLM administrative use only; or to other types of limitations. In addition, the BLM must provide specific guidance about the process for managing motorized vehicle access for authorized, permitted, or otherwise approved vehicles for those specific categories of motorized vehicle uses that are exempt from a limited designation.

Closed Area Designations – These designations are completely restricted to any and all travel and transportation. Areas or trails are designated as Closed if closure to all vehicular use is necessary in order to protect resources, promote visitor safety, or to reduce use conflicts.

Existing Route Systems

Many routes within the Planning Area were constructed in order to access improvements and projects for timber/vegetation management, gas/mineral development, range management, and various ROWs. Some of these routes are maintained by the authorized permittee in order for them to access the improvement (such as a livestock/wildlife pond or fence). Over the years, many of these routes have become part of the roads and trail system frequently used by visitors who are engaged in mechanized and motorized recreation.

Many more mechanized/motorized routes were created, or "pioneered," by users themselves. Open travel designations that allow cross-country mechanized and motorized use, high levels of use, and improvements in mechanized/motorized vehicle technology have allowed users to gain access to, and through, rough terrain. The repeated passage of vehicles or mountain bikes creates and maintains these routes. Created by consistent use, these routes often cause conflict with public land resources and other public land uses.

Current Conditions

The emerging issues within the Planning Area are:

- the current 1984 RMP provides the framework for travel planning; however, it was completed prior to the rapid expansion of recreational vehicle use and visitation on BLM-managed public lands within the Planning Area;
- the lack of planning for recreation that preceded the construction of historic routes;
- subdivision of private property has dramatically increased the number of adjacent property owners, and increased the number of new access routes to public lands within the Planning Area;
- unauthorized creation of unmanaged user-created routes impacting other resources;
- users traveling routes both as an end in itself, as well as to get to specific places;
- some routes and areas that are Open to motorized use are only accessible to adjacent landowners; and
- growing conflicts among recreational users.

Prominent among the travel management issues facing the BLM is the complex challenge in managing motorized activities on BLM-managed public lands. The combined effect of population increases in the west, explosive growth in the use of OHVs, and the advances in technology, has generated increased social conflicts and resource impacts to public lands related to motorized recreation, as well as impacts to other recreation and resource uses (BLM 2009e). Throughout the Planning Area, there is a dramatic increase in OHV use on BLM-managed public lands by hunters during the fall big game hunting seasons.

More than 80 percent of the Planning Area is Open to OHV use. (See Map 2-32, Alternative A: KFO OHV Area Designations.) Table 3-22: Planning Area Acres with Travel Limitations (Open Areas not included), is a summary of acres where OHV travel is restricted. Table 3-23: Seasonal Travel Limitations within the Planning Area, summarizes roads that have seasonal restrictions or limitations. Routes in these areas have proliferated as motorized recreation has increased in popularity. Seasonal limitations protect roads and areas from resource damage during wet and muddy times. Many roads that were addressed in the Implementation Plan are Closed to OHV use when conditions become wet and muddy. Typically, roads are closed by locked gates by the end of October, as weather conditions exacerbate erosion. Some seasonal routes are not closed by gates or other barriers because snow levels effectively close these routes to all motorized vehicles except snowmobiles.

Table 3-22: Planning Area Acres with Travel Limitations (Open Areas not included)

Area	Limited (Existing Roads And Trails)	Limited (Designated Roads and Trails)	Closed
Dice Hill		4,930	
Hebron Slough		8,217	
Kremmling Cretaceous Ammonite ACEC			198
Lawson Ridge	6,012		
North Park *Phacilia formosula* ACEC			318
North Sand Hills SRMA	1,256		
Platte River Contiguous WSA			30
Sulphur Gulch		5,200	
Troublesome WSA			8,158
Windy Gap		1,463	
Wolford Mountain Travel Management Area		42,415	
Total	**7,269**	**57,025**	**8,708**

Source: BLM 1988

Motorized Travel

Within the Planning Area, the heaviest OHV use occurs in the Wolford Mountain, Strawberry, and North Sand Hills SRMA areas, with moderate-to-heavy OHV use in the Kinney Creek and Dice Hill areas (primarily during hunting seasons). Most areas receive OHV use year-long, and for many users the act of driving/riding is the primary reason for their recreational visit. Most of these visitors live within an hour's drive of the area (with the exception of North Sand Hills), and enjoy practicing their technical skills, using their equipment, and spending time with family and friends.

OHV use has also been increasing on BLM-managed public lands surrounding municipalities. The towns of Kremmling, Granby, Hot Sulphur Springs, and Walden have all experienced this growth. In Kremmling, motorized use is the dominant use. Other uses, however, are increasing (such as mountain biking). In the Walden area, motorized use dominates. In Granby and Hot Sulphur Springs, there has been a mixture of motorized, non-motorized, and mechanized use.

High-use/Interest Areas

The following sections describe the higher use in areas mentioned above, in addition to areas where management issues are occurring.

Strawberry

Both motorized and non-motorized use has increased in the Strawberry area as a result of increased visitation from both local populations as well as from front-range communities. The Strawberry area is close to the Winter Park Resort, which continues to see increased visitation. A series of single-track routes named the "Phases" are in the Strawberry area, and are used by motorized and non-motorized bike users. These single-track routes have proliferated on public lands in recent years, and continue on to National Forest System lands adjacent to the east of the Planning Area. The National Forest System lands are designated non-motorized, with the exception of snowmobile use. This area also provides public access to the Fraser River, which is a popular fishing area (due to the lack of public access along other sections of the river). During high run-off periods, the Fraser River experiences some kayak use, with visitors putting in on the river just outside of Tabernash. Other OHV routes are 2-track roads created as the result of timber harvesting. Dispersed hiking and camping also occur within the Planning Area, providing visitors with outstanding views of the Fraser Valley, Byers Peak, and the Continental Divide. Winter uses include snowmobiling, snowshoeing, cross-country skiing, and fishing. During some years, Behler Creek Road 2769, off of Strawberry Road 2751, has been closed in order to keep motorized vehicles off the road during the wet season.

Dice Hill

Dice Hill has seen a large increase in motorized use, mostly during the fall hunting season. After the completion of the 1988 Off-Road Vehicle Implementation Plan, 2 informational signs were installed that identified this area as a Limited Use Area. Signs marked roads and trails that were Open to motorized travel. Due to funding and staffing constraints, minimal monitoring and maintenance has been done. New user routes have been created, and signs have been vandalized or removed, or are in poor condition. Routes that were not identified in the Implementation Plan, but that were present, have been left Open until they are designated under this planning effort.

Wolford Mountain

In 2005, the Wolford Mountain Travel Management Plan designated all routes in the Wolford Mountain Travel Management Area as Open or Closed, and specified the allowable types of travel within each designation. Foot and horse travel is unrestricted throughout the Travel Management Area, with the exception of the Kremmling Cretaceous Ammonite ACEC, which is restricted to foot travel. The Travel Management Plan reduced the miles of OHV motorized routes from 231 to 167, and eliminated cross-country motorized travel. A seasonal closure is in effect between December 15 and April 15 each year in order to protect big game winter range, and to prevent resource damage. During the winter closure, snow travel is limited to County Roads, with the exception of a route linking County Road 25 to County Road 2. Additional seasonal travel restrictions are in place for the Wolford Mountain Motorcycle Trail, and 2 routes within the southeastern section of the Travel Management Area. Route designations have been implemented; however, route proliferation continues. Monitoring and implementation will need to continue, with an emphasis on visitor education. A unique OHV opportunity exists with the Sidewinder Extreme 4x4 Jeep Trail, which is just

outside of the town of Kremmling. This trail is a series of constructed obstacles that is for experienced technical drivers with specially modified equipment.

North Sand Hills

The North Sand Hills SRMA is limited to existing roads and trails, with motorized travel allowed in the open sand dunes. Of this area, 671 acres are within an Instant Study Area (ISA), which is one of three wilderness designations under the Wilderness Act of 1964.

Seasonal Travel Limitations

Travel limitations, especially for motorized use, of varying degrees have been in place since the 1984 RMP. The KFO has used utilized seasonal limitations on motorized use in order to protect the road system. This is because almost all BLM routes are native surface and, therefore, vulnerable to erosion during wet periods. Usually, limitations are in place in order to limit disturbance to wildlife and sensitive resources during critical times. Table 3-23: Seasonal Travel Limitations within the Planning Area, is a summary of roads that have seasonal restrictions. At times, the KFO has issued emergency route closures in order to protect resources, users, and the routes themselves from damage under wet and muddy conditions.

Table 3-23: Seasonal Travel Limitations within the Planning Area

Location	Description of Seasonal Route Limitation
Inspiration Point Flats Road and Jeep Trail	Closed to all motorized travel 12/1 to 4/1
Pumphouse Recreation Site Access Road	Closed to all motorized travel 12/1 to 4/1
Dice Hill Road No. 2750	Closed to all motorized travel 4/15 to 6/1
Black Mountain Access Road No. 2757	Closed to all motorized travel 4/15 to 6/1
Grouse Mountain Road No. 2758	Closed to all motorized travel 4/1 to 6/1
Smith Mesa Road No. 2759	Closed to all motorized travel 4/15 to 6/1
Smith Mesa Lower Mainline Road No. 2762	Closed to all motorized travel Labor Day to 6/1
Kinney Creek Road No. 2755	Closed to all motorized travel 4/15 to 6/1
McQueary Creek Road No. 2756	Closed to all motorized travel Labor Day to 6/1
Kinney Creek Spur Road	Closed to all motorized travel Labor Day to 6/1
Strawberry Road No. 2751	Closed to all motorized travel 4/15 to 6/1
Hurd Peak Road No. 2765	Closed to all motorized travel 4/15 to 6/1
Buffalo Peak Access Roads Nos. 2507 and 2508	Closed to all motorized travel 4/15 to 6/1
Independence Mountain Access Roads Nos. 2503 and 2504	Closed to all motorized travel 4/15 to 6/1
Bull Mountain Road No. 2505	Closed to all motorized travel 4/15 to 6/1
Owl Mountain Roads Nos. 2502 and 2506	Closed to all motorized travel 4/15 to 6/1
Radium Hot Springs Access Road	Closed 6/1 to Labor Day (deferred implementation)

Table 3-23: Seasonal Travel Limitations within the Planning Area

Location	Description of Seasonal Route Limitation
Three Mile Creek Road No. 2510	Closed 10/1 to 6/1 (snowmobiles excepted)
Mitchell Placer Road No. 2511	Closed to motorized vehicles year round.
Parson's Draw Road No. 2513	Closed to motorized vehicles year round.
Owl Mountain Spur Roads	Closed to motorized vehicles year round.
Sheriff Creek Road No. 2764	Closed to motorized vehicles year round.
Behler Creek Road No. 2769[1]	Closed to motorized vehicles April 15 to June 1
Spruce Creek Road No. 2767[1]	Closed to motorized vehicles Labor Day to 6/1
Spruce Creek Spur 1 No. 2770[1]	Closed to motorized vehicles Labor Day to 6/1
Spruce Creek Spur 2 No. 2771[1]	Closed to motorized vehicles Labor Day to 6/1
Wolford Mountain Single Track[1]	Closed to motorized vehicles 9/15 to 6/1
Location	**Description of Seasonal Area Limitations**
Resource Conservation/Wolford Mountain Area	Restricted to snowmobiles on designated routes 12/1 to 4/30 in order to protect big game wintering habitat
Hebron Slough	Closed to all motor vehicles 6/1 to 8/1 in order to protect nesting waterfowl; 8/1 to 7/1 motorized vehicles are limited to designated roads and trails (snowmobiles operating on snow are exempt from this winter seasonal limitation)

Note: Designations/limitations determined in Off-Road Vehicle Implementation Plan, September 1988 (BLM 1988b)
[1] Seasonal and year-around limitations not listed in 1988 OHV Implementation Plan
Source: BLM 1988b

The use of motorized vehicles for travel over-the-snow is subject to the same requirements, limitations, and designations as all other motorized transport, as specified in the KFO RMP (BLM 1984b), unless the area or route is designated as Open to over-the-snow travel during the winter season. Areas and routes Open to over-snow travel must have a minimum average of 12 inches of snow to be considered Open for public use. [See Table 3-24: Over-the-Snow (Snowmobile) Travel within the Planning Area.]

Table 3-24: Over-the-Snow (Snowmobile) Travel within the Planning Area

Location	Area Limited to Designated Roads and Trails	Area Limited to Existing Roads and Trails	Closed
Ammonite Site ACEC			198
North Park Natural Area ACEC			318
Platte River Contiguous WSA			33
Troublesome WSA			8,140
North Sand Hills SRMA		1,450	
Wolford Mountain	33,120		
Total	**33,120**	**1,450**	**8,689**

Source: BLM 2008h

Types of Routes

As of January 2008, there were approximately 2,080 miles of inventoried routes within the Planning Area. Table 3-25: Types of Routes within the Planning Area is a summary of the types of the routes. Most routes within the Planning Area are classified as Primitive Roads, followed by Primitive 4-Wheel-Drive and Light-Duty Roads.

Table 3-25: Types of Routes within the Planning Area

Route Open To	Miles
1-track foot/horse	33.01
1-track mechanized	0.20
1-track motorized	57.47
ATV trail	74.20
County road	39.63
Horseback trail	60.19
Light-duty road	267.54
Obliterated	22.28
Primitive 4-wheel-drive	537.96
Primitive road	968.23
Secondary highway	15.86
Total	**2,076.57**

Source: BLM 2008h

Parking/Camping Off of Designated and Existing Routes

In limited areas, in order to access dispersed campsites, motorized/mechanized travel up to 300 feet from designated motorized/mechanized routes is allowed, provided that resource damage does not occur and that no new routes are created (and that such access is not otherwise prohibited by the BLM Field Manager). Driving off of the road for the purpose of fuelwood cutting and/or the gathering of forest products is allowed, as provided by permit.

Mechanized Travel

Mountain biking has increased within Grand County. No trails specifically designed for mountain bikes exist; however, routes have been recognized by interest groups as popular rides. Some of these routes exist within the Wolford Mountain Travel Management Area, where segments have been closed due to resource and trail network concerns. A popular mountain bike route exists within the Dice Hill area. Mountain bike use has increased within the Strawberry area, which is near many other local, State, and Federal land areas that have seen increased visitation and dispersed use.

Non-mechanized Travel

Hiking opportunities within the Planning Area are limited by the lack of identifiable, designated, and signed trails. Only a few developed and maintained hiking trails exist, including the following:

Gore Canyon Trail – at Pumphouse Recreation Area, heading into Gore Canyon;

Argentine Trail – near the Radium Recreation Area, accessing the warm springs along the Colorado River; and

Yarmony Trail – along the Colorado River near State Bridge.

Other hiking trail opportunities exist on Sheep Mountain in eastern Grand County; however, these trails have limited public access. Other areas with heavy hiking use and user-created trails are along the river corridors that access popular fisheries on BLM-managed public lands. These areas include Strawberry (along the Fraser River); the Sunset, Powers, and Reeder Creek fishing access sites (along the Colorado River); and the Blue River access site (off of the Trough Road) (County Road 1 in Grand County).

Horseback riding is a popular activity that occurs throughout the Planning Area. Many private homeowners in both Middle Park and North Park own horses, and use them for recreation as well as for transportation. Horseback riding is allowed throughout the Planning Area, with little or no restrictions. During hunting season, recreational hunters use horses in order to access remote areas, and to pack out game. Jacques Road (along Highway 40 in Grand County) was improved for horse trailers, and includes a parking/staging area for large trailers. This parking area accesses a route that is Open to non-motorized travel, with the exception of snowmobiles, when conditions permit. Several Dude Ranches are permitted for horseback trail rides, and 2 are also permitted for cattle drives on public lands within the Planning Area. Other Outfitters are permitted to use horses for transportation and for game retrieval. This has brought many visitors to the Planning Area, which is an economic benefit to the local communities and businesses.

Characterization

Indicators

Indicators designed to measure trends in travel management include the size of designated areas for motorized use (such as Open, Limited, or Closed); miles of routes and trails in limited use areas; and miles of routes and trails where motorized, mechanized, and non-motorized uses are allowed, restricted, or not allowed (depending upon resource and use considerations).

Trends

Research shows that the demand for OHV use rapidly increased in the 1990s, and continued into the first few years of this decade (Cordell et al. 2008). In 1995, approximately 368,600 OHVs and ATVs were sold. By 2006, that number had almost tripled to approximately 1,034,966 OHVs. Over a 10-year period, the total existing number of OHVs grew from fewer than 3 million vehicles to more than 8 million in 2003. Sales in 2004 through 2006 totaled almost 3.25 million vehicles. Assuming at least 1 million new vehicles were sold in 2007, and that 80 percent of all vehicles are still operable, there could be as many as 9.8 million ATVs and off-road motorcycles in the U.S. as of January 1, 2008 (Cordell et al. 2008).

OHV use has increased throughout the Planning Area, and will continue to increase as Grand and Summit Counties continue to see increased population growth. Areas expected to see an increase in use include the Wolford Mountain, Strawberry, Dice Hill, North Sand Hills, Kinney Creek, Windy Gap, and Upper Colorado SRMA areas.

Non-motorized use within river corridors is expected to grow, as anglers and other visitors hike along, and to, waterways. The Strawberry area, for example, is expected to continually grow in popularity due to its proximity to the Winter Park Resort Community, which has been growing rapidly. Mountain biking, fishing, hiking, hunting, and camping are likely to increase.

Private property adjacent to BLM-managed public lands will likely continue to be subdivided. Continued collaboration between the BLM and municipalities/counties will help provide appropriate access during subdivision design, as well as valuable stewardship once the homes are occupied.

3.2.17 Lands and Realty

The Lands and Realty Program secures and protects the American public's rights, title, value, and interests in its public lands, and authorizes a variety of uses on those public lands to meet the needs of present and future generations (including utility/energy corridors, pipelines, water lines, power lines, communication sites, energy corridors, rights-of way, and withdrawals management).

Lands and realty actions can be divided between land tenure adjustments and land use authorizations. Land tenure adjustments focus primarily on land acquisition and disposal (including easement acquisition), while land use authorizations consist of rights-of-way (ROWs), utility corridors, communication sites, and other leases or permits. Lands and realty actions ensure that public lands are managed to benefit the public. BLM-managed public lands are used for a variety of purposes. Major focus areas for the Lands and Realty Program include land tenure adjustments, Federal mineral estate, ROWs, other leases or permits, utility corridors and communication sites. Wind and solar renewable resource production is also permitted by ROWs through the Lands and Realty Program.

Land use plan decisions related to land tenure adjustments or land use authorizations, as described above, could affect the Lands and Realty Program. In addition, any land use plan decision that limits or restricts the use of public land in the Decision Area could also affect the Lands and Realty Program.

Current Conditions

Land Tenure

Surface land ownership in the Planning Area is mixed. (See Table 3-26: Surface Land Ownership in the Planning Area.) BLM-managed public lands total approximately 378,884 acres, or 12 percent of total land ownership. Private ownership accounts for 853,894 acres, or 27 percent. Most of the land is managed under other Federal ownership, including the USFS and the NPS. BLM-managed public lands are all managed in accordance with the 1984 KFO RMP (BLM 1984b) and several RMP amendments, including the 2000 RMP Amendment for Land Acquisition and Land Use Priorities (BLM 2000b). (See Map 1-1, KFO Planning Area and Land Status.)

Table 3-26: Surface Land Ownership in the Planning Area

Land Status	Acres	Percentage of Planning Area
BLM	377,852	12 Percent
Colorado Division of Wildlife	21,217	Less Than 1 Percent
Colorado State Forest Service	73,595	2 Percent
National Park Service	97,500	3 Percent
Private	853,894	27 Percent
State	95,361	3 Percent
USFS	1,572,352	50 Percent
USFWS (National Wildlife Refuge)	23,468	Less Than 1 Percent
Total	**3,115,239**	**100 Percent**

Source: BLM 2011

Land Tenure Adjustments

Land tenure adjustments in the Planning Area are used to improve the efficiency and effectiveness of public land management. This is done by identifying public lands suitable for a variety of actions, including disposal, sale, exchange, State selection, inter-agency boundary adjustment, Recreation and Public Purposes leases or patents, and Section 302 leases (BLM 1984b). Consolidation of land ownership through land tenure adjustment provides a more compact and manageable land base, which, in turn, promotes efficient and effective management of BLM-managed public lands in the Planning Area.

Under the updated KFO RMP ROD (BLM 1999d), all 378,884 acres of BLM-managed public lands administered by the KFO can be considered for disposal on a case-by-case basis, provided that disposal serves the public interest. All lands may be available for disposal through exchanges, State selections, boundary adjustments, Recreation and Public Purposes Act (RPPA) leases and patents, and Section 302 leases. Only lands identified as Category II lands are considered for disposal by sale under the provisions of Section 203 of the FLPMA.

Approximately 2,500 acres of BLM-managed public lands in the Planning Area have been identified for special disposals under the updated KFO RMP ROD (BLM 1999d). Disposal of these areas are considered in the public interest, and benefit Federal and other governmental agencies' management programs. Approximately 14,000 acres are identified in the updated ROD for disposal through land sales.

In the Planning Area, public lands considered suitable for disposal are:

- tracts in the Grand Lake, Granby, and Fraser areas that support or enhance their recreational and tourism based economy;
- inholdings within large blocks of State or other Federal lands;

- BLM-managed public lands adjacent to large blocks of State or other Federal lands that would be best managed by that State or other Federal agency;
- BLM-managed public lands overlying other Federal mineral estate; and
- isolated tracts of land that:
  - have no important wildlife habitat values;
  - are not within a sensitive watershed or riparian area;
  - are in areas where BLM-initiated range management opportunities are limited due to size, isolation, and/or site potential;
  - are lands where BLM-initiated forest management opportunities are limited due to tract size, stand size, access difficulties, and/or adverse sites; and
  - have no resource values of major significance.

The general sale authority for BLM-managed public lands is Section 203 of the FLPMA. The FLPMA requires that public lands be retained in public ownership unless, as a result of land use planning, disposals of certain parcels are warranted. Tracts of land that are designated in BLM RMPs as potentially available for disposal are likely to be conveyed out of Federal ownership through an exchange rather than through a sale. BLM-managed public lands must be sold at no less than fair market value, and must meet very specific sale criteria, in accordance with the FLPMA. Generally, BLM-managed public lands proposed for sale are considered to have low resource value.

Acquisition of lands for BLM administration in the Planning Area are considered when the land would benefit overall public land management. Site-specific environmental assessments would consider acquisition needs. Lands considered for acquisition include:

- inholdings of private, State, or other Federal land within large blocks of BLM-managed public lands;
- land adjacent to intensively managed tracts of BLM-managed public lands where overall program management would be enhanced, such as lands adjacent to SRMAs, intensively managed forest sites, grazing allotments, or important mineral areas; and
- lands of mineral importance where the Federal minerals are overlain by State or by private surface ownership.

The BLM may acquire land through exchange with other entities. Inholdings may be acquired if they become available for purchase or exchange. Occasionally, the BLM also receives donated land or interests in land.

In 2000, the BLM signed an amendment to the 1984 KFO RMP (BLM 1984b) establishing land use priorities for specific parcels that the KFO acquired since 1984. This RMP Amendment established land use planning prescriptions and land use priorities for those parcels with different management direction than adjacent BLM-managed public lands (BLM 2000b). Including these lands, the KFO has acquired 36,389 acres in exchanges since the 1984 RMP (BLM 2007k).

Withdrawals

Withdrawn lands are lands that are reserved and set aside from application of some, or all, of the public land laws to protect specific resource values (such as waterpower, reservoir sites, Federal reserve water rights, SRMAs, etc). Segregative effects of withdrawals can vary depending upon the particular resource being protected, and the withdrawal may be modified or eliminated through revocation.

Waterpower and reservoir sites – Waterpower and reservoir sites on BLM-managed public lands in the Planning Area portion of the Colorado River basin have been identified since 1916, beginning with the USGS. The ongoing effort of identifying lands that contain sites with future waterpower and reservoir potential is part of an effort referred to as the Waterpower and Reservoir Resources (WRR) inventory.

These identified lands contain two types of formally designated sites:

- developed reservoirs and diversion-structure sites operated by government agencies and private enterprises; and
- undeveloped potential sites that have been withdrawn.

The Planning Area portion of the river basin likely contains a number of undesignated sites that have the potential for future waterpower and reservoir resource use.

All BLM-managed public lands in the Planning Area with future potential for waterpower and reservoir resource use are assigned to one of the following categories:

- lands suitable for intensive management of waterpower and reservoir resources sites;
- lands suitable for restricted management of waterpower and reservoir resources sites; and
- lands that are unsuitable for management as waterpower and reservoir resources sites.

For undeveloped sites that have been withdrawn, before any uses are allowed that might endanger water power values, an engineering evaluation is conducted in order to determine whether the land has waterpower value. The Federal Energy Regulatory Commission (FERC) is then contacted for concurrence to modify or terminate the withdrawal to allow for compatible uses.

The process of identifying potential waterpower and reservoir sites is continual. If a site is designated as a result of a future WRR effort, a withdrawal action could be initiated and the site would become categorized as “undeveloped potential sites that have been withdrawn”, and managed as “lands suitable for restricted management of waterpower and reservoir sites”.

There may be instances where waterpower or reservoir sites have been withdrawn and are located in stream or river segments determined by the BLM to be suitable for WSR designation status. These withdrawals would remain in effect until Congress acts on the suitability determination, formally designating the segment(s). If Congress seeks BLM input on a potential WSR designation, the BLM would recommend revocation of the withdrawals in the legislation that designates the river as part of the NWSRS.

FERC Sites – Additional BLM-managed public lands in the Decision Area may be withdrawn under the authority of the FERC. These lands are not withdrawn in the same manner as those mentioned above.

The FERC has the authority to issue permits and licenses for proposed hydroelectric (waterpower) development projects pursuant to the Federal Power Act of 1920 (FPA). At any time, when an application is filed, the FERC can issue a license or a permit. Related projects segregate the land from operation of some, or all of, the public land laws. The extent of the segregation depends upon the status of the project.

The BLM, other agencies, and the public, have a right to be involved in the FERC planning process, but that process is separate from the BLM's planning process. The BLM's responsibility is to note the public land records accordingly. The BLM has limited authority over the lands once they are included in a project. For example, the BLM may authorize specific uses for lands involved in a FERC project, but the authorized use must not interfere with the uses authorized under the FERC permit.

SRMAs – SRMAs are specifically defined administrative units managed for select recreational activities in order to produce a set of structured recreation opportunity outcomes. An example of such a withdrawal is the Upper Colorado River SRMA, totaling 12,200 acres. This SRMA is withdrawn from settlement, sale, location, or entry under the general land and mining laws to protect its special river-related recreation emphasis for approximately one-half mile on each side of the Upper Colorado River. Established in 2000 as an Amendment to the 1984 Kremmling RMP, this withdrawal also included 1,020 acres of private or State land with Federal minerals.

ACECs – An ACEC is an area where special management attention is required in order to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources or other natural systems or processes; or to protect life and safety from natural hazards. Currently, there are two ACECs in the Planning Area. Neither of the ACECs have been withdrawn.

Withdrawals that Create Federal Reserved Water Rights – Congress and the Executive Branch of the Federal government have the authority to withdraw or reserve public lands for specific land management purposes. Withdrawals and reservations that are enacted for some Federal land management purposes require a specific quantity of water to fulfill the purpose of the withdrawal or reservation. Withdrawals and reservations that fall into this category include the following: public water holes and springs; mineral hot springs; stock driveways; public oil shale withdrawals; WSRs; National Monuments and Conservation Areas; and Wilderness Areas.

The most common Federal reserved water rights on BLM-managed public lands are associated with water holes and springs. These rights were created by Executive Orders (EOs) referred to as Public Water Reserves (PWRs). Prior to 1926, PWRs were created on an ad-hoc and site-specific basis. Federal agencies would identify the springs or water holes that were necessary to fulfill a specific land management purpose, and these would be incorporated by EO into a chronologically numbered PWR. In 1926, a blanket presidential EO signed by President Calvin Coolidge withdrew 40-acre tracts of land around all significant springs and waterholes on public domain lands from entry under homesteading law and mineral laws. All waters from these sources in excess of the minimum amount

necessary for livestock grazing and homesteading was made available for appropriation through State water law. The purpose of the EO was to prevent the monopolization of critical water sources for livestock grazing and homesteading by a few parties. The BLM has obtained adjudicated Federal reserved water rights from the State of Colorado on these critical water sources with a 1926 priority date, which reflects the date that the lands were reserved by the President for livestock watering and homestead purposes.

Mineral Hot Springs with medicinal or curative properties located on vacant, unappropriated, or unreserved public lands were also withdrawn by EO. The BLM is authorized to lease these springs for public purposes. The BLM has obtained adjudicated Federal Reserve water rights on these sources from the State of Colorado.

Stock driveways are reserved pursuant to the Stock-Raising Homestead Act of 1916. This act was repealed by the FLPMA, but reservations made prior to the FLPMA remain in effect until changed in accordance with the Act. This Act authorized the withdrawal of public lands containing water holes necessary for watering stock during movement to seasonal ranges or shipping points. The BLM has obtained adjudicated Federal Reserve water rights on these sources from the State of Colorado.

Under the Wild and Scenic Rivers Act of 1968 (WSRA), Congress or the Secretary of Interior may designate a stream as “Wild and Scenic.” Designation of a stream or river segment as “Wild and Scenic” prevents construction of flow-modifying structures and other facilities on the segment. The area of restricted development can vary, but it generally includes at least the area within one-quarter mile of the ordinary high-water mark on either side of the segment. The WSRA also reserved to the United States the amount of unappropriated water flowing through the lands necessary to preserve and protect in free-flowing condition, the water quality, the segment and water-related Outstandingly Remarkable Values (ORVs) associated with designation of the segment and the tentative classifications. Presently, there are no designated WSRs in the Decision Area.

Areas designated as Wilderness pursuant to the Wilderness Act of 1964, may or may not carry a Federal reserved water right, depending upon the legislative language used by Congress. Typically, if a Federal reserved right is created, it reserves the amount of water in a Wilderness Area necessary in order to preserve and protect the specific values associated with the area’s Wilderness designation, and to provide for public enjoyment of these values. Only the minimum amount of water necessary to fulfill the primary purpose of the reservation may be asserted as a reserved right. Presently, there are no designated Wilderness Areas on BLM-managed public lands in the Decision Area.

Land Use Authorizations

The most common form of authorization to permit uses of BLM-managed public lands by commercial, private, or governmental entities is the ROW. (See Table 3-27.) A ROW grant is an authorization to use a specific piece of public land for certain projects (such as roads, pipelines, transmission lines, or communication sites). The grant authorizes rights and privileges for a specific use of the land for a specific period of time.

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

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

Each year, the KFO processes approximately 25 ROW applications. To the extent possible, linear ROWs (such as roads and pipelines) are routed where impacts would be least disturbing to environmental resources, taking into account point of origin, point of destination, and purpose and need of the project. The ROWs are issued with surface reclamation stipulations and other mitigation measures. Restrictions and mitigation measures may be modified on a case-by-case basis, depending upon impacts to resources. The placement of major linear facilities depends upon meeting the following location criteria:

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

Some uses of BLM-managed public lands are authorized through land use permits or leases (in accordance with 43 CFR 2900). In general, leases are for long-term land uses, and permits are used to authorize short-term uses. Private individuals and groups, as well as various businesses and government entities can hold these authorizations. (See Table 3-27: Active ROW Authorizations in the Decision Area.)

Table 3-27: Active ROW Authorizations in the Decision Area

Type	Number of Authorizations	Size (Acres)
Road	162	4,196
Railroad	8	1,074
Power	76	3104
Telephone	46	589
Water facilities	82	3591
Oil and gas	10	243
Communication sites	23	45
Other	126	1813
Total	**533**	**14,655**

Source: LR2000

Utility Corridors and Communication Sites

Multiple utility corridors, rights-of-way and communication sites exist in the Planning Area. Land use authorizations for the use of public lands are granted through a ROW. Land use authorization for communication sites are granted through a communication site lease. Permits and leases are authorized under 43 CFR 2900.

Utility Corridors

Section 368 of the Energy Policy Act of 2005 directs the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior to designate corridors on Federal land in 11 western States for oil, gas, and hydrogen pipelines, and for electricity transmission and distribution facilities. In accordance with the Act, the Final Programmatic EIS (FEIS) for the Designation of Energy Corridors on Federal Land in the 11 Western States was published in February 2008 (USDOE and BLM 2008). The FEIS includes a corridor south of Kremmling, coming from the east and following the Western Area Power Administration (WAPA) transmission line as it heads north along U.S. Highway 40, and then over Colorado Highway 134 (Gore Pass). The corridor includes a large transmission line; other energy facilities could be placed in the same corridor.

The 1992 Western Regional Corridor Study established an energy corridor north of Walden (U.S.Western Utility Group 1992). No other corridors to accommodate preferred routes for transportation and transmission facilities are proposed. (See Map 3-19, KFO Utility Corridors, shows the utility corridors in the Planning Area.)

Identifying corridors does not necessarily mandate that transportation and transmission facilities would be located in the corridor, especially if they are not compatible with other resource uses, values, and objectives in, and near, the corridors, or if the corridors are saturated.

Communication Sites

Several sites in the Decision Area host communication equipment for various public and private tenants, including phone companies; local utilities; and local, State, and other Federal agencies. Approximately 11 communication sites, under 21 leases, exist in the Decision Area. Co-location of communication sites is encouraged, and does occur on North Cottonwood, Mount Chauncey, San Toy, and Peterson Ridge. There are no designated sites for establishing communication sites in the Decision Area. Table 3-28: Communications Sites in the Decision Area, provides the communication sites authorized by the KFO.

Table 3-28: Communications Sites in the Decision Area

Serial Number	Holder/Owner	Township, Range, Section	Tenant/Customer
COC-011390	Colorado Division of Telecom	1N-78W-5	
COC-028183	Union Pacific Railroad	2N-78W-19,30 2N-79W-25	Customer-Sprint
COC-12528	CenturyTel of Eagle	7N-79W-12,13	
COC-22842	Tri State G&T	2N-77W-24, 2N-81W-26	
COC-24732	BLM	10N-80W-6 11N-80W-31 11N-81W-24,25	Customer-USFWS
COC-28200	Jackson County	8N-80w-17,18	Customer-Colorado connection repeaters (Andrews) , NP Hospital,Mountain Parks Electric
COC-48523	Northern Colorado Water	1N-77W-3	
COC-50030	Andrews Radio Service	1N-77W-3	Customer- Mountain Parks— Private Grand County
COC-52074	BLM Craig District	2S-83W-13	
COC-53312	QWEST Communications	11N-76W-4	
COC-55891	Union Telephone	1N-81W-35	
COC-55898	Steamboat Springs Amateur Radio	1N-81W-35	
COC-58276	Union Telephone	11N-79W	
COC-60672	Andrews Radio Service	1N-77W-10	Customer-Grand City

Table 3-28: Communications Sites in the Decision Area

Serial Number	Holder/Owner	Township, Range, Section	Tenant/Customer
COC-61882	Tri-State Generation and Transmission Association	1N-77W-10	Mountain Parks
COC-65413	Union Pacific Railroad	1N-81W-33	
COC-67115	Verizon Wireless	1N-77W-10	Tenant – Sprint/Nextel
COC-67285	Verizon Wireless	1N-78W-3	
COC-68772	Larimer County	11N-76W-4	
COD-051744A	Western Area Power Administration	1N-80W-33	
COC-73902	Sprint Spectrum	1N-77W-10	
COC-74128	Andrews Radio Service	1N-81W-35	
COC-74540	Andrews Radio Service	1N-78W-3	

Source LR2000

Characterization

Indicators

An indicator used to assess the condition of lands and realty in the Planning Area is surface land ownership. Any exchange, acquisition, or disposal of public lands in the Planning Area would be reflected in the acreage of surface land ownership. Other indicators used to assess the Lands and Realty Program are changes in the number of active ROW authorizations, leases and permits.

Trends

The BLM is consolidating public lands in the Planning Area to benefit the public. To achieve this goal, candidates for land tenure adjustment through disposal, sale, exchange, or acquisition include parcels that: are difficult to manage; do not have public access; are relatively small, and are adjacent to other State- or federally managed lands; that would increase conservation of natural resources; and that would increase access, and use, of BLM-managed public lands. This trend is consistent with other Colorado BLM Field Office management direction. Under current management, Decision Area parcels eligible for disposal through sale have been limited to those identified for disposal in the 1984 KFO RMP (BLM 1984b).

As with other Field Offices in Colorado, the KFO is moving toward disposal of BLM-managed public lands surrounded by private lands. Acquisitions of lands are being considered, especially in areas where inholdings of private, State, or other Federal lands are within large blocks of BLM-managed public lands. The BLM is also moving toward acquiring land adjacent to intensively managed tracts of BLM-managed public lands where overall program management would be enhanced (such as lands adjacent to SRMAs, WSAs, and ACECs, intensively managed forest sites, grazing allotments, and important mineral areas).

Under the 1984 KFO RMP (BLM 1984b), all BLM-managed public lands are eligible for disposal. The KFO is shifting toward creating specific criteria for determining disposal eligibility and retention areas that are ineligible for disposal. Such areas would include ACECs, WSAs, and other resource-specific management areas.

Most utility and associated facilities' ROWs have been in place for well over 30 years. It is likely, therefore, that the infrastructure would require replacement or upgraded technology. Additionally, many ROWs are expiring, or will expire, soon. Many corridors need to be enlarged to enable future maintenance activities to stay within the confines of the ROW.

Opportunities have been provided for the use of public lands in the Decision Area to develop facilities that benefit the public. At the same time, consideration is given to environmental and agency concerns through R&PP leases, ROW grants, leases, and permit authorizations. Use authorizations are monitored and checked for compliance, in accordance with BLM methods and procedures.

Consistent with the trend for Field Offices surrounding the Planning Area, ROW applications across BLM-managed public lands have increased. The demand for utility corridors, and for access to communication sites in the Decision Area, would likely continue to increase. The USDOE is identifying additional corridors for energy-related ROWs, and the potential for additional ROW corridors in the Planning Area may need to be considered.

As with other Field Offices in Colorado, the demand for communication site applications in the Decision Area, on both existing and new sites, is also increasing. The BLM expects the increasing demand for communication sites to continue, and co-locating communication sites would continue to be encouraged.

3.2.18 Energy and Minerals

Mineral production on BLM-managed public lands in Colorado involves three distinct categories: leasable, locatable, and salable minerals.

Leasable minerals -- Leasable minerals are governed by the Mineral Leasing Act of 1920, as amended, and the Mineral Leasing Act for Acquired Lands of 1947, which authorize specific minerals to be disposed of through a leasing system. Oil and gas, coal, sodium, and other similar minerals, and geothermal resources are available through mineral leasing. Leases are issued for specific periods, and the lessee pays a rental fee and royalties on the minerals produced.

Locatable minerals -- Locatable minerals are hard-rock minerals, such as gold, silver, molybdenum, and uranium. The BLM manages the use of these minerals under mining laws, such as the Mining Law of 1872. Placer claims, which are for minerals that occur in geologic sediments rather than in veins, are also managed under such mining laws. Miners locate claims in order to acquire the right to develop the mineral values in a specified area.

The Mining Law of 1872 makes available metallic and non-metallic locatable minerals on public lands. The law also encourages mining companies to explore for, and develop, such minerals. Locating a mining claim gives a mining company the right to develop the minerals under the claim. Within a mining claim, the surface lands remain open to the public for other multiple uses.

Salable Minerals -- Salable minerals, also referred to as mineral materials, include sand and gravel, limestone aggregate, building stone, moss-covered rock (moss rock), cinders (clinker), decorative rock, and others. Salable minerals are sold or permitted under the Mineral Materials Sale Act of 1947, as amended.

Mineral exploration and extraction activities depend to a large extent on commodity prices. They also depend, in part, on the amount of surface acreage made available for drilling and other mining activities. Areas withdrawn from mineral entry, areas closed to leasing, and areas with No Surface Occupancy (NSO), Controlled Surface Use (CSU), or Timing Limitation (TL) stipulations limit energy and mineral activities. The BLM restricts energy and mineral activities with these tools to comply with the land management direction and multiple-use considerations that are part of its responsibilities under the FLPMA.

Current Conditions

The analysis related to energy and minerals focuses on the Decision Area (the Federal surface or subsurface acreage in the Planning Area managed by the BLM). See Table 3-29. Energy and mineral decisions on National Forest System lands are addressed through separate USFS planning efforts, and are not addressed in this planning process. The BLM does not authorize the use or disposal of minerals in the National Park, National Recreation Area, and National Wildlife Refuge in the Planning Area. Section 1.4, Description of the Planning Area, describes the Planning Area and the Federal mineral estate in the Planning Area.

Table 3-29: Mineral Status in the Planning Area

Land Status	Acres
BLM/Federal Minerals	377,900
Private Surface/Federal Minerals	275,600
USFS/Federal Minerals	1,489,514
State/Federal Minerals	18,652
National Park Service/ Federal Minerals	95,958
National Recreation Area/Federal Minerals	20,010
National Wildlife Refuge/ Federal Minerals	7,952
State Forest/Federal Minerals	44
Total	**2,240,775**

Source: BLM 2011.

The current condition of leasable minerals, locatable minerals, and salable minerals in the Planning Area is described in the following sections.

A total of 13,940 acres (less than 1 percent of the Federal mineral estate) in the Decision Area is withdrawn from mineral entry: the North Sand Hills ISA and Colorado River SRMA. Acres under consideration for wilderness designation remain open for location under the mining law, provided that activities meet non-impairment criteria.

Approximately 10,600 acres in the Decision Area are designated as Closed to leasing for oil and gas: the Troublesome and Platte River Contiguous WSAs and the North Sand Hills ISA. Approximately 7,190 acres are unsuitable for surface coal mining. Some lands are encumbered with specific surface use restrictions: NSO stipulations on approximately 24,700 acres; TL stipulations on 562,900 acres; and CSU stipulations on 250,500 acres. See Table 2-1: Comparative Summary of Alternatives. Some of these restrictions overlap. NSO stipulations are used to protect certain areas, including: the Kremmling Cretaceous Ammonite and North Park Phacelia ACECs; sage-grouse leks; nesting sites for raptors, bald eagles, peregrine falcons, owls, waterfowl, and shorebird habitats; Special Status plant species; the Colorado River SRMA; and the North Sand Hills SRMA. TL stipulations are used to protect crucial big game winter habitat; big game birthing areas; grouse winter habitat; and nesting habitat for greater sandhill cranes, white pelicans, raptors, bald eagles, and peregrine falcons. CSU stipulations are used to protect riparian areas, wetlands vegetation, and steep slopes.

North Park Master Leasing Plan. The North Park Master Leasing Plan (MLP) in Appendix V of the DRMP/DEIS has been revised and incorporated in the Proposed Resource Management Plan in this Chapter, and in Chapters 1, 2 and 4. The condition and trend of the natural and human environments of the MLP area are the same as those described for the Planning Area, described in the fluid minerals discussions, below.

The MLP analysis area, based on the geologic boundary of the North Park Basin, comprises 1,015,800 acres, including about 675,800 acres of Federal mineral estate under various surface ownerships, with the remainder (340,000 acres) in non-federal ownership. See Map 1-3 in Chapter 1. Of the Federal mineral estate, the BLM will keep or make new oil and gas leasing decisions on about 390,600 acres. The MLP analysis area includes the only portion of the Planning Area having high potential for the occurrence of fluid minerals (totalling 111,700 acres), and parts of the two areas of moderate potential (totalling about 20,800 acres). The remainder of the MLP area (883,300 acres) has low or no potential for the occurrence of fluid minerals (BLM, 2008r). The MLP boundary encompasses the major and minor oil fields, areas of current drilling interest, and areas producing CO_2 and coal-bed methane, all of which are described below.

Potential resource conflicts with oil and gas leasing are analyzed as part of the planning process for the PRMP/FEIS. The planning analysis includes and addresses changed circumstances, updated policies, and new information. The Approved RMP (Approved Plan) will include a range of mitigation measures more sophisticated and wide-ranging than those in the current KFO RMP (BLM 1984b). Incorporating the principles of MLP analysis in the PRMP/FEIS planning process provides an effective tool for considering oil and gas leasing.

A summary of the findings regarding the criteria for preparing an MLP follows:

Criterion Number 1: A substantial portion of the area to be analyzed in the MLP is not currently leased -- The North Park MLP analysis area encompasses 1,015,800 acres. The federal mineral estate in the MLP analysis area is approximately 675,800 acres under a variety of surface ownerships: BLM, private, State of Colorado, the Arapaho National Wildlife Refuge, and National Forest System lands. BLM planning decisions apply to approximately 390,600 acres (58 percent) of the federal mineral estate in the MLP analysis area, not including the Wildlife Refuge or National Forest System Lands. Approximately 267,100 acres (39 percent) of the Federal mineral estate in the MLP analysis area are under National Forest System Lands and are not leased, nor are the 21,000 acres (3 percent) of Federal mineral estate under the Wildlife Refuge. Of the BLM-administered federal mineral estate in the MLP analysis area, approximately 203,900 acres (52 percent) are not leased.

Criterion Number 2: There is a majority Federal mineral interest -- The Federal interest in the MLP analysis area (1,015,800 acres) is approximately 67 percent (675,800 acres), which represents the Federal mineral estate under all surface ownerships.

Criterion Number 3: The oil and gas industry has expressed a specific interest in leasing, and there is a moderate or high potential for oil and gas confirmed by the discovery of oil and gas in the general area – Fluid mineral potential was documented in the Reasonably Foreseeable Development (RFD) document (BLM 2008r), and is displayed on Map 1-2 in Chapter 1. The proposed MLP area has had expressions of interest from the oil and gas industry, although these have been primarily concentrated in the low or no potential areas identified in the RFD. About 23 percent of the acreage nominated was leased. See Table 3-30. There are 111,700 acres of Federal mineral estate in the MLP area considered to have high potential for oil and gas. Similarly, there are 20,800 acres considered to have moderate potential for oil and gas.

Table 3-30: Summary of Federal Mineral Estate Nominated for Leasing, in the North Park MLP Analysis Area, 2008- 2013 (in acres)

Total acreage in the MLP area nominated for leasing	62,867
Acreage nominated in the MLP area, High Potential areas	18,367
Acreage nominated in the MLP area, Moderate Potential areas	0
Acreage nominated in the MLP area, Low Potential areas	39,619
Acreage nominated in the MLP area, No Potential areas	4,881
Total acreage leased, 2008-2013	14,603

Note: Mineral potential areas were described in the RFD report.

Criterion Number 4: Additional analysis or information is needed in order to address likely resource or cumulative impacts if oil and gas development were to occur where there are:

- **multiple-use or natural/cultural resource conflicts** – Potential resource conflicts with oil and gas leasing and development have been addressed in the PRMP/FEIS by applying oil and gas leasing stipulations (see Table 2-2 and Appendix B in the PRMP) to protect various resources and resource uses. COAs, BMPs, and SOPs have been developed that could be applied to approvals of oil and gas operations, all of which serve to protect resources and reduce or eliminate conflicts (see Appendix D and Appendix E in the PRMP). Potential areas of major conflicts are based on the Purpose and Need, Planning Criteria, Key Planning Issues, and public comments on the DRMP/DEIS. They are:
    - Air quality;
    - Surface and groundwater protection;
    - Watershed condition, fragile soils, steep slopes;
    - Fish and wildlife;
    - Sagebrush habitat and sagebrush dependent species;
    - Special status plant and animal species;
    - ACECs; and
    - Recreation demand and uses.
- **impacts to air quality --** Air emissions will be produced during all phases of oil and gas development: exploration, well development, production, and well abandonment and road closures. Development in the MLP analysis area is speculative, and development predictions in the RFD report are low. The RFD predicts a total of 370 wells through 2027, of which 192 are federal wells.

- impacts to the resources or values of any unit of the National Park System, a National Wildlife Refuge, or a USFS Wilderness Area, as determined after consultation or coordination with the NPS, the USFWS, or the USFS -- Leasing decisions in the North Park MLP area would not affect Rocky Mountain National Park, the Arapaho National Wildlife Refuge, or nearby National Forest System lands. Rocky Mountain National Park is outside of, and distant from, the MLP boundary. The Arapaho National Wildlife Refuge is closed to leasing except in situations of drainage. Leasing of federal mineral estate under National Forest System lands is conducted with concurrence of the USFS, based on Forest Management Plan decisions.
- impacts on other specially designated areas -- Oil and gas leasing constraints that protect special areas are included in the PRMP/FEIS. See Table 3-31, which displays special areas in the MLP area where fluid mineral activities would be restricted. Restrictions to be applied in these areas are displayed in the North Park Master Leasing Plan section in Table 2-2.

Table 3-31: Special Areas in the MLP Analysis Area with Leasing Contstraints (Acres of BLM-Administered Surface, rounded)

Areas	Proposed RMP Acreage
Areas of Environmental Concern	6,864; no surface occupancy
Wilderness Study Areas	8,158; closed to leasing
Lands with Wilderness Characteristics Outside of Wilderness Study Areas	544; closed to leasing
Wild and Scenic Rivers eligible segments protected	0
Continental Divide National Trail	acreage TBD; no surface occupancy
State or National Trails and Byways	acreage TBD; controlled surface use, conditions of approval, best management practices
Watchable Wildlife Areas	4,300; no surface occupancy
Special Recreation Management Areas	18,600; controlled surface use
Extensive Recreation Management Areas	13,800; controlled surface use

Leasable Minerals

Leasable minerals in the Decision Area include conventional oil and gas, carbon dioxide, coalbed methane, and coal. There is no region of known locations for potential geothermal resources in the Decision Area.

Oil and Gas

No oil and gas has been produced in Summit or Grand Counties (Middle Park Basin) since at least 1988. No oil and gas is produced in the Laramie River area of Larimer County (Laramie Basin). Oil and carbon dioxide gas (with minor amounts of methane gas) is produced in Jackson County (North Park Basin). In Jackson County, five major and 10 minor oil and gas fields exist; four of the minor fields are no longer producing, and six include just one or two wells. Oil production and "shows" (areas either producing or showing the potential to produce) have occurred in fields in North Park. There have also been recent discoveries and developments in oil production in south Jackson County, around Coalmont, and east of Walden, around Johnny Moore Mountain. Some methane gas is produced in the Lone Pine Field, and from the Canadian River Field early in its production life. Carbon dioxide gas is produced in the McCallum and North McCallum fields.

No oil and gas leases exist in Summit County or in the KFO portion of Eagle County. In May 2013, 2,165 acres were leased in the Laramie River area of Larimer County. A small area in the northwestern portion of Grand County is leased. Jackson County has 160,698 leased acres of Federal mineral estate. Recent leasing activity in Jackson County includes leases in the northwest (Alkali Lake), west (Lone Pine, Delaney Butte, Butler Creek), and southwest (Coalmont, Pole Mountain, Grizzly Creek) areas (BLM 2008r). A total of 642,900 acres are Open, and 10,600 acres are Closed to fluid minerals leasing in the Decision Area. None of the areas Closed to leasing overlap with high-potential areas. See Map 3-20, Oil and Gas Leases.

No drilling has occurred over the past 20 years in Grand or Summit Counties. Only three exploratory holes have been drilled in the Laramie River area of Larimer County in the past 20 years, bringing the total number of wells drilled in these counties to five, all of which have been plugged and abandoned as dry holes. New well drilling and re-entry and recompletions of existing wells have occurred in the past 10 years, and continue to occur in Jackson County.

Carbon Dioxide

Carbon dioxide (with condensate oil) is produced in the North and South McCallum Fields. No methane gas, or an insignificant amount of methane gas, is present in these fields. Carbon dioxide is present in the deeper parts of the fields, primarily in the Dakota, Lakota, and Morrison Formations. A liquid carbon dioxide plant near the North McCallum headquarters facility buys carbon dioxide produced from the oil and gas lessee, and ships it by truck to markets.

Coalbed Methane

Coalbed methane exploration and a pilot drilling project are occurring in North Park. A single coalbed methane well, now plugged and abandoned, was drilled in the Coalmont area on Federal mineral estate, and several coalbed methane wells are producing on private mineral lands in the McCallum area.

Colorado Oil and Gas Conservation Commission (COGCC) records show that eight wells are permitted, or have been drilled, in northeast North Park for coalbed methane. In this same general area, three Federal exploration coalbed methane test coreholes have been permitted, with two drilled and subsequently plugged, as required.

Several new Applications for Permits to Drill (APDs) have been received for coalbed methane completions near Walden. In the recent past, two of three permitted test coalbed methane coal cores near McCallum have been drilled on Federal lands.

Coal

Currently, no coal is being mined within the Decision Area. Several areas of coal resources, with considerable historic mining, occur in North Park, and one small historic mine (Coal Mountain) occurs in northwest Middle Park. Recoverable coal reserves remain in North Park in the Coalmont area, in thick sub-bituminous seams in the Coalmont Formation, and in the McCallum area. Activity in the Coalmont area was limited to coal exploration in the 1990s, including the Pole Mountain-Mexican Creek area. Considerable coal has been mined in the McCallum area, including the South McCallum and Johnny Moore Mountain areas. The Suddith seam is of commercial interest, and varies from 20 feet to 50 feet thick in northeast Jackson County. The USGS has defined the McCallum area as a known recoverable coal resource area, with 226,015 acres that contain potentially recoverable coal resources (approximately 1,520 million tons). Future non-conventional uses, including in situ (in place) gasification, may likely have potential in this area.

Locatable Minerals

Locatable minerals in the Decision Area include uranium, gold, and other hard rock minerals. Several claimants with small individual placer mining claims, a small group of hard rock lode mining claims with some metal potential, and a large group of recently staked uranium mining claims exist on BLM-managed public lands in the Decision Area. These include claims in Jackson and Grand Counties, and in National Forest System lands in Summit County. No mining claims occur in Larimer County. Currently, a total of 639,600 acres are Open to locatable mineral exploration or to development in the Decision Area.

Uranium

The Troublesome area in Grand County included 502 uranium lode mining claims that were located as a group in 2005 on the Troublesome Formation (approximately 6 miles east-northeast of Kremmling). No mining occurred. No economic resources, and only trace mineralization, was discovered in the previous activity. No surface-disturbing activity is expected as these claims have expired.

Gold

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

Other Hard Rock Minerals

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

Salable Minerals

Salable minerals include sand and gravel, decorative stone, and moss rock. The sale of mineral materials is discretionary. No sales would be made from the 8,863 acres in WSAs.

Sand and Gravel

Considerable sand and gravel deposits exist in Grand, Summit, and Jackson Counties. Some sand and gravel potential also exists in the Laramie River area of Larimer County, although the BLM has limited jurisdiction over the highest potential deposits in this valley. Most of the privately consumed gravel resources in the Planning Area are produced from private lands. BLM-managed public lands solely provide for County consumption for road surfacing and construction. The BLM sources include the Inspiration Point, Back Troublesome, and Scholl Free Use Permit pits in Grand County; and the East Walden and recently permitted Ridge Road Free Use Permit pits in Jackson County.

Decorative Stone and Moss Rock

A small-to-moderate market for decorative stone and moss rock exists in the Decision Area, driven by primary and secondary home construction in the high value resort communities. High-quality decorative stone is not common in the Decision Area, but three separate rock collection areas are permitted for small sales. Bull Mountain and Corral Creek contain considerable volumes of salable rock. The Yarmony area is largely exhausted, with only poor-quality rock remaining.

Characterization

Indicators

The trends described in the following sections are based upon the KFO Reasonable Foreseeable Development (RFD) (BLM 2008r) and forecasting of other minerals, which is based upon historical trends and anticipated market conditions. The BLM prepared the RFD by considering historical drilling activity, potential geologic occurrence of oil and gas, anticipated drilling and production constraints, and an industry development scenario.

Trends

Leasable Minerals

Oil and Gas

Interest in oil and gas leasing is inconsistent, year to year. In 2007, leasing interest in Jackson County totaled almost 69,150 acres. Most of the requested area is located approximately 15 miles northwest of Walden, most of which has been deferred from leasing due to resource concerns inadequately addressed in the current KFO RMP (BLM 1984b)). In 2008, new leasing interest in Jackson County totaled about 5,500 acres, with most of that acreage located 20 miles south of Walden, and the remainder located approximately 5 miles southeast and 12 miles southwest of Walden. In 2011, about 8,300 acres were nominated for leasing, but were deferred from leasing due to wildlife and other resource concerns. By the end of 2011, leases of Federal mineral estate in Jackson County totaled about 160,700 acres.

In 2007, leasing interest increased in Grand County, with over 54,500 acres requested for leasing in areas located 6 miles to 10 miles west, northwest, and southwest of Granby. Most of this area has been deferred from leasing due to resource concerns inadequately addressed in the current KFO RMP (BLM 1984b). In 2008, the leasing interest in Grand County dropped to less than 1,000 acres. In 2011, about 12,400 acres in western Grand County were nominated for leasing, but were deferred from leasing due to wildlife and other resource concerns. By the end of 2011, leases of federal mineral estate in Grand Country totaled about 25,000 acres.

Future leasing trends will likely include blocking up producing area extensions, and all of the area underlain by coal beds with coalbed methane potential.

Carbon Dioxide

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

Coalbed Methane

Further coalbed methane development is likely in the Decision Area, based upon the continued testing of the existing and permitted wells; the availability of the existing limited pipeline; and the construction of new, and increased, pipeline capacity. If positive results continue, and methods for allowable disposal of excess water are developed, considerable coalbed methane activity may occur over the 250,000 acres of subsurface coal in northeast North Park.

Considerable new coalbed methane lease interest has occurred in southwest North Park (west and south of the Coalmont and Grizzly Creek areas) and in northwest Middle Park (near Whitely Peak and Carter Mountain). Previously, these areas have had minimal, or no, conventional oil and gas interest and production. This area has been reported as having subsurface coal seams and beds. It appears as if much of the recent oil and gas leasing for the Decision Area, and most of the leasing in this specific area, is not likely for conventional oil and gas, although it has coalbed methane potential. The McCallum coal area has had only slight new oil and gas leasing interest, largely due to the fact that most of the area is already leased.

Coal

No mining activity is likely in Middle Park or in the Coalmont area of North Park in the foreseeable future. A considerable volume of mineable and marketable coal remains on Federal lands in the McCallum area of North Park, but the lack of reasonable-cost transportation in the area hinders the use of this resource. There is some potential for methane gas in the near surface and deeper areas of the McCallum coal area.

Locatable Minerals

No significant future activity is anticipated on BLM-managed public lands in Summit, Larimer, or Grand Counties. In Jackson County, no significant mineralization, or activity, is expected with the gold placer claims at Independence Mountain. For the lode claims at Independence Mountain, communication with CeeArco indicates that they have the data from the old Caprock Corporation work, and that some metal mineralization exists. There may be interest in future drilling and exploration at these claims.

Salable Minerals

Continuing trends of urbanization in eastern and southern Grand County, and the concentration of ownership in agricultural lands into single large ranches in Grand and Jackson Counties, yield long-term concerns regarding the availability of sand and gravel in future decades. Some of the Grand County Free Use Permit pits are in their last years of material supply. Closures and reclamation of the old pits and replacement with new permitting of Federal sources for the Grand County Road and Bridge Department is anticipated. Jackson County, with its low population base and long and expensive haulage from the limited gravel operations, is handicapped by limited budget. The Jackson County Road Department continues to search for new Federal sources of gravel on BLM-managed public lands in Jackson County. Demands are expected to increase on BLM-managed public lands for sand and gravel resources. Continuing demand for decorative stone will likely drive additional sales, and the permitting of new areas (as they are discovered or requested).

3.2.19 Renewable Energy

Solar, wind, biomass, and geothermal (which is managed as a fluid leasable mineral) are considered renewable energy resources. Renewable energy resources all have different requirements related to economic development. Some issues are common to all renewable energy resources, including distance to existing power transmission facilities and compatibility with existing Federal land uses.

As demand has increased for clean and viable energy to power the nation, consideration of renewable energy sources on BLM-managed public lands has come to the forefront of land management planning. In cooperation with the DOE's National Renewable Energy Laboratory (NREL), the BLM assessed renewable energy resources on BLM-managed public lands in the western U.S. (USDOE and BLM 2003). The BLM also reviewed the potential for concentrated solar power, photovoltaic, wind, biomass, and geothermal energy on BLM, Bureau of Indian Affairs, and National Forest System lands in the western United States.

Wind and solar resource facilities are authorized by ROWs, through the Lands and Realty Program. Geothermal resources, as mentioned above, are considered fluid leasable minerals. As a result, management actions related to the Lands and Realty Program and leasable minerals could affect renewable energy resources. Special management designation areas, such as ACECs and WSAs, could also affect the use of renewable energy resources by limiting the location of these facilities.

Current Conditions

Solar Power

There are two basic types of solar energy installations that produce electrical power: photovoltaic (PV) systems and commercial concentrating solar power (CSP) systems. To work effectively, the solar installations require consistent levels of sunlight (solar insolation) and would be backed up with battery, thermal, or other forms of energy storage. Solar insolation is a measurement that has become increasingly more accurate in evaluating specific sites for solar energy installations. Solar insolation is the amount of sunlight hitting an area on the surface of the earth over a specific period of time. The higher the exposure of sun measured on an annual basis, the more electrical power can be produced. The quality of the solar resource, over a month or a year, is an important indicator in determining the viability of a site for commercial solar development. Other site attributes include access to available water for concentrated solar power steam generation and cooling, proximity to electric transmission facilities, and site slope.

Photovoltaic Systems

PV systems use semiconductor materials similar to those in computer chips to capture the energy in sunlight and convert it directly into electricity. Most PV applications are small, use little or no land, and have minimal or no environmental impact since electricity created is generally used on-site or as part of an existing authorized use. They generally provide power to individual homes and small buildings. They are also found in rural areas on communication towers, water pumps, and road and traffic signs. The environmental impact

of small distributed PV systems is minimal, as they require no water for system cooling and generate no by-products. Most installations of solar PV systems are less than 5 kilowatts (kW) in capacity, and tend to be most cost-effectively applied in isolated locations where construction of electric transmission and distribution networks would be more costly. These types of solar PV systems will likely be installed on an existing facility or structure or as part of an existing authorization.

Concentrating Solar Power Plants

CSP plants are generally large systems that use mirrors to focus sunlight to create high temperatures. The lands having the best solar resources are usually arid or semi-arid. Unlike PV systems, CSP systems require sunlight that is not diffused by clouds. This limits their use to the West, with the southwest possessing some of the best solar energy resources. There are currently three different types of centralized CSP systems: parabolic trough, solar "power tower", and solar dish. These systems require relatively flat land with slopes not exceeding three percent to accommodate the solar collectors. The area of land required depends on the type of plant, but it is about five acres per produced megawatt (MW). It is anticipated that a commercial scale CSP facility may be in the range of 100 MW or larger and will require in excess of 500 acres. This large land base requirement can involve significant surface disturbance with an associated potential impact on a variety of resources and resource uses on the public lands. These types of facilities also require roads, water, protection from gusty winds, and security fencing. Electricity generated is sold to the utility under a power purchase agreement.

Additional information on solar energy technology is available from the Department of Energy at http://www.eere.energy.gov/RE/solar.html or the National Renewable Energy Laboratory (NREL) at http://www.nrel.gov

Currently, there are no commercial solar energy producing facilities, and no pending applications for solar facilities, in the Decision Area, although with over 300 days of sunshine per year, Colorado is one of the prime locations for solar energy development.

Wind Resources

The BLM Wind Energy Programmatic EIS (PEIS) (BLM 2005c) has determined which areas on BLM-managed public lands have high, medium, or low potential for wind energy development, based upon their wind power classification. The majority of BLM-managed public lands in the Planning Area have a low potential for wind energy development (BLM 2005c). BLM-managed public lands near the northern boundary of the Planning Area, in Jackson and Larimer Counties, have some small areas of medium and high wind resource potential.

Wind power classifications are used to identify wind resource potential based upon wind power density at 50 meters (approximately 164 feet) above ground level. Wind power classes range from Class 1 (lowest) to Class 7 (highest). Wind power is considered economic for large turbines (commercial utilities scale) at Class 3 and higher, but a small non-commercial turbine can be used at Class 1. Areas of fair-to-superb wind power classes (Class 3 through Class 7) are located in the northwestern and northeastern portions of the Planning Area, in

Larimer and Jackson Counties. Smaller areas of localized fair-to-outstanding wind power classes are located along the southern and eastern boundaries of the Planning Area, in Summit and Grand Counties. See Map 3-21, Wind Energy Potential.

Applications for a ROW grant may be submitted for one of the following types of wind energy projects:

- a site-specific wind energy site testing and monitoring ROW grant for individual meteorological towers and instrumentation facilities with a term that is limited to 3 years;
- a wind energy site testing and monitoring ROW grant for a larger site testing and monitoring project area, with a term of 3 years that may be renewed beyond the initial 3-year term, consistent with 43 CFR 2807.22 and the provisions of IM 2006-216 (BLM 2006a); and
- a long-term commercial wind energy development ROW grant with a term that is not limited by the regulations, but is usually within the range of 30 years to 35 years.

Biomass

Biomass power is obtained from the energy in plants and plant-derived materials, including food crops and grassy and woody plants; residues from agriculture or forestry; and the organic component of municipal and industrial wastes. Biomass can be used for direct heating (such as burning wood in a fireplace or wood stove) and for generating electricity. It can also be converted directly into liquid fuels i to meet transportation energy needs (USDOI 2007a). When raw biomass is in an inconvenient form for use, the biomass can be pelletized in a pellet plant. The resulting fuel pellets can be used for energy or heat. There are two pellet plants in the Planning Area. Both plants are located on private land.

In 2007, Confluence Energy received approval from the Town of Kremmling to construct and operate a wood pellet plant. The pellet plant began taking raw material in June of 2007, and opened in July of 2008. The plant produces approximately 200 tons of pellets a day, and utilizes approximately 100,000 to 150,000 ton of beetle-killed and green material per year (Lopez 2008). The Kremmling site produces enough wood pellets to meet the heating needs of approximately 30,000 homes (Confluence Energy 2007). Currently, Confluence Energy is working with Eagle and Summit counties to use wood pellets to meet some of their energy needs. Another wood pellet plant located in the Planning Area is operated by the Rocky Mountain Pellet Company, in Jackson County (just south of Walden). The Walden pellet plant primarily uses beetle-killed timber to produce commercial wood pellets.

In its NREL Study (USDOE and BLM 2003), the BLM evaluated the long-term sustainability of supporting biomass plants using the monthly Normalized Difference Vegetation Index (NDVI) computed from the NASA's Advanced Very High Resolution Radiometer Land Pathfinder satellite program. (The NDVI is a simple numerical indicator that can be used to analyze remote sensing measurements, typically, but not necessarily, from a space platform, and assess whether the target being observed contains live green vegetation or not.)

The NDVI correlates directly to the amount of surface vegetation that could be available for biomass energy. An NDVI of at least 0.4 is considered to be the threshold for biomass potential. The number of months an area has an NDVI rating of 0.4 or above also correlates

to biomass potential. For an area to have biomass development potential, it has to meet the following criteria:

- a NDVI rating of 0.4 for at least 4 months between April and September;
- a slope of less than 40 percent;
- is within 50 miles to a town with at least 100 people; and
- is compatible with BLM and National Forest Systems land use management (USDOE and BLM 2003).

Areas with an NDVI rating of at least 0.4 for 4 to 5 months are scattered throughout the Planning Area. Moderately sized areas with an NDVI of at least 0.4 for 6 months are located in the northeastern portion of the Planning Area, in Larimer County. See Map 3-23, Biomass Potential.

Geothermal

There is no region of known or potential geothermal resource in the Decision Area. There are several hot springs (over 50 degrees Celsius) in the Hot Sulphur Springs vicinity. Currently, there are no leases or development activities for geothermal resources.

Characterization

Indicators

The indicators for renewable energy in the Planning Area include the existence of current renewable energy facilities, pending or authorized applications, and renewable energy development in neighboring areas with similar geography.

Trends

The demand for alternative energy-related ROWs should increase nationally. In the Planning Area, however, the potential for wind and solar energy is low to medium. The demand for biomass is expected to increase in the Planning Area.

The potential for biomass and wind energy is higher than it is for solar energy, and may be of interest to commercial developers, depending upon economic factors and State regulatory policy. There has been interest in Grand, Summit, and Jackson Counties regarding biomass, due in large part to the MPB infestations throughout the forests. Due to the large amount of biomass, it is expected that future applications and industry development will occur.

Of all the BLM planning units included in the NREL study of renewable energy resources, the Planning Area ranked 6th for the amount of land area in wind Class 5 (USDOE and BLM 2003). The NREL study also listed the Planning Area as having high potential for wind and biomass energy resources (USDOE and BLM 2003). The KFO was one of only two BLM planning units in Colorado to have high potential for two renewable energy sources (Royal Gorge being the other). This high potential for wind and biomass resources in the Planning Area may lead to increased development of renewable energy resources in the future.

The rapid expansion of the wind industry underscores the potential for wind energy to supply 20 percent of the nation's electricity by 2030, as envisioned in the 2008 DOE report, 20 Percent Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply. Funding provided by the DOE, the American Recovery and Reinvestment Act of 2009, and State and local initiatives have all contributed to the wind industry's growth, and is moving the nation toward achieving its energy goals (NREL 2010a).

Thermal solar generating technologies, including parabolic trough, power tower, and dish Stirling plants, are likely to play a dominant role in energy efficiency due to their high efficiency, low cost, and track record. Arabolic trough and power towers have the ability to store solar energy as heat, and can avoid a great deal of the intermittence issues that are a challenge for wind power and other forms of solar generation. In addition, hybridization with fossil fuels is possible for all thermal solar power plants, allowing around-the-clock generation (NREL 2010a).

In recent years, small scale renewable energy facilities on private lands have been increasing in the Planning Area, and are expected to continue into the future. Private wind turbines and solar facilities are being located in the Planning Area, providing renewable energy to localized structures and services.

3.2.20 Areas of Critical Environmental Concern

The BLM uses the ACEC designation to highlight public land areas where special management attention is necessary to protect and prevent irreparable damage to important historical, cultural, and scenic values; fish or wildlife resources; or other natural systems or processes [43 CFR 1610.7-2(b)]. The ACEC designation may also be used to protect human life and safety from natural hazards. Research Natural Areas (RNAs) are areas where natural processes are allowed to predominate, and that are preserved for the primary purposes of research and education. Under current BLM policy, RNAs must meet the relevance and importance criteria of ACECs and are, therefore, designated as ACECs.

Current Conditions

There are two RNAs/ACECs in the Decision Area:

- the Kremmling Cretaceous Ammonite RNA/ACEC; and
- the North Park Natural Area RNA/ACEC.

These RNAs/ACECs total approximately 516 acres. (See Map 2-128.) The size of each area, and the values it is designed to protect, are listed in Table 3-32. Both were designated in 1984 (BLM 1984b).

Table 3-32: Designated RNAs/ACECs in the KFO

ACEC	Size (acres)	Values
Kremmling Cretaceous Ammonite RNA/ACEC	198	Significant marine invertebrate fossils
North Park Natural Area RNA/ACEC	318	Endangered plant species
Total	516	

Kremmling Cretaceous Ammonite RNA/ACEC

The 198-acre Kremmling Cretaceous Ammonite RNA/ACEC is managed for research and for the preservation of the fossil resources. The goal is to facilitate professional research, and to give the public opportunities to appreciate the fossil resources and develop a preservation ethic enhanced through interpretation and educational outreach. The area contains a rich fossil assemblage of giant ammonites and other extinct species of marine fauna. Ongoing research by the University of South Florida has recently identified 10 new species of extinct shellfish from this locality. Fossils in the area have also been used to recover geochemical data to compare with that of modern corals off the coast of Florida; to study modern environmental change; and to help answer questions about how much of the change can be attributed to natural cycles and how much can be attributed to human use of natural resources, specifically carbon fuels. The Scripps Institute has also used the area's stratigraphy to help date dinosaur fossils found in Mongolia. In addition to the geologic

importance of the Kremmling Cretaceous Ammonite RNA/ACEC, the area contains important core habitat for Greater Sage-Grouse, a BLM-designated Sensitive Species and Federal Candidate (BLM 2007h).

North Park Natural Area RNA/ACEC

The 318-acre North Park Natural Area RNA/ACEC was designated to protect the federally-listed Endangered plant, North Park phacelia *(Phacelia formosula)*. The population has an imperilment rank of G1/S1, which means it is critically imperiled globally and within the State of Colorado due to its rarity (five or fewer occurrences in the world or State; or 1,000 or fewer individuals), or due to some factor of its biology that makes it especially vulnerable to extinction (CNHP 2007).

Characterization

Indicators

ACECs are managed to protect identified relevant and important values. Indicators will vary by value, and may be found under the respective resource or resource use section.

Trends

Kremmling Cretaceous Ammonite RNA/ACEC

Visitor use at the Kremmling Cretaceous Ammonite RNA/ACEC has shown only a very modest increase. There has been, however, a change in the types of visitors. From 1989 through 1994, visitor use was primarily from local grade schools. Beginning in 1995, visitors were primarily university students and avocational recreationists. Locals and others who know the location of the RNA/ACEC do not request access information, and it is unknown how many of these visitors use the site yearly. The inclusion of the RNA/ACEC in two book publications has stimulated much of the recent interest from the avocational community. In addition, the RNA/ACEC has been published in professional journals and avocational newsletters (BLM 2007h).

Interest in fossils and paleontology has been greatly stimulated in recent years due, at least in part, to the popularity of dinosaurs (as evidenced by numerous recent movies, articles, books, museum exhibits, and paleontology certification courses). Increasing interest has brought new avocational and professional visitors into the field to experience known fossil locations, and has increased exploration designed to discover new fossil localities. This has, in turn, increased agency concern for potential impacts to the resource from vandalism and theft. Increased interest has also brought about an increase in the availability, and monetary value, of fossils for sale. Many of the fossil specimens are valued for their commercial value, and are obtained legally from out-of-country and private land sources, but many specimens are collected illegally from BLM-managed public lands. This is a concern for this ACEC because many of the fossil ammonites and baculites are located at, or near, the surface, and can be collected with relative ease. Additionally, the site is remote and only occasionally patrolled, increasing the vulnerability of the site to illegal activities. Renewed interest also

has a positive impact, in that it provides stimulus for paleontology students to pursue their interests into fossil domains, such as the late Cretaceous Period (BLM 2007h).

North Park Natural Area RNA/ACEC

There are little data to indicate a specific trend. North Park phacelia (*P. formosula)* within the RNA/ACEC, however, seems to be stable within its limited available habitat. Monitoring studies conducted at the RNA/ACEC since 2002 suggest that individual populations or groupings of North Park phacelia are highly variable and unpredictable, primarily due to variations in climate. Numbers seem to indicate that North Park phacelia prefer drought: hot and dry temperatures with a lack of precipitation events. Currently, no threats exist in the RNA/ACEC, but in adjacent populations, motorized recreation and livestock grazing are considered the primary threats to North Park phacelia.

3.2.21 Wilderness and Wilderness Study Areas

Congress passed the Wilderness Act (PL 88-577) in 1964, establishing a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, most land considered for, and designated as, Wilderness was managed by the NPS and the USFS. With the passage of the FLPMA in 1976, Congress directed the BLM to inventory, study, and recommend which lands under its administration should be designated as Wilderness. The FLPMA required the BLM to designate areas that were formally identified as "natural" or "primitive" prior to November 1, 1975 as "Instant Study Areas" (ISA), a type of Wilderness Study Area (WSA). Congress gave the BLM 15 years to complete the Wilderness inventory of all other BLM-managed public lands, which was done on a State-by-State basis. Through this process, three areas in the Decision Area were identified as WSAs.

Section 603 of the FLPMA required the BLM to provide Congress with recommendations as to suitability or unsuitability of BLM WSAs (roadless areas greater than 5,000 acres and roadless islands) for wilderness designation. A WSA is an area designated by the BLM as having wilderness characteristics, thus making it worthy of consideration by Congress for designation as a National Wilderness Area. During the time Congress considers whether to designate a WSA as permanent wilderness, the BLM is required to manage the WSA in a manner designed to prevent the impairment of the area’s suitability for wilderness designation. Only Congress can ultimately decide which areas, if any, would be designated as Wilderness and added to the National Wilderness Preservation System.

In 1991, the Colorado BLM issued a Record of Decision (ROD) that included Wilderness recommendations for 54 WSAs throughout the State (BLM 1991d). The recommendations were based upon the findings of the 15-year wilderness study process (from 1976 to 1991). Recommendations included each area’s resource values; present and projected future uses; manageability as Wilderness; the environmental consequences of designating, or not designating, the areas as Wilderness; mineral surveys; and public input. Until Congress acts on the recommendations, and either designates them as Wilderness or releases them for other uses, these areas are managed under the the BLM’s WSA 6330 policy for Management of Wilderness Study Areas to preserve their wilderness values. Activities that would impair wilderness suitability are prohibited in WSAs. This standard applies to all uses and activities,

except those specifically exempted from this standard by the FLPMA (grandfathered uses and valid existing rights). Grandfathered uses and valid existing rights are grazing, mining, and mineral leasing uses on lands under wilderness review in the manner, and to the degree, in which these uses were being conducted on October 21, 1976, as long as they do not result in unnecessary or undue degradation of the lands.

The BLM's Manual 6330 – Management of Wilderness Study Areas provides specific policy and guidance for management of most resource values and uses in WSAs. Visual resource management decisions, OHV designations, and route designations are made during land use planning. Summaries of some aspects of WSA management are:

- WSAs must be managed so as not to impair their suitability for preservation as wilderness;
- activities that are permitted in WSAs must be temporary uses that create no new surface disturbance, and must not involve permanent placement of structures;
- grazing, mining, and mineral leasing uses that existed on October 21, 1976, may continue in the same manner and to the same degree as on that date;
- WSAs may not be closed to appropriation under the mining laws to preserve their wilderness characteristics;
- valid existing rights must be recognized; and
- WSAs must be managed in a manner designed to prevent unnecessary or undue degradation.

Under Section 201 of the FLPMA, the BLM is obligated to inventory public land resources and other values, including wilderness characteristics, associated with the concept of wilderness, and to consider such information during land use planning. Through the land use planning process, the BLM considers all available information to determine the mix of resource use and protection that best serves the FLPMA's multiple-use and sustained yield mandates.

No congressionally designated Wilderness Areas exist on BLM-managed public lands in the Planning Area. Portions of 12 Wilderness Areas administered by the USFS are in the Planning Area.

Current Conditions

There are three WSAs in the Decision Area, totaling approximately 8,863 acres. See Table 3-33.

Table 3-33: Wilderness Study Areas in the Decision Area

WSA Name	Total Acres
North Sand Hills ISA	672
Platte River Contiguous WSA	33
Troublesome WSA	8,158
Total	**8,863**

North Sand Hills ISA

The North Sand Hills were designated an RNA in 1965. When the FLPMA was passed in 1976, requiring the BLM to designate areas that were formally identified as "natural" or "primitive" as Instant Study Areas (ISA), the area became an ISA. See Map 2-174. The North Sand Hills ISA represents a small sand dune complex, within the existing North Sand Hills Special Recreation Management Area (SRMA),with two open sand areas intermixed with stands of aspen and sagebrush. The eastern portion of the ISA includes a stand of lodgepole pine intermixed with Douglas-fir. The 1980 BLM inventory concluded that the area did not meet wilderness criteria, and was not recommended for designation. This did not release the area from ISA status, and the area is subject to additional management guidance under BLM Manual 6330-Management of Wilderness Study Areas. Approximately 672 acres of public land comprise the ISA.

Platte River Contiguous WSA

Approximately 33 acres of BLM-managed public lands comprise the WSA .See Map 2-173. This includes portions of the rim and Northgate Canyon of the North Platte River, which is adjacent to the 23,000 acre Platte River Wilderness Area, managed by the USFS. The Platte River Contiguous WSA represents a rugged, mountainous terrain varying in elevation from 7,760 feet to 8,340 feet. The WSA has rock outcroppings, boulders, and crags on the rim; slide areas, including north facing slopes with dense stands of Douglas-fir trees in the river canyon; sparse stands of aspen and sagebrush on gentler slopes west of the canyon rim; and scattered juniper and limber pine on the canyon rim. The WSA provides outstanding opportunities for solitude, including a 400- to 600-foot-deep river canyon. The WSA is in a vast, remote region of north-central Colorado with little development. The WSA provides outstanding opportunities for primitive and unconfined recreation. Following inventory, this WSA was recommended for wilderness designation.

Troublesome WSA

Approximately 8,158 acres of BLM-managed public lands comprise the Troublesome WSA. See Map 2-176. A private inholding of 625 acres is located in the interior of the unit. The surrounding lands are National Forest System lands to the north and east, and predominantly private lands to the south and west. The Troublesome WSA represents a rugged, mountainous terrain varying in elevation from 8,000 feet to 10,800 feet. Most of the WSA is forested with spruce, fir, aspen, and dead-and-dying lodgepole pines, with riparian habitat along many steams. The WSA provides outstanding opportunities for solitude due to the following factors: sufficient size; topographic variation, and forest and riparian vegetation. The WSA provides outstanding opportunities for primitive and unconfined recreation. The 1980 inventory concluded the area had wilderness characteristics, but the area was not recommended for wilderness designation.

A brief description of each WSA is provided in Table 3-34: Description of WSAs in the Decision Area. All WSAs are managed according to the IMP.

Trends

No major impairment has occurred in the Troublesome and North Platte Contiguous WSAs, due to the lack of public access. Few vehicle-use violations have been noted, but in recent years this trend has increased in the Troublesome WSA due to a ROW providing access to privately-owned lands adjacent to the WSA. This has also has brought greater visitation and recreational use to the area, but the increase use has had limited impacts on naturalness and opportunities for solitude.

The North Sand Hills ISA has had increased OHV use since its designation as an SRMA in 1984. The popularity of recreational OHV use and the unique sand dune environment has drawn increased visitation and created associated impacts on the naturalness of the ISA. Due to the small size of the ISA and the visitation on adjacent BLM-administered public lands, State Forest State Park, Colorado State Trust Lands and nearby USFS-administered lands, the opportunities for solitude are not present. While improved management of the ISA and SRMA through increased staffing, resource protective fencing, interpretation, and signage has reduced impacts to the area, impacts to naturalness continue to occur, especially on the outer edges of the open sand area.

Table 3-34: Description of WSAs in the Decision Area

Name	Natural Values	Current Uses	Management Prescriptions
North Sand Hills ISA (10 miles northeast of Walden, in Jackson County)	• Open sand dune environment; • Primary vegetation is sagebrush and aspen; and • Provides scenic overview of North Park.	• Heavy OHV use, camping, hunting, hiking, and scenery viewing; • Portions of two grazing allotments are within the ISA; • Heavy holiday use, with up to 4,000 visitors on Memorial Day weekend; and • Two big game Outfitters' permitted uses are within, but not limited to, the ISA.	• Open to cross-country OHV use on open sand dune area and limited to existing roads and trails in remainder of area; • Livestock grazing on two allotments; • Fence exclosures to protect vegetation; • Minimal signage for public health and safety; • Monitored weekly during summer months; and • In accordance with BLM Manual 6330, manage for VRM Class I management objectives until such time as Congress decides to designate the area as wilderness or release it for other uses.
Platte River Contiguous WSA (18 miles north of Walden, in Jackson County)	• Steep rocky hillside covered with Douglas-fir, pinyon pine, juniper, and sagebrush; • Adjoins southern end of the USFS Platte River Wilderness; • Scenic overview of North Platte River; • Protects portion of Platte River viewshed; and • Habitat for deer and elk.	• Minimal recreation use and limited hunting; • No public access other than hiking up from the North Platte River; • Part of existing grazing allotment; minimal grazing due to steep rocky terrain; • No commercial Outfitters; and • No oil and gas leasing or ROWs.	• Closed to OHV use; • Within an existing grazing permit; • Annual monitoring began in 2007; and • In accordance with BLM Manual 6330, manage for VRM Class I management objectives until such time as Congress decides to designate the area as wilderness or release it for other uses.

Table 3-34: Description of WSAs in the Decision Area

Name	Natural Values	Current Uses	Management Prescriptions
Troublesome WSA (18 miles north of Kremmling, in Grand County)	• Primary vegetation is lodgepole pine, spruce, fir, and aspen; • Two major perennial streams, Rabbit Ears and Troublesome Creeks; • Rugged topography varying from 8,000 feet to 10,800 feet; • Riparian areas and wetlands associated with streams; • Remote area with limited public access; • High quality deer, bear, moose, and elk habitat; • No significant human-made impacts; • Adjoins an 80,000-acre Citizen's Wilderness Proposal area on National Forest System lands.	• Hunting, fishing, hiking, backpacking, and wildlife viewing; • Estimated use is 600 visitors per year; • Portions of two grazing allotments are within the WSA; and • Three big game Outfitter/Guides permitted uses include, but not limited to, the WSA.	• Closed to OHV use; • Livestock grazing management on 2 allotments; • Three Special Recreation Permits (SRPs) issued for commercial hunting; • Monitored annually. In 2007, monthly monitoring done during the summer and fall when motorized use adjacent to the WSA is the greatest; and • In accordance with BLM Manual 6330, manage for VRM Class I management objectives until such time as Congress decides to designate the area as wilderness or release it for other uses.

3.2.22 Wild and Scenic Rivers

The nation's waterways have long served as arteries for commerce, trade, navigation, and exploration. They provide vital sources of drinking water, irrigation for farming, and hydroelectric power for industry, to name a few uses. Waterways have also long drawn people to their shores for settlement and development. This development, often in floodplains, regularly resulted in devastating floods. This inevitable flooding led to major public works projects designed to prevent or mitigate flood damage through diversion, channelization, or through the construction of dams and levees, which, in turn, resulted in many miles of rivers and streams being lost or changed forever.

By the 1960s, there was sufficient concern over the increasing loss of free-flowing rivers in the United States that Congress decided to intervene. They established the Outdoor Recreation Resources Review Commission (ORRRC). The commission recommended that the nation protect wild rivers and scenic rivers from development that would substantially change their wild or scenic nature. The National Wild and Scenic Rivers Act of 1968 (WSRA), sponsored by Senator Frank Church (D-Idaho), was the direct result of this commission.

The Wild and Scenic Rivers Act

The purpose of the WSRA of 1968 (16 USC 1271-1287) is to preserve the free-flowing condition, water quality, outstandingly remarkable values (ORVs) and tentative classifications of select waterways. The WSRA was signed into law by President Lyndon B. Johnson (as Public Law 90-542) on October 2, 1968.

The basic objective of WSR designation is to maintain the existing condition of a waterway. If a land use or development clearly threatens the Outstandingly Remarkable Values (ORVs) – scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar value(s) – that resulted in designation of the waterway, efforts would be made to remove the threat through such actions as local zoning, land exchanges, or purchases from willing sellers. Agricultural and livestock grazing activities occurring at the time of designation would generally not be affected.

The WSRA is also designed to protect waterways from the harmful impacts of water resource projects. To protect this free-flowing character, the Federal Energy Regulatory Commission (FERC, the agency that licenses non-Federal hydropower projects) is not allowed to license the construction of dams, water conduits, reservoirs, powerhouses, transmission lines, or other project works on, or directly affecting, wild and scenic rivers. Other Federal agencies may not assist (by loan, grant, license, or otherwise) any water resources project that may have a direct and adverse impact on the values for which a waterway was designated.

The Federal government is responsible for ensuring that management of designated waterways meets the intent of the WSRA. In the absence of local or State waterway protection provisions, the Federal government may ensure compliance through acquisition of private lands or interest in lands.

Analyzing or managing a waterway for WSR status does not give or imply any government control over private lands. If Congress were to designate a stream as a WSR, there would be no federally imposed management restrictions on private land. Using condemnation to acquire fee title to land is not authorized. Use of condemnation to acquire easements is permitted, although it is extraordinarily rare in the western United States.

The National Wild and Scenic Rivers System (the National System)

Congress established the National Wild and Scenic Rivers System (NWSRS or "National System") to accomplish the goal of protecting wild and scenic waterways. A waterway, or waterway segment or tributary, must be in a free-flowing condition and must be deemed to have one or more ORV to qualify for nomination to the National System.

The WSRA directs that each waterway in the National System be administered in a manner that protects and enhances its ORVs. The existing uses of a waterway are allowed to continue, and future uses may be considered, so long as existing or proposed uses do not conflict with the goal of protecting waterway values.

The typical process for the BLM includes public scoping, and agency review, followed by the nomination of qualifying waterways by the land manager to the Secretary of the Interior. The Secretary then forwards a recommendation to the President and to Congress. Congress, then decides whether to pass a law adding the waterway to the National System.

WSR Study

The BLM is required to evaluate potential additions to the National System under the WSRA, and all other applicable laws, rules, regulations, policies, standards, and guidelines. The BLM WSR study process includes three phases, which are:

- determining what waterway(s), or waterway segment(s), are eligible for WSR designation (eligibility determination);
- determining the potential (tentative) classification of eligible waterway(s), or waterway segment(s), with respect to a wild, scenic, or recreational designation (classification analysis); and
- conducting a suitability study of eligible waterway(s), or waterway segment(s), for inclusion into the National System, by recommendation to the Secretary of the Interior and subsequent legislative action.

The BLM's policy, as stated in BLM W&SR Manual 6400, is to protect and, where possible, enhance any identified waterway ORVs pending a subsequent suitability determination and a designation decision by Congress. The decision to designate waterway segments for inclusion in the National System is outside the scope of the planning process, as these designations can be made only by Congress or by the Secretary of the Interior (BLM 1993b).

This first phase of a WSR study is the eligibility determination. The eligibility determination and the classification analysis represent an inventory of existing conditions. This analysis is designed to determine whether a waterway is eligible to be tentatively considered for WSR designation. To be eligible, the waterway must meet the criteria of being free flowing and, along with the adjacent public lands, must possess one or more ORV. If found eligible, a

waterway is then analyzed as to its current level of development (e.g., water resources projects, shoreline development, accessibility), and a recommendation is made that it be placed into one of three classes: wild, scenic, or recreational. The following are the guidelines used in applying the eligibility criteria on BLM-administered public lands:

Free Flowing – In Section 16(b) of the WSRA, free flowing is defined as "existing or flowing in natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway." (Note: Free flowing should not be confused with naturally flowing, a state in which a waterway flows without any upstream manipulation, except by nature.)

The existence of small dams, diversion works, or other minor structures, either upstream or downstream of the free-flowing segment, does not automatically disqualify it for possible addition to the National System. In addition, a waterway need not be "boatable or floatable" to be eligible. A seasonal or episodic flow does not, per se, disqualify a free-flowing waterway from inclusion in a free-flowing waterway inventory. There is no "minimum flow" requirement.

According to BLM Manual 6400 (Wild and Scenic Rivers), waterways identified for review may be divided into segments for evaluation purposes. There is no minimum length for free-flowing segments. (Congress has designated a segment as short as 0.4 miles.) A waterway segment is of sufficient length if a specific ORV can be protected (a factor in the suitability determination, not eligibility determination) should the segment be designated.

Outstandingly Remarkable Value(s): The public lands must also possess one or more ORV to be eligible for further consideration. In accordance with Section 1(b) of the WSRA, the BLM Manual defines ORVs as scenic, recreational, geological, fish and wildlife, historical, cultural, hydrological, scientific, or research values. The BLM compares resource values of the waterways under study to similar features on other waterways in the region and identifies values that are unique or exemplary. In order to be considered "unique," a resource, or combination of resources, must be one of a kind within a region. In order to be considered "exemplary," a resource, or combination of resources, must be one of the better examples of that type of resource at a national level. ORVs must be directly waterway-related. That is, they should:

- be located in the waterway, or on its immediate shore lands (within one-half mile on either side of the waterway);
- contribute substantially to the functioning of the waterway ecosystem; and
- owe their location or existence to the presence of the waterway.

A determination that a waterway is eligible for designation does not lead immediately to a recommendation that it should be added to the National System. The eligibility study simply determines whether the waterway should be carried into the classification and suitability phases of the study.

The second phase of the WSR study is the classification analysis, which determines whether the waterway should be tentatively classified as wild, scenic, or recreational. This tentative BLM classification is based on the level of development present in the waterway corridor at the time of the study. The determining factors include waterway development, shoreline

modification, and vehicular access. The three classification categories for eligible waterways are:

Wild Waterways – These are waterways, or waterway segment(s), on public lands that are free of impoundments. Generally, they are inaccessible, except by trail, and their watersheds or shorelines are essentially primitive and unpolluted. They represent vestiges of primitive America. Basically, wild means undeveloped. Roads, dams, or diversion works are generally absent from a quarter-mile corridor on both sides of the waterway.

Scenic Waterway Areas – These are waterways, or waterway segment(s), on public lands that are generally free of impoundments. Their watersheds are still largely primitive, and their shorelines are still largely primitive and undeveloped, but are still accessible by roads. Scenic does not necessarily mean that the public lands have to have scenery as an ORV. It does mean, however, that the public lands may contain more development (except for major dams or diversion works) than a wild waterway segment, but less development than a recreational waterway segment. For example, roads may cross the waterway in places, but do not generally run parallel to it. In certain cases, if a parallel road is unpaved and well screened from the waterway by vegetation, a hill, or other obstruction, it may qualify for scenic waterway area classification.

Recreational Waterway Areas – These are the waterways, or waterway segment(s), on public lands that are readily accessible by road or railroad. They may have some development along their shorelines, and may have undergone some impoundment or diversion in the past. Parallel roads or railroads; adjacent lands that have agricultural, forestry, commercial, or other developments; and the existence of small dams or diversions, may be allowed in this classification, provided that the waterway remains generally natural and riverine in appearance. A recreational waterway area classification does not imply that the waterway, or waterway segment(s), on public lands would be managed or prioritized for recreational use or development.

Different segments of the same waterway may be assigned different classifications, depending upon the natural qualities and degree of human intrusion. A waterway's classification does not represent the values for which it was added to the National System. For example, a "recreational" river segment denotes a level of in-corridor and water resources development and does not necessarily mean that the recreation resource has been determined an ORV. Similarly, a recreational classification does not imply that the waterway would be managed for recreational activities. For example, there are waterways in the National System paralleled by a road that are classified as recreational – yet, the ORV is the fish resource. Regardless of classification, each designated waterway is administered with the goal of non-degradation and enhancement of the values that led to it being designated.

Current Conditions

In the Decision Area, 16 BLM-managed river segments were identified as eligible in previous eligibility studies (BLM 2007c). No eligibility studies have been completed prior to 2007. A re-examination of the land ownership and management status revealed that one of the segments determined to be eligible in the March 2007 Study (Blue River Segment No. 1) occurs on National Forest System lands rather than on BLM-managed public lands. The USFS did not identify this segment as eligible during its previous land use planning process.

As a result, Blue River Segment No. 1 has been dropped from consideration by the BLM. All of the other 15 eligible segments are being studied for suitability as part of the planning process. See Map 3-22, Stream Segments Eligible for Inclusion in the National Wild and Scenic River System.

Activities that would adversely affect eligible WSR stream segments are those affecting the ORV(s), water quality or the free-flowing condition of the segment. Similarly, activities that affect the preliminary classification of a stream segment (such as construction of a road in a segment with a wild classification) would impact the segment.

The Final Suitability Report and BLM's final suitability determinations are contained in Appendix T. Appendix T has been published as a separate, free-standing volume, because it also contains suitability determinations for streams located within BLM's Colorado River Valley Field Office. The Final Suitability Report contains detailed information on the suitability study process, and the rational for BLM's final suitability determinations. In conformance with WSRA direction, as well as with all applicable laws, rules, regulations, policies, standards, and guidelines, a full range of alternatives is analyzed in Chapter 4, Environmental Consequences. Table 3-35: Eligible Stream Segments in the Decision Area, displays the 15 eligible segments being studied for suitability, and their preliminary classifications.

Indicators

The BLM is required to manage all eligible and suitable stream segments in a manner designed to protect their free-flowing condition, water quality, ORVs, and classification. As a first step, the BLM is required to regularly monitor the segments to determine if any of these values are at risk. This monitoring may be done in cooperation with other agencies and stakeholders. If a segment is at risk, the BLM evaluates discretionary actions within its authority to determine if they need to be modified to better protect the river-related values. In addition, the BLM evaluates all projects and activities proposed by third parties on BLM-administered public lands to determine if the proposed action must be denied, or if terms and conditions must be imposed, to protect river-related values.

Table 3-35: Eligible Stream Segments in the Decision Area

River or Creek	Segment	Total Segment Length (miles)	Length on Public Lands (miles)	Preliminary Classification	ORVs
Blue River[1]	Total of 2 segments	4.60 (total)	1.48 (total)		
	Segment 2	2.55	0.96	Recreational	Wildlife, Recreational
	Segment 3	2.05	0.52	Recreational	Recreational, Wildlife, Biodiversity
Colorado River	Total of 5 segments	54.74 (total)	21.36 (total)		
	Segment 1	7.32	0.80	Recreational	Recreational, Wildlife, Historic
	Segment 2	2.44	0.31	Recreational	Recreational, Scenic, Geologic, Wildlife, Historic
	Segment 3	24.36	3.24	Recreational	Recreational, Wildlife, Historic
	Segment 4	5.36	4.73	Recreational	Recreational, Geologic, Wildlife, Historic
	Segment 5	15.26	12.28	Recreational	Recreational, Wildlife, Scenic, Geologic, Paleontologic, Historic
Kinney Creek	1 segment	2.35	2.35	Scenic	Fish
Muddy Creek	1 segment	8.93	3.43	Recreational	Wildlife
North Platte River	1 segment	0.07	0.07	Recreational	Recreational, Geologic, Historic
Piney River	1 segment	2.30	2.11	Recreational	Paleontologic
Rabbit Ears Creek	1 segment	4.24	4.24	Wild	Geologic
Spruce Creek	1 segment	0.97	0.97	Recreational	Fish
Sulphur Gulch	1 segment	3.04	3.04	Recreational	Paleontologic
Troublesome Creek	1 segment	6.14	3.71	Wild	Geologic
TOTALS		83.78	42.76		

1 1 additional segment along the Blue River was originally identified as eligible (Blue River Segment 1). A re-examination of the land ownership and management status revealed that Segment 1 of the Blue River is on USFS-managed land rather than on BLM-managed public lands. As a result, this segment has been dropped from consideration by the BLM, and is not studied for suitability in this report.

This page is intentionally left blank.

Trends

River-related recreation is increasing in the Decision Area, and relies on certain flow rates to support the activity. For example, fishing requires a certain flow rate to support the fisheries, and white-water boating relies on certain flow rates to create a white-water experience. Flow rates that are necessary to support river-related recreation may become at risk as demand for additional water diversion occurs at upstream locations to satisfy growing populations on the Western Slope and the Front Range. Accordingly, gathering data about flow rates required to support recreation will be critical for managing the ORVs.

Interested parties including water rights holders, recreationists (e.g., anglers, float boaters, and kayakers), environmental groups, and local governments have expressed diverging interest in designating eligible segments in the Decision Area. One of the primary areas of disagreement is the best management approach for maintaining and enhancing the ORVs, specifically, whether protection would be best implemented by designating the stream segments under the WSRA or by implementing appropriate land management prescriptions in the Approved Plan. Another major area of disagreement is how to best manage flows in stream segments that support ORVs, specifically, whether the best management would be a Federal reserved water right under the WSRA, or the use of State-based instream flow water rights and cooperative measures among water rights holders.

The presence of railroads, utilities infrastructure, lands owned privately or by other agencies, and the activities on those areas, are outside of BLM control. The current management of railroads and utilities infrastructure is not incompatible with protection of ORVs. A change in management practice, however, could have an effect. It is difficult for the BLM to ensure the protection of ORVs in fragmented stream segments.

3.2.23 Watchable Wildlife Areas

The Federal Watchable Wildlife Program is a cooperative nationwide effort among 13 organizations, including the BLM, designed to foster the conservation of wildlife and wildlife habitats by:

- providing enhanced opportunities for the public to enjoy wildlife;
- promoting learning about wildlife and habitat needs;
- contributing to local economies; and
- enhancing active public support for resource conservation.

There are 201 Watchable Wildlife Areas (WWAs) in the State of Colorado, with the majority concentrated along the Front Range and in the Rocky Mountains. Activities that could affect WWAs are the same as those that would affect wildlife habitat.

Current Conditions

There are no designated BLM-administered WWAs in the Decision Area. Due to a recent land exchange, the Windy Gap Wildlife Viewing Area is no longer under BLM management. The Hebron Waterfowl Management Area is promoted by the KFO as a WWA, although no formal management plan exists. The Junction Butte Wetland also provides outstanding opportunities for wildlife viewing.

The Hebron Waterfowl Management Area is 16 miles southwest of Walden. This 4,300-acre area on BLM-managed public lands consists of numerous small ponds and human-made lakes, varying in size from less than 1 acre to more than 160 surface acres. These bodies of water are surrounded by wetland vegetation and nearby uplands of sagebrush and greasewood. Over 100 species of birds have been recorded, among them are mallards *(Anas platyrhynchos)*, pintails *(Anas acuta)*, gadwalls *(Anas strepera)*, wigeons (*Anas* spp.), Canada geese (*Branta Canadensis*) , willets *(Catoptrophorus semipalmatus)*, black-crowned night herons *(Nycticorax nycticorax)*, phalaropes (*Phalaropus* spp.), avocets *(Recurvirostra americana)*, and black-necked stilts *(Himantopus mexicanus)*. The area also attracts golden eagles (*Aquila chrysaetos*), prairie falcons (*Falco mexicanus*), harriers *(Circus cyaneus)*, and Swainson's hawks *(Buteo swainsoni)*. In addition to birds, pronghorn *(Antilocapra americana)* are found year-round, and mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus nelson*) winter in the area (Young 2000).

The Junction Butte Wetland is located 1 mile southeast of Kremmling, and borders the Colorado River. The 125-acre wetland area, at an elevation of 7,400 feet, is a series of natural and human-made depressions that were converted from irrigated hay meadows to artificial wetland. The area is intersected by a series of irrigation ditches that deliver water pumped from the Colorado River and the KB Ditch to the meadows and shallow depressions in the wetland. The area has open water habitat surrounded by wet meadows and upland habitat.

Riparian areas and wetland vegetation have been supported in the past by irrigating the area for hay production. A mixture of native and introduced grass and grass-like species with some willows and forbs constitute most of the vegetation in the wetland. Common species encountered in the wetland include chickpea milkvetch, Rocky Mountain iris, reed canary grass, panicled bulrush, Northwest Territory sedge, and several species of rushes. The area also supports some sagebrush steppe habitat, a small patch of greasewood, and a few cottonwood trees adjacent to the County Road. In addition, the wetland is home to several undesirable species, including crested wheatgrass, field pennycress, Canada thistle, houndstongue, and dalmatian toadflax.

The desired dominant community type is an early successional sedge/rush/willow habitat. Desired vegetative cover in the emergent wetland and wet meadow habitat is 50 percent to 80 percent, in order to provide optimal cover, foraging, and nesting habitat for a variety of wildlife species. Desired vegetation throughout the wetland would place emphasis on a diverse native plant community suitable for the soils and hydrology of the Junction Butte Wetland.

Numerous species of waterbirds are common in the area when water , riparian areas and wetlands habitat are available. Among the more common species are Canada geese, mallards, American wigeon, gadwall, lesser scaup, green-winged teal, blue-winged teal, great blue herons, common snipe, black-crowned night herons and numerous species of riparian and upland songbirds. Some of the more common songbird species include the yellow warbler, western wood-pewee, American robin, broad-tailed hummingbird, willow flycatcher, dusky flycatcher, common yellowthroat, marsh wren, hermit thrush, veery, violet-green swallow, and warbling vireo. Red-tailed hawks, great-horned owls, bald eagles, American kestrels, and Swainson's hawks also use the Junction Butte Wetland as a hunting area.

The Junction Butte Wetland provides habitat for a variety of wildlife species. Beaver, muskrat, porcupine, badger and other small mammals use the herbaceous and woody vegetation year-round. Amphibians and reptiles, including western chorus frogs, northern leopard frogs (a BLM Sensitive Species), and garter snakes also inhabit the area during all, or part, of their life cycles. Mule deer are common throughout the year, and Rocky Mountain elk use the area during winter. The CPW has identified the area as winter range for both deer and elk, and the wetland is adjacent to a critical winter area where these animals concentrate. In addition, white-tail deer are occasional winter residents, moose are occasional summer residents, and evidence of black bears migrating through the wetland has been observed. The wetland has also been identified by landowners as an important area that reduces conflicts on private land by providing winter forage for elk.

Characterization

Indicators

The primary indicator of health of aquatic animals and their habitats on BLM-administered public lands is Public Land Health Standard 2 of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a). See Appendix J. Primary indicators of the health of terrestrial animals are associated with Public Land Health Standard 3: their population numbers; the conditions of the individuals that make up these populations; the age structure represented in the population; and the population's distribution relative to its historic range. These data are tracked by the CPW for game animals and, increasingly, for key species of non-game animals (CDOW 2002).

Trends

Historically, many of the low-lying areas adjacent to the Colorado River provided wetland habitat for waterbirds and other wetland-dependent wildlife. As the area was settled and the lands became private property, these low-lying areas were converted to agricultural production, and primarily used to produce hay in order to provide winter feed for livestock. As a consequence, waterfowl and shorebird habitat adjacent to the river is limited to small oxbows and other natural depressions that are too wet for hay production. Due to the limited amount of wetland habitat currently available along the Colorado River, the Junction Butte Wetland is extremely important to waterbirds and amphibians.

The trends exhibited by wildlife habitat have a solid foundation in the land health assessments that are being completed for nearly all of the landscapes in the Decision Area. Beginning in 1998, approximately 236,200 acres of BLM-managed public lands in the Decision Area had been evaluated using the BLM Standards (BLM 1997a). Application of these standards is the primary tool for evaluating the condition and trend of WWAs in the Decision Area. The land health assessments indicate that the Hebron Waterfowl Management Area was meeting the BLM Standards. Junction Butte has not been assessed, because it is not in a grazing allotment. Based upon the current condition, however, it is likely that it would meet BLM Standards for public land health.

3.2.24 National Trails

The National Trails System Act of 1968 (PL 90-543, as amended) authorized the creation of National Scenic Trails. BLM Manual 6280 defines a National Scenic Trail as a congressionally designated trail that is a continuous and uninterrupted extended, long-distance trail so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant resources, qualities, values, and associated settings and the primary use or uses of the areas through which such trails may pass. National Scenic Trails may be located so as to represent desert, marsh, grassland, mountain, canyon, river, forest, and other areas, as well as landforms that exhibit significant characteristics of the physiographic regions of the Nation.

Current Conditions

Portions of the Continental Divide National Scenic Trail (CDNST) occur in the Planning Area. The trail traverses the KFO from west to east, roughly following the southern Jackson County boundary. At U.S. Highway 34, the trail turns south along the eastern edge of the Planning Area. The trail is primarily on National Forest System lands, with very little of the route occurring on BLM-managed public lands.

There is a multi-agency effort underway to complete the Muddy Pass section of the trail between Rabbit Ears Pass and Indian Creek, and the potential routes may incorporate BLM-managed public lands. Lands between Rabbit Ears Pass and Indian Creek are primarily privately owned with isolated parcels of BLM and Colorado State Trust lands intermixed. Currently, from Rabbit Ears Pass, trail users must hike along U.S. Highway 40 and State Highway 14 to Jackson County Road 53 near Indian Creek, which bisects public lands, to access the next designated portion of the trail. An alternative is for hikers to stay on U.S. Highway 40 and connect to the CDNST by traveling along Chimney Rock Road to the south. Hiking along the highways poses a public health and safety hazard due to having little or no road shoulder or emergency lane. An effort to find an alternative route away from these highways and meet the CDNST Comprehensive Plan guidelines has been ongoing between the BLM, USFS and interest groups. The trail is officially administered by the Secretary of Agriculture in consultation with the Secretary of the Interior (see *Federal Register* 150, August 5, 1981, page 39867).

Characterization

Indicators

The CDNST Comprehensive Plan was amended in 2009, and contains guidelines for trail management, completion of new segments of trail, and trail monitoring. Within the CDNST Comprehensive Plan, consideration is given to carrying capacity of the trail, motorized vehicle use, cultural sites, budget constraints, physical environment and resources (including wildlife and wildlife habitat, soil, vegetation, water quality, and air quality), existing ROWs, private landownership, and public safety hazards. Impacts on national scenic trails would occur if substantial interference to the values for which the trail was designated occurs.

Trends

The Continental Divide Trail Alliance (CDTA) was formed in 1995 to assist the Federal land management agencies in the completion, management, and protection of the CDNST. Since its inception, the non-profit organization worked to increase public awareness of the CDNST by mailing out public information packets; producing and distributing brochures and newsletters; placing stories and advertisements in magazines and newspapers; producing national radio reports and website trail updates; coordinating public awareness events; and making presentations to civic groups, schools, and clubs. The Continental Divide Trail Alliance also had coordinated volunteer efforts designed to improve, or complete, portions of the CDNST. The CDTA has been replaced by the Continental Divide Trail Coalition as the primary current organization that is working with Federal land managers.

Where the CDNST has a delineated and designated alignment crossing BLM-managed public lands in other States, it has been designated as a Special Recreation Management Area (SRMA) or is within other special designations in other areas. These designations may be considered in the future if the alignment crosses public lands managed by the KFO.

3.2.25 National Scenic Byways

The National Scenic Byways and All-American Roads Programs are part of the U.S. Department of Transportation, Federal Highway Administration. Similar programs are the Colorado State Scenic and Historic Byways, and BLM-designated Backcountry Byways. These programs seek to recognize, preserve, and enhance selected roads. The U.S. Secretary of Transportation recognizes 31 All-American Roads and 120 National Scenic Byways, based upon one or more archaeological, cultural, historic, natural, recreational, or scenic qualities (National Scenic Byways Online 2012).

The National Backcountry Byway Program is the BLM’s version of the larger National Scenic Byways Program. BLM State Directors designate BLM Backcountry Byways on BLM-managed public lands. Because many BLM-designated byways cross other local, County, private, State, and Federal lands, their designation and management can vary based upon the agency responsible for the management of the Byway.

Most BLM-designated Backcountry Byways are native surface or gravel base roads. Backcountry Byways fall into one of the following four category types:

- **Type I** – Roads are paved, or have an all-weather surface, and have grades that are negotiable by a normal touring car. These roads are usually narrow, slow speed, secondary roads.
- **Type II** – Roads require high-clearance type vehicles (such as trucks or 4-wheel drives). Usually, these roads are not paved; however, they may have some type of surfacing. Grades, curves, and road surface are such that they can be negotiated with a 2-wheel drive high-clearance vehicle without undue difficulty.
- **Type III** – Roads require 4-wheel drive vehicles or other specialized vehicles (such as dirt bikes, ATVs, etc.) Usually, these roads are not surfaced; however, they are managed in a manner designed to provide for safety considerations and resource protection needs. They have grades, tread surfaces, and other characteristics that will require specialized vehicles to negotiate.
- **Type IV** – Trails that are managed specifically to accommodate dirt bike, mountain bike, snowmobile, or ATV use. These are usually single track trails.

There are no BLM-designated Backcountry Byways in the Planning Area.

The Colorado Scenic and Historic Byways program provides recreational, educational, and economic benefits to Colorado residents and visitors. The system of roads affords the traveler interpretation and identification of key points of interest and services, while providing for the protection of significant resources. Colorado Scenic and Historic Byways are nominated by local partnership groups, and are designated by the Colorado Scenic and Historic Byways Commission for their exceptional scenic, historic, cultural, recreational, and natural features.

Current Conditions

National and State Scenic Byways in the Planning Area are the Colorado River Headwaters National Scenic Byway, the Cache la Poudre-North Park National Scenic and Historic Byway, and a portion of the Top of the Rockies National and State Scenic Byway.

- **Colorado River Headwaters National Scenic Byway –** The 69-mile Colorado River Headwaters National Scenic Byway bisects a large portion of the Planning Area, following the Colorado River from Grand Lake west to State Bridge. The BLM is a member of the Colorado National Scenic Byway Committee, and works with this group on interpretive planning and implementation.
- **The Cache la Poudre-North National Scenic and Historic Byway** – The 101-mile-long Cache la Poudre-North Park National Scenic Byway begins east of Walden on Colorado Highway 14 and extends east to downtown Fort Collins. The Byway was once a transit corridor for Native Americans and early euro-American explorers (National Scenic Byways Online 2007).

- **The Top of the Rockies National and State Scenic Byway –** A portion of The Top of the Rockies National and State Scenic Byway is in the Planning Area, but does not cross any BLM-administered public lands in the Planning Area. The Byway begins approximately 10 miles southeast of Vail (near Copper Mountain) and runs along State Highway 91, south of the I-70 junction to its intersection with U.S. Highway 24, near Leadville. The Scenic Byway also runs along U.S. Highway 24 south of the I-70 junction, approximately 5 miles southwest of Vail at Dowd Junction to its intersection with State Highway 82 at Balltown.

Trends

Driving for pleasure is expected to increase along the Colorado Headwaters National Scenic Byway. The BLM is collaborating with the Colorado Headwaters National Scenic Byway Committee to educate the public, advertise, and develop an interpretive plan for the Byway (BLM 2007k).

3.2.26 Transportation System

The BLM's Transportation System represents one of the most critical assets to the accomplishment of the BLM's mission. A well-functioning Transportation System is essential for the resource management, energy production, and recreational activities that take place on BLM-managed public lands. In addition to allowing the BLM to achieve its agency goals (sustaining the health, diversity, and economic vitality of American public lands), transportation enables ongoing contributions to the regional and national economies (BLM 2008h). With the increase in the regional population, the continued demand for energy and ROWs, the growth in recreational use, and ongoing fire risks, it is expected that the KFO's Transportation System will continue to expand and, over time, become even more important.

Historically used by BLM personnel, permittees, and leaseholders, the BLM's Transportation System is now also extensively used by the general public for recreation. Many rural communities adjacent to BLM-managed public lands continue to experience unprecedented growth in residents and visitors. In addition, the growth of commercial activities and industries throughout the West has also brought many new economic opportunities to BLM-managed public lands. The resulting mix of recreational and commercial activities further contributes to the complex challenges in managing the BLM's Transportation System (BLM 2009e).

Most administratively permitted roads, such as those associated with ROWs and livestock grazing, are naturally surfaced (dirt roads). The majority of BLM roads authorized for energy development are gravel roads. There are no paved BLM-managed roads in the Planning Area. In addition to being responsible for the roads themselves, the BLM is also responsible for the associated infrastructure, such as bridges and culverts, on all BLM-managed roads.

Comprehensive Travel and Transportation Management (see Section 3.2.16) is the identification, through the RMP planning process, of areas where foot, horse, mechanical transport, and motorized vehicle travel is appropriate, restricted, or not allowed, depending upon resource objectives and use considerations. This section addresses Federal, State, County roads, and the BLM roads in the BLM Facility Asset Management System (FAMS). (The FAMS tracks BLM-managed facilities including those associated with transportation, recreation, campgrounds, administrative sites, buildings, and more.)

Federal, State, and County Roads

A network of Federal, State, and County roads provides access throughout the Planning Area. Interstate Highway 70, U.S. Highway 40, and Colorado Highways 9, 14, 82, 125, and 131, bring traffic to the region from across the country. See Map 1-1, Project Planning Area and Land Status. Traffic volumes on the road network are highly variable. The highest volume counts are found on major roadways in, or near, the largest communities. State highways and I-70 carry the largest traffic volumes, followed by County roads. Due to the geography of the Planning Area, and to the location of mountain communities, these routes are major thoroughfares that have moderate-to-high use throughout the year.

BLM-managed Roads

BLM-managed roads provide public and administrative (BLM and permittee) access to BLM-managed public lands, access through BLM-managed public lands, and access to inholdings of private lands in the Planning Areas. In accordance with new policy guidance, Roads and Trails Terminology (BLM 2006c), some of the terms associated with roads and trails include:

- **Transportation Linear Features –** Linear features represents the broadest category of physical disturbance (planned and unplanned) on BLM-managed public lands. Transportation-related linear features include engineered roads and trails, as well as user-defined, non-engineered roads and trails created by public use of BLM-managed public lands. Linear features may include roads and trails identified for closure or removal, as well as those that make up the BLM's defined Transportation System.
- **Transportation System –** The Transportation System represents the sum of the BLM's recognized inventory of linear features (roads, primitive roads, and trails) formally recognized, designated, and approved as part of the BLM's Transportation System.
- **Routes –** Routes represent a group or set of roads, trails, and primitive roads that represent less than 100 percent of the BLM's Transportation System. Generically, components of the Transportation System are described as routes.
- **Roads, Trails, and Primitive Roads –** These terms describe specific categories of transportation linear features, and represent subsets of the BLM's Transportation system:
    - **Road:** A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, maintained for regular and continuous use.

- **Primitive Road**: A linear route managed for use by 4-wheel drive or high-clearance vehicles. Primitive roads do not normally meet any BLM-managed road design standards.
- **Trail:** A linear route managed for human-powered, stock, or OHV forms of transportation or for historical or heritage values. Generally, trails are not managed for use by 4-wheel drive or high-clearance vehicles.

- **Transportation Linear Disturbances –** "Linear disturbances" is used to identify human-made linear features that are not part of the BLM's Transportation System. Linear disturbances may include engineered (planned) as well as unplanned single and two-track linear features that are not part of the BLM's Transportation System. (Source: http://www.blm.gov/nstc/library/pdf/TN422.pdf)

Road System Maintenance

BLM road maintenance consists of blading and grading, which usually occurs in the summer or fall. Additional corrective maintenance or water drainage work (installation of culverts, drains, or other water-management devices) is performed as needed, such as after a heavy rainfall. The BLM does not remove snow, although some access routes have portions plowed by County road maintenance crews, utility companies, or private entities, if the roads provide access to utilities, homes, or private buildings.

The BLM has changed from "Maintenance Levels" to "Maintenance Intensity," and simplified the standards for consistency across all linear features. The old "Maintenance Levels" definitions addressed both the type of road (road geometry or construction material) and the level of use; they did not provide a clear standard for the actual maintenance level. As a result, they were used inconsistently across the BLM as a means for describing everything from road construction type through appropriate maintenance standards. The BLM Maintenance Intensity standards provide guidance for appropriate "standards of care," such as appropriate intensity, frequency, and type of maintenance activities that should be undertaken for recognized routes. Recognized routes, by definition, include roads, primitive roads, and trails included as "Assets" in the BLM's FAMS. the FAMS includes four primary "Maintenance Intensity" levels that allow for removal, low, medium, and high maintenance intensities, irrespective of the type of route (road, primitive road, or trail). Maintenance intensities must be consistent with land use planning management objectives (e.g, those associated with natural and cultural resources, recreation settings, and visual resource management). These Maintenance Intensity Levels are described below.

Level 0

- **Maintenance Description –** Existing routes that will no longer be maintained, and that will no longer be declared a route. Routes identified as Level 0 are identified for removal from the Transportation System entirely.
- Maintenance Objective –
  - no planned annual maintenance;
  - meet identified environmental needs; and
  - no preventive maintenance activities.
- **Maintenance Funds –** No annual maintenance funds provided.

Level 1

- **Maintenance Description –** Routes where minimum (low intensity) maintenance is required to protect adjacent lands and resource values. These roads may be impassable for extended periods of time.
- Maintenance Objectives –
  - low (minimal) maintenance intensity;
  - emphasis is given to maintaining drainage and run-off patterns, as needed, to protect adjacent lands; grading, brushing, or slide removal is not performed unless route bed drainage is being adversely affected, resulting in erosion;
  - meet identified resource management objectives;
  - perform maintenance, as needed, to protect adjacent lands and resource values;
  - no preventive maintenance;
  - planned maintenance activities limited to environmental and resource protection; and
  - route surface and other physical features are not maintained for regular traffic.
- **Maintenance Funds –** Maintenance funds provided, as needed, to address environmental and resource protection requirements. No maintenance funds provided for the performance of preventive maintenance activities.

Level 2

The BLM has reserved this level for possible future use; there is no current description or objective.

Level 3

- **Maintenance Description –** Routes requiring moderate maintenance due to low volume use (e.g., seasonally or year-round for commercial, recreation, or administrative access). Maintenance intensities may not provide year-round access, but they are intended to provide resources appropriate to keep the route in use for the majority of the year.
- Maintenance Objectives –

  - medium (moderate) maintenance intensity;
  - drainage structures will be maintained, as needed; surface maintenance will be conducted to provide a reasonable level of riding comfort at prudent speeds for the route conditions and intended use; brushing is conducted, as needed, to improve sight distance when appropriate for management uses; landslides adversely affecting drainage receive high priority for removal; otherwise, they will be removed on a scheduled basis;
  - meet identified environmental needs;
  - generally, maintained for year-round traffic;
  - perform annual maintenance, as needed, to protect adjacent lands and resource values;
  - perform preventive maintenance, as required, generally to keep the route in acceptable condition;
  - planned maintenance activities should include environmental and resource protection efforts, and annual route surfacing; and
  - route surface and other physical features are maintained for regular traffic.
- **Maintenance Funds –** Maintenance funds provided to preserve the route in the current condition, perform planned preventive maintenance activities on a scheduled basis, and address environmental and resource protection requirements.

Level 4

The BLM has reserved this level for possible future use; there is no current description or objective.

Level 5

- **Maintenance Description –** Routes for high (maximum) maintenance due to year-round needs, high volume traffic, or significant use. Also may include routes identified through management objectives as requiring high intensities of maintenance, or to be maintained open on a year-round basis.
- Maintenance Objectives –
  - high (maximum) maintenance intensity;
  - entire route will be maintained at least annually; problems will be repaired, as discovered; routes may be closed or have limited access due to weather conditions, although they generally are intended for year-round use;
  - meet identified environmental needs;
  - generally, maintained for year-round traffic;
  - perform annual maintenance, as needed, to protect adjacent lands and resource values;
  - perform preventive maintenance, as required, to generally to keep the route in acceptable condition;

  - planned maintenance activities should include environmental and resource protection efforts and annual route surfacing; and
  - route surface and other physical features are maintained for regular traffic.
- **Maintenance Funds –** Maintenance funds provided to preserve the route in the current condition, perform planned preventative maintenance activities on a scheduled basis, and address environmental and resource protection requirements.

Administrative Access

The BLM responds to public requests for land use authorizations. Reasonable administrative access is made available to persons engaged in valid uses, such as mining claims, mineral leases, livestock grazing, and energy development. Typically, road construction maintenance for an authorized road is the responsibility of the permittee.

Current Conditions

Road system maintenance in the Decision Area has focused on maintaining the major access roads that generally receive most of the traffic volume. See Appendix Q, Road Maintenance levels, for a list of system roads and maintenance levels. Each year, maintenance activities alternate between Middle Park and North Park, with maintenance rotating through each location.

The BLM annually maintains approximately 139 miles of roads in the Decision Area. The KFO receives snow-removal assistance from Counties, utility companies, and private entities. This provides public access, to some degree, in such areas as Strawberry Road, Kinney Creek, Dice Hill, Pumphouse Recreation Area, and the Wolford Mountain Reservoir.

The growing demand for local energy production could increase oil and gas operations in the North Park area. Typically, a short-term increase in the volume of both heavy and light traffic occurs during the construction, well-drilling, and completion phases of developing oil and gas resources. Temporary conflicts, including a potential for delays, dust, road degradation, and increased vehicle safety, occur during the well construction and drilling phases, and during recompletion and work-over activities. Impacts associated with traffic levels are lower after oil or gas wells are in operation, because traffic levels drop.

It is anticipated that road capacity and use will increase on the adjoining County, State, and Federal roads in the North Park area. Table 3-36 provides average daily traffic counts for access roads at significant locations in the Planning Area. It also shows traffic counts projected to occur at the same locations for the year 2030 (CDOT 2009).

Table 3-36: Average Annual Daily Traffic (AADT) on Roads in Grand, Jackson, and Summit Counties

Highway or Road Segment	Average Annual Daily Traffic		
	2007	2030	Percent Change (2007 to 2030)
State Highway (SH) 14 at Muddy Pass, northeast of SH 40	830	1,260	52 percent
SH 14 south of Walden, west of SH 125	1,100	1,758	60 percent
SH 14 at Walden, 6th Street east of SH 125	1,400	2,205	58 percent
SH 14 at Walden, Washington Street south of 6th Street	760	1,153	52 percent
SH 125 at Rand, southeast of County Road (CR) 27	320	662	107 percent
SH 125 southeast of CR 28	280	579	107 percent
SH 125 south of Walden at SH 14 south	1,850	2,811	52 percent
SH 125 east of CR 12W	2,000	2,690	35 percent
SH 125 at Walden at SH 14	4,900	6,424	31 percent
SH 125 at Walden, south of 4th Street	3,600	4,676	30 percent
SH 125 at Walden, south of 2nd Street	2,300	3,120	36 percent
SH 125 at Walden, north of 1st Street	1,600	2,170	36 percent
SH 125 at Walden, south of SH 127	730	1,376	88 percent
U.S. 40 west of SH 14 at Muddy Pass	2,700	3,507	30 percent
SH 127 northeast of SH 125	610	1,178	93 percent
SH 9 (Blue River Parkway) northwest of 1-70 and east of Wildernest Road and Rainbow Drive	31,200	49,858	60 percent
SH 9 (Blue River Parkway) northwest of Wildernest Road and Rainbow Drive	22,300	37,174	67 percent
SH 9 (Blue River Parkway) north of 6th Street	16,900	27,201	61 percent
SH 9 (Blue River Parkway) at Willowbrook Road	23,100	34,157	48 percent
SH 9 (Blue River Parkway) north of Hamilton Creek Road at County Road 1900	6,300	9,053	44 percent
SH 9 south of County Road 15 at Ute Pass Road	6,800	10,043	48 percent
SH 9 north of Heeney Road south junction at Green Mountain Reservoir	2,900	4,734	63 percent
SH 9 south of County Road 1	2,900	4,934	70 percent

Source: CDOT 2009

Characterization

Indicators

The indicator used to measure trends associated with the BLM's Transportation System and facilities is the Maintenance Intensity Level (levels 1, 3, or 5).

Trends

The CDOT is able to project traffic growth for all roads within its jurisdiction using an annual growth rate that is based upon historic population trends. The projections are intended to provide a background scale against which impacts may be measured. While the CDOT's projected traffic growth reflects a number of ongoing trends (e.g., growth in interstate traffic, population growth, and increase in local industrial and business activity), it may be low or high when compared to actual population growth that occurs during the same period.

Maintenance costs are rising, and each year the BLM maintains fewer miles of BLM-managed roads. With flat or decreasing Federal budgets and rising fuel and equipment costs for contractors, this trend is likely to continue.

3.2.27 Public Health and Safety

Public health and safety topics discussed in this section are law enforcement, hazardous materials and hazardous wastes, illegal dump sites, target shooting, energy development, hydrogen sulfide wells, and geocaching. Abandoned mines are not discussed, because most mines are closed or have exclosures to keep people out. Hot springs also are not addressed, because the BLM does not maintain hot springs for recreational use. Frequently, recreational activities such as hiking, horseback riding, OHV riding, and rockhounding involve public health and safety topics. See Section 3.2.15 Recreation and Visitor Services. Wildland fires also involve public health and safety. See Section 3.2.10 Wildland Fire Management.

Public health and safety is affected by various factors, including educational outreach; access to sites containing dangerous materials or situations; and enforcement of laws, regulations, and guidelines designed to protect the public. In addition to preserving and protecting natural and cultural resources, the BLM's stewardship role extends to protecting public health, safety, and property (BLM 2009a). The BLM is responsible for maintaining facilities and infrastructure; reducing health and safety risks to employees and to the public; protecting BLM-managed public lands from illegal dumping of wastes; theft and destruction of Federal property; misuse of resources; and wildland fires.

The BLM's Hazard and Risk Management responsibility involves managing BLM-managed public lands in a way that minimizes human exposure to hazards and risks, and that reduces or eliminates threats to human health and natural resources (BLM 2009b). As a rule, the following priorities govern the BLM's response to hazardous conditions:

- mitigate and respond to risks on lands near expanding urban centers and in areas of heavy public visitation;
- clean-up contaminated lands that pose direct risks to human health and the environment;

- consult and cooperate with communities, and State and local agencies, in order to leverage funds and prioritize needs;
- respond to hazards, disasters, and emergencies using up-to-date risk management methodologies;
- maintain and update internal Emergency Management Plans, and comply with Departmental initiatives;
- respond in a timely and effective manner to incidents of illegal dumping of hazardous materials on BLM-managed public lands;
- increase attempts to identify parties responsible for illegal activities in order to reduce the use of appropriated funds for the clean-up of contaminated lands; and
- monitor and maintain sites that have been restored and where damage has been mitigated.

The BLM engages in hazardous material response actions, site evaluations, and prioritization of clean-ups in accordance with applicable laws, rules, regulations, policies, standards, and guidelines (BLM 2009b). This involves working with the EPA, State environmental quality departments, counties, and potentially responsible parties (both public and private) in order to fund and expedite the clean-up of hazardous sites.

The BLM also mitigates or remediates hazards that pose threats to public health, safety, or property, or that endanger the environment (BLM 2009b). Sites that are in imminent threat to public health and safety, as well as sites that are under a consent order and can generate penalties and fines, are a priority for the BLM.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (186) (42 USC9601-9673) provides for liability, risk assessment, compensation, emergency response, and clean-up (including the clean-up of inactive sites) for hazardous substances. The Act requires Federal agencies to report sites where hazardous wastes are, or have been, stored, treated, or disposed. It also requires responsible parties, including Federal agencies, to clean up releases of hazardous substances. The CERCLA Response Actions Handbook (BLM Manual Handbook H-1703-1) provides policy and guidance to BLM employees in the use of CERCLA authorities and responsibilities with regard to addressing hazardous substance releases (BLM 2009b).

Current Conditions

Law Enforcement

The mission of the BLM Law Enforcement Program is to enforce the laws, policies, and regulations that protect BLM-managed public lands from destructive and unlawful uses, and to safeguard the lives, property and rights of the visiting public. The lands managed by the KFO are patrolled by a uniformed BLM Law Enforcement Officer (Ranger). The Ranger focuses on:

- providing a safe environment for BLM employees and public land users;

- providing protection to BLM facilities, or facilities for which that the BLM has interest in, or oversight responsibilities over;
- reducing or eliminating illegal drug activities on BLM-managed public lands, including manufacturing and cultivation;
- reducing or eliminating threats to natural and cultural resources; and
- providing education through field contacts, public meetings, and school classroom sessions.

The KFO Law Enforcement Program provides for investigative, public education, and patrol support activities for 377,900 surface acres of public lands managed by the KFO. One Ranger is assigned to the KFO. In addition to enforcing OHV-use violations, the Ranger also investigates mineral, lands and realty, grazing, recreation, forestry, cultural, and other program violations.

Law enforcement support comes from formal and informal working relationships with other law enforcement agencies. One type of formal support comes in the form of MOUs with the following law enforcement agencies: the Grand County Sheriff's Department; the Jackson County Sheriff's Department; the Eagle County Sheriff's Department; the USFS; and the CPW.

Hazardous Materials/Wastes

The BLM has limited regulatory authority over hazardous materials or substances, which are defined in various ways under a number of regulatory programs. Hazardous materials represent potential risks to public health and safety when not managed properly during transportation, storage, use, or disposal. Hazardous materials may include chemical, biological, and radioactive materials. They may be on, or near, public lands where hazardous or regulated material use and storage are authorized. Hazardous sites also result from unauthorized or illegal use or disposal. Contamination of air, soil, surface water, and groundwater may result from improper handling, storage, or disposal. Hazardous materials are transported over the road and rail systems that cross, or are near, public lands. The BLM maintains a database of hazardous materials sites (Abandoned Mines and Site Clean-Up Module). The State of Colorado maintains a list of sites with current hazardous materials permits. The two primary types of hazardous material sites on, or near, public land are related to mining or to agricultural use and storage. Health and safety may be affected by hazardous materials and conditions that have resulted from prior industrial or commercial activities on BLM-managed public lands or on adjacent privately held properties. The KFO periodically uses herbicides to treat land that has been invaded by noxious weeds and invasive exotic species.

The KFO provides for public safety by maintaining a Hazardous Material Emergency Contingency Plan, which is designed to facilitate correct responses to hazardous materials situations; establish procedures for reporting such incidents; and, in some cases, to guide possible remediation of the situation. The Plan provides guidance to KFO employees on how to react to a hazardous materials situation, and whom to contact for assistance.

Illegal Dump Sites

Illegal dumping has been occurring on the BLM-managed public lands for many years (BLM 2009d). State and Field Offices continue to encounter many illegal dump sites within their jurisdictions. Such dump sites often encourage, or engender, additional illegal dumping in the same area, in what has come to be called "promiscuous dumps." Illegal dumping primarily involves the dumping of solid wastes, such as appliances, yard wastes, household trash, vehicles, furniture, construction debris, and household hazardous wastes. A major type of hazardous waste found in illegal dumps is that generated by clandestine drug labs. Illegal dumps are often created along railroad corridors, gravel roads, and routes and in uninhabited areas. Illegal dumps also pose a tempting opportunity to dispose of hazardous waste in violation of the Resource Conservation and Recovery Act of 1976 (RCRA). The RCRA authorizes the EPA to manage, by regulation, hazardous wastes on active disposal operations. The Act waives sovereign immunity for Federal agencies with respect to all Federal, State, and local solid and hazardous waste laws and regulations. Federal agencies are subject to civil and administrative penalties for violations, and to cost assessments for the administration of the enforcement.

Trash disposal is a growing and contentious issue in Grand County. Most of the County's trash is generated at the east end of the County, in conjunction with residential developments, and ski area and resort development. Due to unstable soil conditions at the landfill site in Granby and lack of capacity at the landfill in Kremmling, both landfills have been closed. Trash is collected at a transfer station in Granby and trucked to a landfill out of the County. Illegal dumping could increase on easily accessible BLM-managed public lands anywhere in the County (especially the west end) depending upon the fees charged at the transfer station and the distance to that location.

In order to prevent and reduce the occurrence of illegal waste dumping on the BLM-managed public lands, the Division of Engineering and Environmental Services provides the following recommendations for State and Field Offices in order to assist offices with their illegal waste dumping problems (BLM 2009d):

- community outreach, education, and involvement;
- targeted enforcement;
- creation of legal alternatives for illegal dumpers; and
- measurement.

These recommendations have been successful in preventing illegal waste dumping for a number of BLM Field Offices.

The KFO identifies approximately 10 to 20 new illegal dump sites each year. Most waste consists of dilapidated vehicles, motor homes and campers, construction materials, and household items. Remediation consists of coordinating with the Ranger, who investigates for evidence that could make violators accountable for clean-up and appropriate disposal.

Target Shooting

There are two areas where recreational target shooting is particularly popular on BLM-managed public lands in the Planning Area. The North Park Public Rifle Range (near

Walden, in Jackson County) is maintained by volunteers, Jackson County, and the CPW. This area is currently being transferred to Jackson County through a Recreation and Public Purposes Act patent and would no longer be managed by the BLM. The Troublesome shooting area was near Kremmling, in Grand County. User conflicts between shooters and OHV/ATV users are a safety concern at this location. This location was identified as an Open OHV Play Area within the Wolford Travel Management Plan (2005) resulting in the site being designated as closed to Recreational Target Shooting.

Energy Development

Expanding and increasing energy development creates health and safety concerns and management challenges for the BLM. Energy development involves, for example, oil, gas, geothermal, wind, and solar energy sites. In relation to public health and safety concerns, oil and gas development attracts the most attention. Oil and gas development in the Planning Area is concentrated around North Park, in Jackson County. The BLM requires all oil and gas operators to comply with applicable laws, rules, regulations, policies, standards, and guidelines designed to protect the environment and the public. Oil and gas operators are required to comply with additional requirements imposed by the BLM as part of a leases, permits or ROW grants.

Hazardous chemicals are used, and produced, by oil and gas extraction processes (Witter et al. 2008). Spills of oil and gas wastes, or of chemicals used in production, can pollute groundwater and surface water, and soil. Active wells can continue to pose health hazards as the result of fugitive air emissions from the wells, as well as from emissions from stationary and vehicular traffic. If proper capping and maintenance procedures are not used, abandoned wells may continue to be a source of toxic contaminants.

Oil and gas exploration and production activities have been exempted from standards created to protect health under a number of Federal statutes, including provisions of the CAA, the CWA, the SDWA, the RCRA, the CERCLA, and the Emergency Planning and Community Right to Know Act (EPCRA) (Witter et al. 2008). These laws are designed to protect the health of the American population by ensuring clean air and water.

In 2008, some Cooperating Agencies suggested that the BLM conduct Human Health Impact Assessments. However, a Human Health Impact Assessment is an extensive process (not just a single study) that goes beyond the scope of this planning process, and beyond the expertise of the BLM. Instead, the BLM formally requested agencies with specific human health expertise and jurisdiction to review the DRMP/DEIS.

U.S. Department of Transportation data indicate that an average of one rupture annually should be expected for every 5,000 miles of pipeline (Office of Pipeline Safety 2005). More than 50 percent of pipeline ruptures occur as a result of heavy equipment striking the pipeline. Potentially, ruptures could cause a fire or explosion, if a spark or open flame ignited the natural gas escaping from the pipeline. Pipeline design, materials, maintenance, and abandonment procedures are required in order to meet the Standards set forth in U.S. Department of Transportation regulations (49 CFR Part 192, Transportation of Natural Gas by Pipelines). Visit: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl, to review the full text of these regulations.

Geocaching

With regard to geocaching, the KFO follows Instruction Memorandum No. 2005-092 Geocaching Activities on BLM Public Lands (BLM 2005d), which provides details on the BLM rules related to Geocaching. Geocaching is a "treasure hunting" outdoor adventure game for global positioning system (GPS) users. Participating in a cache hunt is an activity designed to take advantage of the features and capability of a GPS unit, and to enjoy the freedom of access to public lands. Individuals and organizations set up caches all over the world and share the locations of these caches on the Internet. GPS users use the location coordinates to find the caches. Once found, a cache may provide the visitor with a variety of awards. The visitor may be expected to leave or replace items in the cache, deliver items to another cache, or take a self-portrait to upload to an Internet virtual album. The cache may be a small waterproof box or simply an unmistakable landmark to include in the portrait.

The BLM welcomes this activity in appropriate locations on the public lands if it is conducted with minimal impact to the environment. The BLM must confirm that geocaching activities do not jeopardize public health and safety, do not result in environmental damage, and do not conflict with other authorized land uses. Prior to establishing a cache on public lands, visitors must contact the local Field Office to identify the intended location, and to request authorization. Through this contact, the BLM can verify that the proposed cache location:

- is not near any prehistoric or historic archaeological site, cave, cave entrance, ruins, stock tanks, wildlife waters, or other sensitive resources;
- will not interfere with Threatened or Endangered Species habitat;
- is not inside a designated wilderness, WSA, or RNA/ACEC where such use is not considered appropriate;
- will not conflict with other land uses or users;
- is not hazardous or does not present any hazards to the public; and,
- requires no other special considerations or undue disturbances.

A SRP is not required if the geocaching activity complies with casual use conditions. The following conditions apply to casual use:

- the activity is not a commercial endeavor;
- the activity complies with land use decisions and designations, such as special management area designations and the BLM's 6330 policy for Management of Wilderness Study Areas ;
- does not award cash prizes;
- is not publicly advertised;
- poses minimal risk for damage to public lands or to related water resource values; and,
- generally requires no monitoring.

Geocaching does occur on BLM-managed public lands in the Planning Area. The locations of geocache sites are available online.

Characterization

Indicators

Law Enforcement

The Law Enforcement Ranger responds to concerns regarding safety. The Ranger issues written and verbal warnings, as well as violation notices.

Hazardous Materials and Hazardous Wastes

Hazardous wastes can be found at illegal dump sites. The BLM maintains a record of illegal dump sites.

Illegal Dump Sites

The Law Enforcement Ranger conducts patrols for illegal dump sites. The Ranger also relies on local, County, and State law enforcement reports; reports from co-workers; and input from the public about illegal dump sites. The BLM maintains a record of illegal dump sites.

Recreational Target Shooting

The Law Enforcement Ranger conducts patrols for recreational target shooting problems. The Ranger also relies on co-worker reports; local, County, and State law enforcement reports; and input from the public about target shooting problems. The BLM maintains a record of recreational target shooting sites.

Energy Development

In order to develop on BLM-managed public lands, energy developers are required to obtain, for example, leases and ROW grants. Applications for leases and ROW grants allow the BLM to monitor interest in energy development and the location of energy development, and to control the types of activities developers are allowed to conduct.

Geocaching

Geocaching that involves a casual use of BLM-managed public lands is not tracked. If the geocaching activity or event does not meet the conditions of casual use, the event is treated as any other organized recreational group or competitive activity or event for which the BLM would require the event organizer to obtain a SRP (BLM 2005d). If it is determined that the use is casual, but there are concerns about the use (e.g., placing the caches in congressionally designated Wilderness or WSAs, at cultural resource sites, in areas with Threatened or Endangered Species, or in any other special fragile area), the BLM issues a “Letter of Agreement” with special stipulations attached that address the concerns. These Letters, as well as SRPs, are tracked and monitored by the BLM.

Trends

Law Enforcement

Law enforcement actions are expected to remain constant, and the need for additional BLM law enforcement officers is expected to persist.

According to the North-Central Colorado Community Assessment Report for the BLM KFO (BLM 2007g), there are community concerns and interests regarding public health and safety. The most commonly cited administrative change was the need for a greater on-the-ground presence by BLM personnel. Communities expressed an interest in greater enforcement of existing land use regulations and more active education by BLM staff. It is believed that an increased presence of BLM staff on the ground would help alleviate problems, including the creation of bandit trails by motorized recreation users, trespass on private land, and unauthorized use of seasonally closed trails.

Hazardous Materials and Hazardous Wastes

The amount of dumping of hazardous wastes at illegal dump sites is expected to remain at, or near, the current level. An increase in hazardous materials and hazardous wastes associated with illegal dumping may occur if the local population grows or if dump fees at permitted sites increase.

Illegal Dump Sites

Illegal dumping occurrences are expected to remain at, or near, the current level. An increase in illegal dumping may occur if the local population grows or if dump fees at permitted sites increase.

According to the North-Central Colorado Community Assessment Report for the BLM KFO (BLM 2007g), there are community concerns and interests regarding public health and safety. One of the most important issues involved trash and illegal dumping. Trash on BLM-managed public lands was a common subject, with participants specifically identifying illegal dumping and trash on trails and at campgrounds as key issues. Dumping, bandit trail creation, litter, fence-cutting, and scarring from motorized recreation were identified as affecting the desired landscape, public land resources, viewshed quality, and recreational experiences.

Recreational Target Shooting

Jackson County is in the process of acquiring the North Park Public Rifle Range. The Troublesome shooting range, near Kremmling, is slated to be closed.

Energy Development

The KFO's receipt of APDs has fluctuated over the last decade: 82 APDs were submitted from fiscal year 2000 to 2010. Fiscal year 2000 was a high year for the KFO, when 26 APDs were received; 2003 and 2006 were both low years, when no APDs were received. Within the last three years, the KFO has received four applications for seismic surveys in Jackson County, indicating interest in oil and gas development in that area. In addition, there are new

issues, such as enhanced protection of Greater sage-grouse habitat, a BLM Sensitive Species, that need to be addressed in the planning process.

Geocaching

The BLM believes that geocaching is an appropriate casual use of public land (BLM 2005d). As use increases or becomes a management issue in a particular area, the following minimum steps should be taken:

- locate the person, or group, that is responsible for the cache, and have them register the cache with the BLM;
- make sure the cache is safe and environmentally sound;
- prepare an environmental analysis document;
- issue a Letter of Agreement or a SRP with special stipulations designed to mitigate concerns;
- remove the cache from public lands if sites are not registered in a reasonable amount of time after notification (normally, the cache would be determined to be abandoned property after 10 days, unless the appropriate authorization has been obtained);
- monitor the use in order to assess public health and safety and environmental protection issues; and,
- take appropriate steps to properly manage the activity, if the activity or sport becomes too large and begins to conflict with other authorized use.

Geocaching activities could increase in the Decision Area, in conjunction with the popularity and more common use of GPS.

3.2.28 Socioeconomics

The nature of local economic and social activity is influenced and shaped by numerous factors, which include BLM-managed public lands and their associated resources. The presence of cities or communities; types of long-standing industries (such as agriculture and forestry); predominant land and water features; and unique area amenities affect local economic and social activity. In its role as land manager, the BLM operates as a steward of many of these area resources and opportunities, and plays a principal role in the region.

Current Conditions

The impact area for socioeconomics is comprised of Grand, Jackson, Summit, Larimer and Eagle Counties (Figure 3-7). This five-county area includes populations and connected economies outside of the field office RMP Planning Area, given important social and economic relationships with activity in the field office. Within this area, socioeconomic resources are the most likely to be directly affected by BLM land management decisions in Summit, Grand, and Jackson Counties. Therefore, the discussion of social and economic trends focuses primarily on Summit, Grand, and Jackson Counties (socioeconomic focus area), while the larger five-county impact area is included in the model of economic

contributions from BLM management, given indirect connections to these areas discussed below.

Approximately 449,400 acres of the RMP Planning Area are in Larimer County (approximately 27 percent of the total County acreage), of which 26, 900 acres are BLM-managed public lands covered under this RMP. As a result, Larimer County is not included in this discussion, although it is included in the modeling of economic contributions from BLM management. While the BLM land in Larimer County may not contribute much to the larger county economy (that includes a portion of Front Range communities including Fort Collins) uses on other BLM land in Grand and Jackson Counties necessitate inclusion of the entire county in theimpact area.

Population

Table 3-37 shows current and historic populations. In the three-county socioeconomic focus area(Jackson, Grand and Summit Counties), Summit County had the largest population in 2010. Of Jackson and Grand Counties (the two counties with the greatest acreage in the three-county socioeconomic focus area, and with the most BLM-managed public lands), Grand County had the larger population: 14,526 (Economic Profile System 2012) (U.S. Department of Commerce 2012).

Population growth can be attributed in part to natural increase (births minus deaths) and in part to net migration, which has the potential to affect the availability of housing, services, and jobs. Net migration accounted for 11.8 percent of total population increase in the Planning Area between 2000 and 2011. Net migration accounted for 49.2 percent of population increase in the State during that same period (Economic Profile System 2012) (U.S. Department of Commerce 2012).

Population growth in Summit County was the highest and the county was ranked as one of the fastest growing counties in the nation between 1990 and 2000 when it experienced 82.8 percent growth, three times as fast as the CO State average and eight times fasrer than the national average. This growth can likely be attributed to Summit County's close proximity and access from the large Front Range metropolitan communities (e.g. within a 1-hour drive of Denver), community expansion around popular ski areas, and the ready availability of high-end amenities for visitors and residents alike.

Figure 3-7: Kremmling Field Office Impact Area

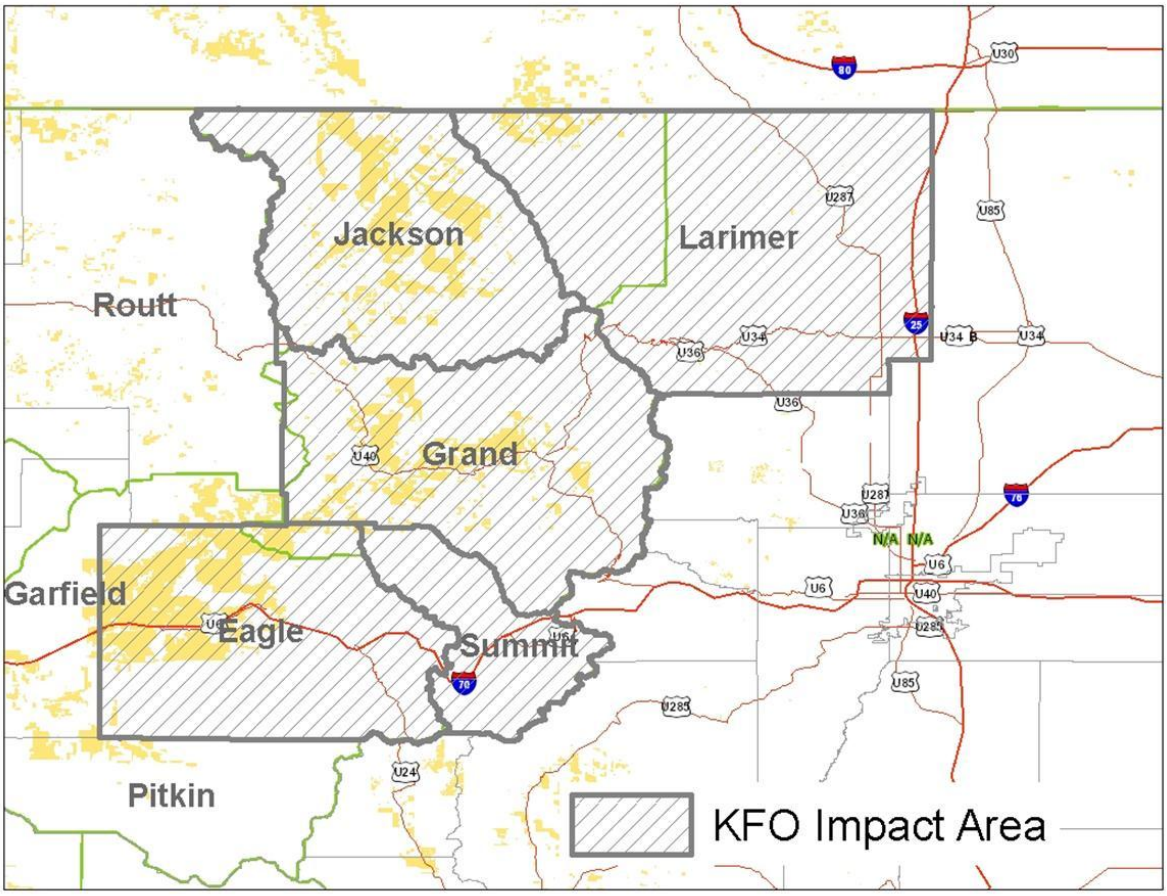


Table 3-37: Three-County Focus Area Population Totals (1980-2010)

Location	1980	1990	1980-1990 Percent Change	2000	1990-2000 Percent Change	2010	2000-2010 Percent Change	1980-2010 Percent Change
State	2,889,735	3,294,473	14.0	4,301,261	30.6	5,029,196	16.9	74.0
Focus Area	18,186	22,452	23.5	37,567	67.3	44,231	17.7	143.2
Grand County	7,475	7,966	6.6	12,442	56.2	14,843	19.3	98.6
Jackson County	1,863	1,605	-13.8	1,577	-1.7	1,394	11.6	25.2
Summit County	8,848	12,881	45.6	23,548	82.8	27,994	18.9	216.4

Source: Economic Profile System 2012 (U.S. Department of Commerce. 2012. Census Bureau, American Community Survey Office, Washington, D.C).

Age Distribution

As shown in Table 3-38, the population of the three-county socioeconomic focus area in 2010 was made up of a higher percentage of working age people (ages 18 to 64) than the State average. Grand and Jackson Counties had the highest percentage of children ages 0 to 17, at 20.6 and 22.2 percent, respectively, while Summit County had the lowest, at 18.0 percent. Summit County had the highest percentage of working-age people and the lowest percentage of people 65 and older. Jackson County had the highest percentage of the ages 65 and older group, higher than the state average (Economic Profile System 2012 (U.S. Department of Commerce 2012)).

Table 3-38: Three-County Socioeconomic Focus Area Regional Age Distribution (2010)

Location	Percent Ages 0 to 17	Percent Ages 18 to 64	Percent Ages 65 and Older
State	24.6	64.9	10.5
Planning Area	19.0	72.4	8.6
Grand County	20.6	69.7	9.7
Jackson County	22.2	57.0	20.8
Summit County	18.0	74.6	7.4

Source: Economic Profile System 2012 (U.S. Department of Commerce. 2012. Census Bureau, American Community Survey Office, Washington, D.C).

Housing

In the past, rapid population growth resulting from the increased development necessary to support resort communities and energy development has increased pressure on the local housing market. The availability of affordable housing for workers near their places of work has become an issue in many of the towns and counties in the three-county Planning Area.

Public input from the socioeconomic workshop held by the BLM in Kremmling on September 22, 2007, revealed that a shortage of affordable housing has made it difficult for workers to live near their employment, especially those that work in resort-related areas. U.S. Department of Housing and Urban Development defines affordable housing as a household that pays no more than 30 percent of its annual income on housing (U.S. Department of Housing and Urban Development, 2013). The U.S. Census measures housing affordability through the ratio of selected monthly housing costs to household income. This information is provided as "Selected Monthly Owner Costs as a Percentage of Household Income" for owner-occupied units and as "Gross Rent as a Percentage of Household Income" for renter-occupied unit (U.S. Census Bureau, 2013). Table 3-39 shows the percentage of owner-occupied housing units with a mortgage and occupied units with someone paying rent in which housing costs are thirty percent or more of household income in the three-county socioeconomic focus area for 2000 and 2007-2011. The data for year 2000 reflects Census 2000 data and 2007-2011 reflects data from the 2007- 2011 American Community Survey 5-Year Estimates which provides the average estimate for that time period. The data shows that the percentage of households that have excessive housing costs, meaning housing costs are thirty percent or more of household income, have risen for the three-county socioeconomic focus area as well as for the State of Colorado. Owner-occupied units with a mortgage saw greater increases from 2000 to 2007-2011) than occupied units paying rent for all three counties and for the State of Colorado, with Jackson County having the largest increase of 111.2 percent. In terms of occupied units paying rent Grand County saw the largest increase of 60.1 percent while Jackson County only had a 22.6 percent increase from 2000 to 2007-2011. Overall, the data shows housing affordability has decreased and there has been an increase in the number of households having monthly housing costs greater than 30 percent of household income from 2000 to 2007-2011.

Table 3-39: Three-County Socioeconomic Focus Area Housing Affordability-Selected Monthly Housing Costs are 30 Percent or More of Household Income (2000, 2007-2011)

Location	2000		2007-2011	
	Owner-occupied Units with Mortgage	Occupied Units Paying Rent	Owner-occupied Units with Mortgage	Occupied Units Paying Rent
Grand County	21.8 percent	28.3 percent	36.1 percent	45.3 percent
Jackson County	17.0 percent	28.3 percent	35.9 percent	34.7 percent
Summit County	27.8 percent	33.6 percent	45.3 percent	42.0 percent
Colorado	23.7 percent	38.7 percent	36.5 percent	51.3 percent

Source: Economic Profile System 2004 and U.S. Department of Commerce 2010

The latest data on housing availability for 2010 (Table 3-40) suggest the availability of homes was highest in Summit and Grand counties (vacancy rates of 60.6 and 59.7 percent, respectively) while lowest in Jackson County (vacancy rate of 49.5 percent). The high degree of second home ownership in the analysis area, however, suggests high vacancy rates may overstate housing availability since these homes are not available for rent, lease, or sale. Data from the U.S. Census Bureau for 2010 indicates vacant homes for seasonal, recreational, or occasional use made up high percentages of vacant housing units (86.2 percent in Grand County, 84.2 percent in Summit County, and 77.7 percent in Jackson County; U.S. Department of Commerce 2010). Removing these shares from housing unit vacancies provides a more accurate portrayal of probable housing availability in the analysis area.

Table 3-40: 2010 Housing Availability in the Three-County Socioeconomic Focus Area

Area	Housing Units	Occupied Housing Units	Vacant Housing Units	Vacancy Rate	Adjusted Vacant Housing Units	Adjusted Vacancy Rates
Grand County	16,061	6,469	9,592	59.7%	1,319	8.2%
Jackson County	1,286	649	637	49.5%	142	11.0%
Summit County	29,842	11,754	18,088	60.6%	2,866	9.6%

Source: U.S. Department of Commerce 2010

Contributions from BLM Management

Local economies realize direct and indirect benefits from expenditures and revenues generated by a variety of activities on BLM-managed public lands in the five-countyimpact area (Eagle, Grand, Jackson, Larimer, and Summit Counties). BLM-managed public lands contribute to the livelihoods of area residents through subsistence uses, as well as through market-based economic production and income generation. Public lands provide products of value to households at no, or low, cost (permit fees), such as those associated with fuelwood, wood posts, and livestock. Additional products with subsistence value may include fish, game, plants, berries, and seeds. Use of these products is often part of traditions that sustain local cultures. Contributions to the area economy through market-based production can be measured using the IMPLAN input-output model (IMPLAN 2010). (IMPLAN is a complete economic assessment package, including data, software, and an external hard drive, providing economic resolution from the National level down to the ZIP Code level. For additional information, visit: http://implan.com/V4/Index.php.)

Input-output models describe commodity flows from producers to intermediate and final consumers. The total industry purchases are equal to the value of the commodities produced. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services continues until leakages from the region stop the cycle. The resulting sets of multipliers describe the change of output for regional industries caused by a change in final demand in an industry. The IMPLAN database describes the economy in 440 sectors using Federal data from 2008. These sectors are further aggregated below to better identify areas relevant to BLM management activities. These include recreation; livestock grazing; forest products; mineral resources; externally funded ecosystem restoration; revenue sharing from fees collected from recreation and commercial activities on BLM-managed public lands; and the direct contribution to the local economy from BLM expenditures and employment for operations and management of each Field Office area.

Using the most recent data available, the BLM applied IMPLAN response coefficients to its outputs and expenditures in order to estimate its economic contribution in the five-county impact area. This analysis examines the links and interdependencies among businesses, consumers, and the BLM-managed resources on which some area economic activity depends. IMPLAN allows a more complete examination of these links for the five-countyimpact area.

IMPLAN examines the direct contributions from the KFO, as well as indirect and induced contributions. Indirect employment and labor income contributions occur when a sector purchases supplies and services from other industries to produce their product. Induced contributions are the employment and labor income generated as a result of spending new household income generated by direct and indirect employment. The employment estimated is defined as any part-time, seasonal, or full-time job. In Table 3-41 and Table 3-42, direct, indirect, and induced contributions are included in the estimated BLM contributions.

Table 3-41: Average Annual Employment Contributions by Resource Program within the Impact Area (Full and Part-time Jobs)*

Resource	KFO Employment Contributions
Recreation	280
Livestock Grazing	34
Forest Products	28
Mineral Resources	2
Externally Funded Ecosystem Restoration	0.01
Revenue Sharing (County Payments)	8
BLM Expenditures and Employment	53
Total BLM Management	404

*Potential employment and labor income contributions are based upon estimated resource outputs from KFO specialists.

Table 3-42: Average Annual Labor Income by Resource Program in the Impact Area (Thousands of 2012 Dollars)

Resource	Labor Income Contributions
Recreation	$8,373
Livestock Grazing	$636
Forest Products	$865
Mineral Resources	$81
Externally Funded Ecosystem Restoration	$0.18
Revenue Sharing (County Payments)	$375
BLM Expenditures and Employment	$2,649
Total BLM Management	$12,980

Revenue Sharing

The BLM collects revenues from recreation and commercial activities that take place on the nearly 8.4 million acres of public land that it administers in Colorado. These revenues are redirected in part to the County and State governments, and are collected from campground facilities; recreation permits (special, competitive, organized group activity, and event use permits); mining leases and mineral revenues; grazing fees; timber sales and Federal ROWs. By far the greatest revenues to Colorado County and State governments come from mineral activities, primarily from oil and gas royalties (BLM 2003a).

Transfers or returns are payments made to the State from collections and receipts from activities on BLM-managed public land. By far the greatest returns to the State came from mineral activities, primarily from oil and gas royalties (BLM 2003a),followed by Payments in Lieu of Taxes (PILT). (PILTs are Federal payments to local governments that help off-set losses in property taxes due to non-taxable Federal lands within their boundaries.)

Congress appropriates PILT annually, and the BLM disburses it to individual Counties. PILTs are determined according to a formula that includes population, the amount of Federal land in the County, and off-sets for certain Federal payments to Counties (such as timber, mineral leasing, and grazing receipts) (BLM 2003a). Table 3-43 shows the amount of PILTs that each County in the five-county impact area received, attributable to BLM-administered public lands in the Planning Area. Annually, as a result of revenue sharing from BLM activities, on average approximately eight jobs and $375,000 in labor income are contributed to the five-countyimpact area economy.

Table 3-43: Impact Area PILT, 2010 dollars

Location	PILT Amount
Eagle County	$43,426
Grand County	$153,613
Jackson County	$61,554
Larimer	$45,285
Summit County	$2,215
Impact Area	$306,093

Source: DOI 2010b

Recreation

KFO Field Office staff estimate that, on average, there are about 600,000 recreation visitor days annually to BLM-managed public lands in the Planning Area (RMIS 2012). On their way to the Planning Area, and once they arrive, these visitors spend money on goods and services they would spend elsewhere if these opportunities did not exist. In this manner, the opportunities on BLM-managed public lands contribute to the local economy by attracting these visitors. These recreation estimates do not include visits from all local users because their expenditures do not represent new money into the economy. If the recreation opportunity used by local recreationists was not available on BLM-managed public lands, local recreationists would likely find substitute opportunities in the area. As a result, their spending would remain in the five-county impact area. After separating the contributions made from local residents, recreation contributes the most employment and labor income to the area economy of all resource programs; supporting 280 jobs and $8.4 million in labor income on an average annual basis.

As a result of public scoping, the public noted particular interest in the economic contribution of BLM recreation in the North Park area on the local Jackson County economy. Field Office staff estimate there are 150,000 recreation visits (local and non-local) to BLM-managed public lands in the North Park area annually. Contributions from these visitors support 45 jobs and $245,000 in labor income on an average annual basis to the Jackson County economy. This constitutes 4 percent of all employment in the county and larger portions of individual sectors related to recreation (14 percent of the Retail Trade Information sector, 38 percent of the Arts, Entertainment, and Recreation sector and 18 percent of the Accommodation & Food Services sector).

Mineral Resources

The BLM manages 8.4 million surface acres and 27.9 million acres of subsurface Federal mineral estate in Colorado. Mining, not including the construction employment associated with mining, accounted for 0.7 percent of total State employment. About one-third of this was oil and gas industry employment. There are mining claims for gold and uranium, and coal and coalbed methane resources are present in the Decision Area, although these are not a substantial source of mineral activity. Coal mining is unlikely to become economically feasible over the planning period due to the lack of available transportation. The types of commercial mineral resource production occurring in the Decision Area include salable minerals (for which there is a small-to-moderate market for decorative stone and moss rock) and oil and gas (which are occurring mainly in Jackson County). As a result of the removal of this mineral material from BLM-managed public lands, on average approximately two jobs and $81,000 in labor income are supported annually in the five-county impact area economy .

Livestock Grazing

Public land continues to be important to local economies in Colorado, providing habitat and forage for domestic livestock, horses, and wildlife. Approximately 336,900 acres in the Decision Area are allocated for grazing. In all Counties in the Planning Area, livestock sales made up more than 80 percent of the total market value of agricultural production (NASS 2007a). In 2007 total cattle inventory was 106,568 head within the Planning Area. The amount of forage required to support this inventory would be 639,408 AUMs. Between 2000 and 2009, the average annual use of the BLM AUMs in the Planning Area was 16,000 of the 39,686 AUMs allocated under current BLM management. This use corresponds to roughly 2 percent of the total forage required to support the 2007 inventory of livestock in the Planning Area. Overall, BLM livestock grazing provides an average of approximately 34 jobs and $636,000 in labor income annually to the five-county impact area economy.

BLM Expenditures and Employment

The Kremmling Field Office is in the Town of Kremmling, providing a direct contribution to the area economy. BLM operations and management make direct contributions to area economic activity by employing people who reside in the area, and by spending dollars on project-related goods and services. BLM-managed public lands in the Planning Area are managed by a professional and administrative staff in the Field Office. In addition to these permanent, full-time (PFT) employees, seasonal staff work and live in the area. Contracts for facilities maintenance and projects contribute directly to the area economy and social stability, as well. On an average annual basis, KFO expenditures and employment support 53 jobs and $2.6 million in labor income.

Externally Funded Ecosystem Restoration

A portion of the management actions performed on BLM-managed public lands is carried out with funds not provided by the BLM, but these expenditures are not accounted for under the category of BLM expenditures discussed above. A recent example of such projects is the implementation of range improvement projects funded with a portion of fees from grazing payments. These treatments are labor intensive and use agricultural industries and associated businesses in the five-county s impact area’s economy. As a result of these treatments, less than one job and $200 in labor income would be supported annually in the five-county impact area’s economy.

Non-Market Economic Value

The value of resource goods traded in a market can be obtained from information on the quantity sold and market price, but markets do not exist for some resources, such as recreational opportunities and environmental services. Measuring their value is important, because without estimates these resources may be implicitly undervalued, and decisions regarding their use may not accurately reflect their true value to society. These recreation and environmental values are not traded in markets, so they can be characterized as non-market values.

Non-market values can be broken down into two categories: use and non-use values. The use-value of a non-market good is the value to society from the direct use of the asset. In the Planning Area, this occurs through activities such as recreational fishing, hunting, and bird watching. The use of non-market goods often requires consumption of associated market goods, such as for lodging, gas, and fishing equipment.

Non-use values of a non-market good reflect the value of an asset beyond any use, which can be described as existence, option, and bequest values. Existence values are the amount society is willing to pay to guarantee that an asset simply exists. An existence value of BLM-managed public lands in the Planning Area might be the knowledge that undisturbed wildlife habitat exists on those BLM-managed public lands. Other non-use values are thought to originate in society's willingness to pay to preserve the option for future use. These are referred to as option values and bequest values. Option values exist for something that has not yet been discovered, such as the future value of a plant as medicine. In the Decision Area, bequest and option values might exist for numerous plant species.

Non-market use and non-use values can be distinguished by the methods used to estimate them. Use values are often estimated using revealed preference methods or stated preference methods, while non-use values can be estimated only by using hypothetical methods. Use and non-use values exist for the Planning Area, although evaluation is not always feasible during the planning process. This does not, however, preclude their consideration in the planning process.

Employment

Employment in the impact area is distributed among industry sectors, and is displayed below in Table 3-44 (IMPLAN 2010). Contributions from management in the KFO discussed above make up only a portion of employment and labor income within industry sectors displayed in Table 3-44. The largest industry is the government sector, which comprised 13 percent of total employment. The Interior Columbia Basin Ecosystem Management Project identified communities that were specialized with respect to employment. Their method used the ratio of the percent employment in each industry in the region of interest (the five-county impact area) to an average percent of employment in that industry for a larger area (Colorado). For a given industry, when the percent employment in the analysis region is greater than in the reference region, local employment specialization exists in that industry. Using this criterion applied to 2010 data, the five-county impact area can be characterized as most specialized with respect to the accommodation and food services sector, followed by the arts, entertainment, and recreation sector, and the real estate and rental sector.

Income

Total Personal Income (TPI) and Per Capita Personal Income (PCPI) are useful measures of economic well-being. In 2010, TPI in the five-county impact area was $16.4 billion. The PCPI was $42,396 in the five-county impact area, and $43,631in the State of Colorado in 2010 (Economic Profile System 2012). The PCPI is a useful measure of economic well-being, but it should be examined alongside changes in real earnings per job. The PCPI includes income from 401(k) plans and other non-labor income sources, such as transfer payments, dividends, and rent. It is possible, therefore, for the PCPI to be relatively high, while the average wage per job is low, relative to the State. In 2010, average earnings per job were $42,044 in the five-county impact area and $53,124 in the State (Economic Profile System 2012).

Further examining personal income provides insight into the area economy and its connection to BLM-managed public lands. The three major sources of personal income in the Planning Area in 2010 are: 1) labor earnings or income from the workplace; 2) investment income, or income received by individuals in the form of rent, dividends, or interest earnings; and 3) transfer payment income or income received as Social Security, retirement and disability, or Medicare and Medicaid payments.

Labor earnings were the largest source of income in the Planning Area, accounting for 65.8 percent of all income in 2010. In Colorado, labor earnings made up 68.6 percent of total personal income. The government and health care sectors were the largest components of labor income in 2010 for the five-county economic impact area. The contributions from the BLM represent only a portion of the economic activity, reflected in the natural resource and other sectors in Table 3-44.

Table 3-44: Current Employment and Labor Income by Industry Sector within the Planning Area

Sector	Employment (Full and Part-Time Jobs)	Labor Income (Thousands of 2010 Dollars)
Agriculture	3,390	$64,885
Mining	597	$55,997
Utilities	466	$48,390
Construction	27,649	$1,395,774
Manufacturing	12,718	$1,110,182
Wholesale trade	4,170	$273,193
Transportation and warehousing	29,498	$850,917
Retail trade	3,594	$166,820
Information	3,475	$232,351
Finance and insurance	6,074	$353,542
Real estate and rental and leasing	13,381	$565,824
Professional, scientific, and technical services	17,196	$1,246,755
Management of companies	699	$60,268
Administration, waste management, and removal services	13,597	$481,131
Educational services	2,838	$57,411
Health care and social Assistance	20,963	$1,044,674
Arts, entertainment, and recreation	9,497	$299,470
Accommodation and food services	29,512	$750,368
Other services	14,164	$372,429
Government	34,391	$1,968,217
Total	247,867	$11,398,597

Government Revenues and Expenditures

Table 3-44.1 shows the sources of revenues and expenditures for the three-county focus area for 2000 and 2003. Taxes were the dominant source of revenue in 2003, most of which were property taxes.

Table 3-44.1: Focus Area Government Revenue and Expenditures

	2000	2000 Percent of Total	2003	2003 Percent of Total	Percent Change 2000-2003
Taxes	$29,421,921	53.1	$35,198,071	52.5	19.6
Property tax	$16,517,154	29.8	$20,661,818	30.8	25.1
Sales and use tax	$10,738,638	19.4	$12,381,692	18.5	15.3
Other taxes	$2,166,129	3.9	$2,154,561	3.2	-0.5
Licenses	$2,798,283	5.0	$2,267,096	3.4	-19.0
Intergovernmental revenues	$10,933,949	19.7	$13,467,741	20.1	23.2
Charges for services	$10,399,776	18.8	$13,996,677	20.9	34.6
Other revenues	$1,886,680	3.4	$2,050,600	3.1	8.7
Total revenues	$55,440,609		$66,980,185		20.8

Source: Colorado Division of Local Government 2005

Social Values

Recreational opportunities and scenic beauty were the most commonly cited reasons that people live in, or visit, the communities in the RMP Planning Area. The quality of life and small-town character were also cited as reasons that residents live in the area. Popular recreational activities include skiing, fishing, hiking, and hunting, as well as OHV use and mountain biking. These activities contribute greatly to the quality of life, and to the lifestyle, in the RMP Planning Area.

Rapid population growth; decreased housing availability and affordability; an influx of second-home owners; and increases in recreation, tourism, and construction have affected the quality of life and lifestyles, as well as attitudes toward change, throughout much of the Planning Area. In fast-growing areas, long-time residents and newer residents often have different values and beliefs. Problems with housing, day care, and local health care are often attributed to new residents, who are perceived as putting strains on local infrastructure and community facilities (BLM 2007k; Eagle County Economic Council 2006; Rural Planning Institute 2001).

Changing housing ownership, and an overall increase in housing demand, are pricing local workers out of the market. These conditions have affected Grand County. The high cost of living has resulted in an out-migration of the population to less expensive areas, which has increased the housing pressure in other areas. Often, it is the long-time residents who are driven out by the increased cost of living (Eagle County Economic Council 2006; Rural Planning Institute 2001).

Common social themes expressed throughout most of the RMP Planning Area include concern for the preservation of rural characteristics and values. Increased workforce commuting and residential development into more rural areas have raised social issues, as well. It is thought that those who commute to jobs outside of their communities have less of a social connection with the places where they live, and that they participate less in local affairs. In addition, residential development has increased the value of land to the extent that ranching is no longer cost effective, and the number and size of ranches is decreasing, especially in Grand County. Land consumption has raised social concerns about preserving Open Space and traditional western values and culture. Cattle ranching has a large role in this culture, and in providing open areas (BLM 2007k; Grand County 2000).

Social characteristics in Jackson County differ from those of many of the other counties in the Planning Area. Jackson County, due to geographic isolation, a small population, and a small tax base, is one of the few counties in Colorado that has experienced a recent reduction in population. Its population is entirely rural, with most economic activity coming from agriculture, forestry, fishing, hunting, and mining. The North-Central Colorado Community Assessment Report (BLM 2007g) identified the reasons people live in Jackson County, the most important issues to Jackson County residents, and their desired benefits from public land management. Jackson County residents expressed that they wish to preserve the rural character and lifestyle, but still want to pursue some development. They enjoy a rugged lifestyle and use the land for their prosperity. They respect the land and its resources, as it provides the base for their lifestyle. Jackson County residents have a flexibility and survivability inherent in their lifestyle, necessitated by the lack of diversity in economic opportunities (BLM 2007g). Recreation opportunities are available in Jackson County, but they are not tourist-oriented, as they are in the other counties in the Planning Area.

This discussion, with information from public scoping comments and the North-Central Colorado Community Assessment Report, provides a comprehensive assessment of the concerns of communities in the Planning Area. These sources were examined, and general categories were formed from common themes pertaining to community connections and interests in BLM management. The three communities of interest are individuals and groups interested in recreation and access; preservation of rural characteristics and values; and oil and gas development. Effects on these communities are discussed in Chapter 4.

Characterization

Indicators

Changes in the following indicators show the relative impact on socioeconomic resources resulting from management actions proposed by the different alternatives:

- population trends;
- local housing market;
- total income or earnings;
- employment rates; and
- access to BLM-managed public lands and resources.

Changes that could alter these indicators represent adverse socioeconomic impacts, as follows:

- population growth would not follow the upward or downward trend currently projected;
- the local housing market could not accommodate the population growth or rebound from a loss in population;
- total income or earnings for the region would be adversely impacted;
- total employment for the region would be adversely impacted; and
- access to BLM-managed public lands and resources would be restricted to the extent that a perceivable change in the social well-being of a particular user group would be affected.

Trends

Population

The population in the three-county socioeconomic focus area, and in the State, has grown since 1980. Over the past 30 years, the population of the three-county socioeconomic focus area has increased by 137 percent; and the population of the State has increased by 69.1 percent. Summit County experienced the greatest growth during this time. Jackson County was the only county in the three-county socioeconomic focus area to experience a decline in population. The decade between 1990 and 2000 showed the highest growth: 67.3 percent for the three-county socioeconomic focus area and 30.6 percent for the State (Economic Profile System 2012).

Much of the growth in the socioeconomic focus area's three counties can be attributed to the success of the ski area and resort industries. The construction of I-70 has also been a factor in the increase in population in the socioeconomic focus area, especially in Grand and Summit Counties.

Housing costs, an increase in the number of second homes, and growth in resort and oil and gas employment have spurred population growth away from many of the incorporated areas to unincorporated rural areas (BBC Research and Consulting 2004; Grand County 2000).

Jackson County has the lowest population density of the counties three-county socioeconomic focus area, with less than one person per square mile. An agriculture-based economy, the absence of ski area and resort facilities, undeveloped energy resources, and low employment and income in the County are likely to have contributed to an out-migration of the working age population, and to the decrease in the population in general.

Between 1980 and 2005, the influence of net migration over population change in the three-county socioeconomic focus area has fluctuated. Between 1991 and 2001, net migration was the dominant source of population change in the three-county socioeconomic focus area, and had a greater influence over population change than in the State overall. Net migration had a much more dominant influence on Jackson and Grand Counties between 1980 and 2005 than it did in Jackson, Grand, and Summit Counties combined. From 2002 through 2004, natural increase dominated population change in the three-county socioeconomic focus area. By 2005, slightly more than one-half of the population change in the three-county socioeconomic focus area was attributable to net migration (Colorado State Demography Office 2007b).

Between 2010 and 2030, the population of the counties in the three-county socioeconomic focus area is forecast to increase by 32,253 (72.9 percent), while the population of the State is expected to grow by 1,963,379 (38.9 percent). Summit County is projected to have the greatest absolute increase (21,186) and the greatest percentage increase (75.4 percent). Jackson County is forecast to have both the smallest absolute population increase (319) and the smallest rate of growth, at 22.9 percent [(Colorado State Demography Office 2012) (https://dola.colorado.gov/demog_webapps/cpc_parameters.jsf;jsessionid=a246c661002b38dec16dbdbb94d9)].

Age Distribution

Since 1990, the overall aging of the population has affected, and is anticipated to continue to affect, the three-county socioeconomic focus area and the State. As shown in Table 3-45, between 1990 and 2010 the population of children ages 0 to 17 declined in the three-county socioeconomic focus area, while the working age population (ages 18 to 64) also decreased slightly. The percentage of people ages 65 and older increased steadily in the three-county socioeconomic focus area, but was lower than the State average. The percentage of the population made up of children is not projected to change by much, hovering around 20 percent from 2005 to 2030.The working age population is also forecast to decline steadily over the next decade. The three-county socioeconomic focus area average population of those 65 and older is projected to continue to increase after 2005, and exceed the State average by 2020 [(Colorado State Demography Office 2012) (https://dola.colorado.gov/demog_webapps/pag_category.jsf)].

Table 3-45: State and Three-County Socieconomic Focus Area Age Distribution

Year	Ages 0 to 17		Ages 18 to 64		Ages 65 and older	
	Focus Area Percent	Colorado Percent	Focus Area Percent	Colorado Percent	Focus Area Percent	Colorado Percent
1990	22.6	26.2	72.7	63.8	4.7	10.0
1995	20.8	25.9	74.3	64.3	4.9	9.8
2000	18.9	25.6	76.0	64.8	5.1	9.7
2005	18.2	24.9	75.3	65.1	6.5	10.0
2010	18.4	24.3	72.5	64.7	9.1	11.0
2015	20.6	23.9	66.9	63.1	12.4	13.0
2020	22.3	23.7	62.7	61.4	15.0	14.9
2025	23.0	23.6	60.0	59.8	17.0	16.6
2030	23.0	23.7	59.1	58.6	17.9	17.7

Source: Colorado State Demography Office 2012 (https://dola.colorado.gov/demog_webapps/pag_category.jsf)

Housing

Figure 3-8 shows that housing in the three-county socioeconomic focus area, in general, was affordable for the median household in 2000 in the State overall, and in Jackson County; but was not affordable in Grand and Summit Counties (Economic Profile System 2004). More recent data for 2010 suggests that homes in the State and Jackson County may be less affordable, while affordability has improved in Grand and Summit Counties (U.S. Department of Commerce 2010).

Between 1990 and 2005, the number of housing units in the three-county socioeconomic focus areaincreased by more than the State average, with the largest percentage increase in Summit County (78.5 percent). The number of housing units in Jackson County declined between 1990 and 2005, with a decrease of 13.7 percent between 1990 and 2000, and a subsequent increase of 6.4 percent between 2000 and 2005 (Colorado State Demography Office 2007d). The latest data on housing availability for 2010 (Table 3-37) suggest the availability of homes was highest in Summit and Grand counties (vacancy rates of 60.6 and 59.7 percent, respectively) while lowest in Jackson County (vacancy rate of 49.5 percent). The high degree of second home ownership in the three-county socioeconomic focus area area suggests high vacancy rates may overstate housing availability since these homes are not available for rent, lease, or sale. Data from the U.S. Census Bureau for 2010 indicates vacant homes for seasonal, recreational, or occasional use made up high percentages of vacant housing units (86.2 percent in Grand County, 84.2 percent in Summit County, and 77.7 percent in Jackson County (U.S. Department of Commerce 2010). Removing these shares from housing unit vacancies provides a more accurate portrayal of probable housing availability in the analysis area.

Trends in Industry Sectors related to BLM Management

Tourism growth tends to follow a pattern similar to that of population growth in tourist destination areas. Under this assumption, tourists visiting the area would generate 367 jobs and $10,962 in labor income on an average annual basis within the five-county impact area over the planning period of analysis, under current management conditions (IMPLAN 2010).

With the signing of the Energy Policy Act of 2005, which offers incentives to develop renewable energy, it is likely that the BLM will see an increase in the development of renewable energy. Due to the limited potential for wind and solar energy in the RMP Planning Area, and with the availability of biomass resources, due to the large number of trees killed by beetles, interest in biomass already has increased. More applications for the use of biomass for energy are expected (see Section 3.2.19 Renewable Energy).

The Kremmling Town Board approved an application for a pellet plant, in June of 2007. Opening in April of 2008, the plant cost roughly $7 million to construct. The plant was estimated to employ about 26 workers (Looby 2008), in jobs starting at $34,500 annually, which is approximately 20 percent more than the median income for Grand County (Lipsher 2007). The plant also provides 50 logging and trucking jobs to process 180,000 tons to 225,000 tons of biomass annually (Looby 2008). This facility can produce enough pellets to heat approximately 30,000 to 40,000 homes (Mathis 2007). The use of biomass pellets reduces energy costs to residents, since bagged pellets cost about $4 less per British thermal unit (Btu) than natural gas, and $11 less per Btu than propane. Bulk pellets are even less expensive, at $9 less than natural gas per Btu, and $12 less than propane per Btu (Stoner 2007). Ample biomass exists to support other such endeavors.

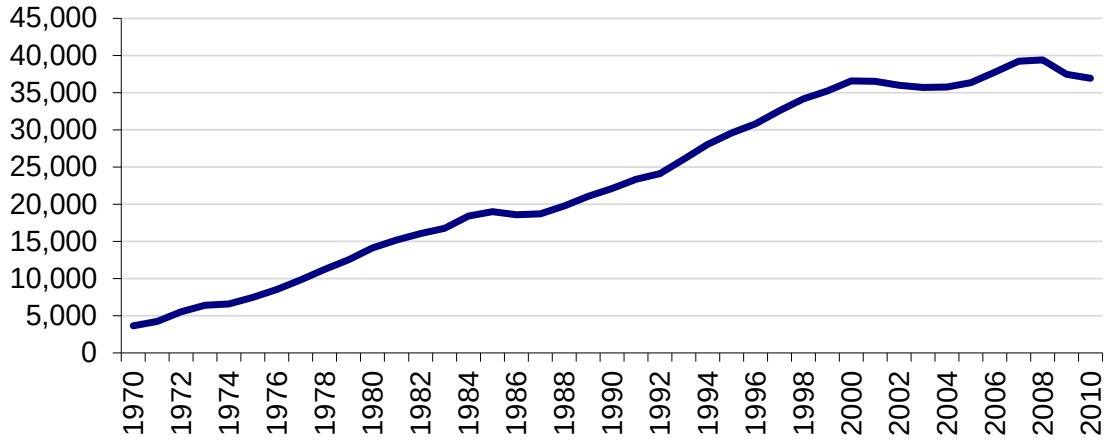
In addition, the Rocky Mountain Pellet Company, which has begun operations in Walden, is capable of producing 150,000 tons of pellets annually (Rocky Mountain Pellet Company, Inc. 2009). At a rating of 7,951 Btus per pound (Rocky Mountain Pellet Company, Inc. 2009), the plant would produce approximately 2,385,300 million Btus.

While currently not running at capacity, the pellet plants together could generate $69 million in sales, assuming that 172,367,286 Btus would be used per home; that 30,000 homes would use the pellets produced by the Confluence Energy pellet plant in Kremmling; that the Rocky Mountain Pellet Company Plant in Walden sells all 150,000 tons of pellets (2,385,300 million Btus); and that only bulk pellets would be purchased, costing $9.09 per million Btus. These sales would generate a total of $16,690,925 in earnings and 634 jobs statewide, adjusted to include the impact on local government (EIA 2004; Colorado Division of Local Government 2005).

Employment

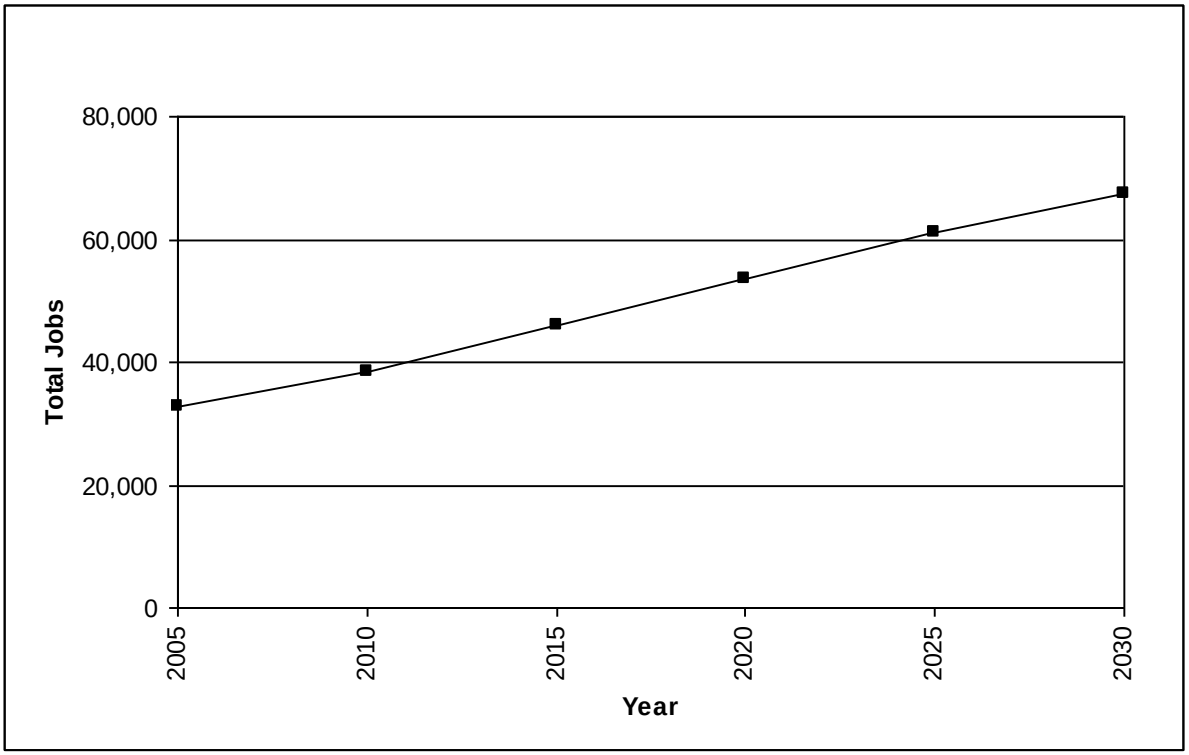
Between 1990 and 2010, the total number of jobs in the three-county Planning Area grew by 67 percent, while the labor force (persons aged 18 to 64) grew by 96.4 percent (Economic Profile System 2012). Figure 3-8 shows employment growth between 1970 and 2010 for the three-county socioeconomic focus area. Total employment increased by 920 percent in the three-county socioeconomic focus area, between 1970 and 2010. Figure 3-9 shows projected total jobs in the three-county socioeconomic focus area between 2005 and 2030. Figure 3-10 shows projected jobs by sector in the three-county socioeconomic focus area between 2005 – 2030.

Figure 3-8: Three-County Socioeconomic Focus Area Employment 1970-2010



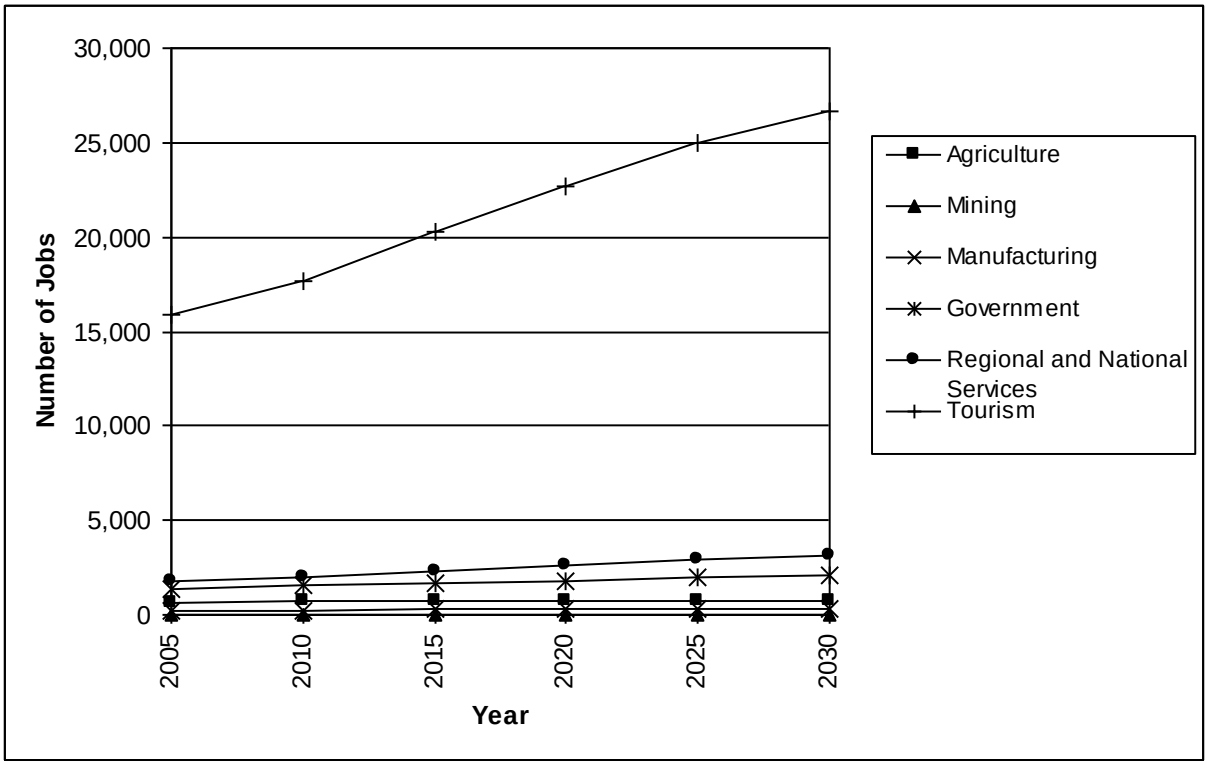
Source: Economic Profile System 2012

Figure 3-9: Three-County Socioeconomic Focus Area Projected Total Jobs (2005 – 2030)



Source: CSDO 2007h

Figure 3-10: Three-County Socioeconomic Focus Area Projected Jobs by Sector (2005—2030)



Source: CSDO 2007h

The dominant source of employment in 1970 was the services-related sector, at 51 percent. This continued through subsequent decades. By 2000, the proportion in the services-related sector had increased to 75 percent and the non-services related and government sectors had decreased by one-half. The non-services related sector had decreased from 31 percent in 1970 to 15 percent in 2000, and the government sector had decreased from 18 percent in 1970 to 9 percent in 2000 (Table 3-46: Percent Employment by Industry (1970-2000)). Trends in service-related employment have continued between 2000 and 2010 (U.S. Department of Commerce, 2011).

Table 3-46: Percent Employment by Industry (1970-2000)

Industry	Year			
	1970	1980	1990	2000
Non-Services Related	31	19	12	15
Services-Related	51	71	78	75
Government	18	11	10	9

Source: Economic Profile System 2012

Income

Between 1970 and 2010, annual TPI in the five-county impact area increased by $14.374 billion to $16.413; and annual PCPI increased from $18,944 to $41,356 (all measures adjusted for inflation to 2011 dollars). This translates to a TPI increase of 704 percent (roughly 5.3 percent increase annually over 40 years) and a PCPI increase of 118 percent (roughly 1.9 percent increase annually) over this period (Economic Profile System 2012).

The PCPI is a useful measure of economic well-being, but it should be examined with changes in real earnings per job. The PCPI includes income from 401(k) plans and other non-labor income sources, such as transfer payments, dividends, and rent. It is possible, therefore, for per capita income to rise, even if the average wage per job declines over time. The PCPI rose between 1970 and 2010, and average earnings per job also increased in the five-county impact area from $34,282 to $42,044 (values adjusted for inflation to 2011 dollars). This represents an overall 22.6 percent increase over the 40 years (0.5 percent increase annually), indicating a possible decrease in area economic well-being (U.S. Department of Commerce 2008).

In 1970, non-labor income in the five-county impact area represented 27.7 percent of total personal income. B 2010, non-labor income had increased to 34.2 percent of TPI (Economic Profile System 2012). As the population of the area continues to age, the share of income from these non-labor sources should continue to rise, as long as residents continue to stay in the area after retirement, or new retirees move in. Rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (Knapp and Graves 1989; Clark and Hunter 1992; Treyz et al. 1993; Mueser and Graves 1995; McGranahan 1999; Lewis et al. 2002). The BLM manages many of the natural amenities in the area; they indirectly contribute to area labor and non-labor income.

Government Revenues and Expenditures

As shown in Table 3-44.1, property taxes increased slightly as a percentage of total revenue between 2000 and 2003. Sales and use taxes, which are a measure of expenditures within the local economy (often by tourists), decreased slightly as a percentage of total revenue. The actual value of these taxes, however, increased from $10,738,638 to $12,381,692. Over this period, total revenue increased by 20.8 percent. Spending on recreation, public works, and health increased by the highest percentages between 2000 and 2003. During this time, spending on capital outlays and social services decreased as a portion of total spending. Total expenditures increased by 15.8 percent (Colorado Division of Local Government 2007).

3.2.29 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and an accompanying Presidential Memorandum require all Federal agencies to make the consideration of environmental justice part of their mission. Federal agencies must address the potential for their actions to have disproportionate impacts on minority populations or low-income populations, or both**.** Population growth can stimulate economic growth and provide economic diversification. Development in support of the growing population, however, is encroaching on previously undeveloped areas near public

lands. Growth also increases demands on public lands for timber, minerals, livestock grazing, and other commodities, and for recreation and roads.

This Section displays economic, racial, and demographic information generated in order to identify areas of low-income and high minority populations in and around the five county impact area (see Figure 3-7). The distribution of persons in poverty is used as an identifier for low-income populations. The presence, distribution, and percentage of environmental justice populations are identified in this Section. The potential for disproportionate impacts on these populations resulting from proposed management actions is assessed in Chapter 4. Disproportionate impacts would include those that would especially harm the physical health, livelihood, or social structure of these minority or low-income populations. The following are examples of activities that could impact low-income or high minority populations, or both:

- management actions that reduce the availability of jobs, or that induce a reduction in the types of jobs in sectors that typically employ low-income populations, such as services and retail;
- management actions that could increase health and safety risks near areas where minority or low-income populations are concentrated (e.g., increased traffic due to increases in minerals activities or activities in new locations, depending upon the location and population characteristics of the affected area);
- management actions that would limit access such that they that would be particularly restrictive to low-income or high minority populations, or both, so that these populations would be especially limited in their ability to participate in activities on BLM-managed public lands in the Planning Area; and
- management actions that could restrict access of Native American tribal groups to ancestral lands and cultural practices.

Current Conditions

As shown in Table 3-47, the population of the five-county impact area was predominantly White and non-Hispanic, and was more homogeneous than that of the State. The Black/African American group and those of some other race alone were the largest minority in the State, while the largest minorities in the five-county impact area were those of some other race alone, and those of two or more races. The percentage of the State population composed of Hispanic or Latino persons was greater than that of the five-county impact area. Only Eagle and Summit Counties had a higher percentage of Hispanic origin than did the State. Jackson County had the lowest percentage of Hispanic origin of the counties in the five-county impact area (CSDO 2007i).

Table 3-47: State and Impact Area Race and Ethnic Origin (2010)

Race/Origin	Eagle County Percent	Grand County Percent	Jackson County Percent	Larimer County Percent	Summit County Percent	Impact Area Percent	Colorado Percent
Race							
White	91.1	96.2	97.6	91.1	93.4	91.5	83.5
Black/African American	0.2	0.3	0.0	0.8	0.4	0.6	3.9
American Indian and Alaska Native	0.2	0.1	0.8	0.6	0.0	0.5	1.0
Asian	1.1	0.8	0.0	1.8	1.1	1.7	2.7
Native Hawaiian and Other Pacific Islander	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Some other race alone	5.6	1.3	1.0	2.8	3.3	3.1	5.7
Two or More Races	1.7	1.2	0.6	2.8	1.7	2.5	3.1
Origin							
Non-Hispanic	71.0	93.1	93.5	89.8	87.0	87.3	79.9
Hispanic or Latino	29.0	6.9	6.5	10.2	13.0	12.7	20.1

Source: EPS 2012

The U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition in order to determine which families are living in poverty. If a family's total income is less than its threshold, then that family, and every individual within it, is considered to be living in poverty. Poverty thresholds do not vary geographically. They are updated annually for inflation using the Consumer Price Index. For individuals who do not live with family members, their own income is compared with the appropriate threshold (U.S. Census Bureau 2007).

Table 3-48 shows estimated median household income and poverty levels for the counties in the five-county impact area. Summit County had the lowest poverty level in 2010, and Jackson County had the highest. The poverty rate in Jackson County exceeded the State average. Eagle County's median household income was the highest in the five-county impact area, and exceeded the State average, while Jackson County's was the lowest. (EPS 2012).

Table 3-48: Impact Area Poverty and Median Household Income

Location	Percent in Poverty				Median Household Income 2010
	1989	2000	2004	2010	
Eagle		7.7		5.8	$71,337
Grand County	6.8	7.3	7.2	5.1	$60,433
Jackson County	18.4	14.5	12.0	13.5	$37,222
Larimer		9.2		6.9	$56,447
Summit County	5.3	6.1	5.9	3.1	$68,750
Three-County Focus Area	10.2	9.3	8.4	4.3	Not available
Colorado	11.7	8.9	10.2	8.6	$56,456

Source: U.S. Census Bureau 1998, 2003, and 2006, and EPS 2012

The Kremmling Field Office consults with a number of tribes on traditional cultural uses. There are no BLM administered public lands within the 5-county impact area that border on tribal lands or lands associated with Federal treaties where subsistence uses might continue to be important issue. To date no tribe or group has identified any traditional or subsistence use.

Characterization

Indicators

Changes in the ethnic composition and poverty levels in Grand, Jackson, and Summit Counties since 1989 are identified as the basis for assessing trends for low-income or high minority populations, or both.

Trends

Between 1990 and 2005, the percentage of minority population in the region decreased from 2.83 percent to 2.73 percent of the total population. Over this period, the minority population in the three-county socioeconomic focus area (Jackson, Grand and Summit Counties) decreased by 69.6 percent. Jackson County experienced the greatest decrease in the percentage of minorities in the three-county socioeconomic focus area, from 7.79 percent in 1990 to 1.17 percent in 2005 (the lowest level in the three-county Planning Area). The proportion of minorities in Grand and Summit Counties increased between 1990 and 2005, but all remained at least 5 percentage points below the State average. Summit County had the greatest percentage increase in minority populations, with a 137.79 percent increase, and minorities increased from 2.38 percent to 2.93 percent of the total County population. The Hispanic population in the three-county socioeconomic focus area increased by 169.13 percent, from 6.9 percent to 12.5 percent of the population. Summit County experienced the

greatest increase, and had the highest percentage of Hispanic people in the three-county socioeconomic focus area. See Table 3-47: State and Impact Area Race and Ethnic Origin (2010).

As shown in Table 3-48: Impact Area Poverty and Median Household Income, the poverty rate in the three-county socioeconomic focus area and the State declined, with the poverty rate in the three-county socioeconomic focus area lower than that in the State. Since 1989, poverty in Grand and Summit Counties increased. Between 2000 and 2004, however, the poverty rate declined in Grand and Summit Counties. Between 1989 and 2004, the percentage in poverty was below the State average for all of the three-county socioeconomic focus area counties, except in Jackson County. Poverty has declined in Jackson County, but it has consistently been the highest in the three-county socioeconomic focus area, and well above the State average (U.S. Census Bureau 1998, 2003, and 2006).