
3.0 CHAPTER 3 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing condition and trend of issue-related elements (resource areas) of the biological, physical, and socioeconomic characteristics found within the Planning Area, including human uses, that could be affected by the implementation of the proposed 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 proposed in this DRMP/DEIS.

This chapter includes a discussion of resources, resource uses, special designations, and social and economic conditions. Within these subsections, a description of current conditions and characterization is provided. This characterization 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 in general (such as wild horses and burros) do not exist within the Planning Area; therefore, they are not covered in this Section.

Information from broad-scale assessments was used in order 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 alternatives (discussed in Chapter 2.)

3.2 Resources

This Section describes the biological and physical resources found within the Planning Area, as follows:

- 3.2.1 -- Air and Atmospheric Value (Air Quality, Climate and Meteorology, Climate Change);
- 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;
- 3.2.11 -- Lands with Wilderness Characteristics outside Existing WSAs;
- 3.2.12 -- Cave and Karst Resources;
- 3.2.13 -- Forestry Resources;
- 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 and Scenic Byways;
- 3.2.25 -- Transportation System;
- 3.2.26 -- Public Health and Safety;
- 3.2.27 -- Socioeconomics; and
- 3.2.28 -- Environmental Justice

NOTE: Acreage figures and other numbers used within the following resource sections are approximate projections; readers should not infer that they reflect exact measurements or precise calculations. 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 within the Planning Area. Some activities analyzed in this DRMP/DEIS in relation to the proposed alternatives could affect these values both within the Planning Area, as well as 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 (see Section 3.2.1 for additional information). Accordingly, activities on, and uses of, BLM-managed public lands within the Planning Area must comply with State and Federal air quality laws, rules, regulations, policies, standards, and guidelines.

Air pollution control programs are based on a combination of Federal and State legislation. The Clean Air Act of 1970 (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 2 size fractions: inhalable particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}).

As of August 2011, the EPA is proposing to strengthen the NAAQS for ground-level ozone (O₃), which is the main component of smog. The EPA is proposing to establish the 8-hour "primary" ozone standard to a level within the range of 0.060-0.070 parts per million (ppm). The EPA is also proposing to establish a secondary ozone standard to a level within the range of 7-15 ppm-hours. The proposed secondary ozone standard would be a cumulative, seasonal standard expressed as an annual index of the sum of weighted ozone hourly concentrations, cumulated over 12 hours per day (from 8 a.m. to 8 p.m.) during the consecutive 3-month period within the ozone season with the maximum index value.

The EPA established a new 1-hour nitrogen dioxide (NO₂) NAAQS at the level of 100 parts per billion (ppb) (188 µg/m³). In addition to establishing an averaging time and level, the EPA is also setting a new “form” for the standard. (A form is the air quality statistic used to determine if an area meets the standard.) The form for the 1-hour nitrogen dioxide standard is the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations. The annual standard for nitrogen dioxide remains unchanged.

Additionally, Hazardous Air Pollutants (HAPs), which are suspected to cause cancer or other serious health effects, are regulated under the Clean Air Act (CAA); however, 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. This includes stationary sources with uncontrolled actual emissions of 200 pounds per year, 2 tons per year, 5 tons per year, or 10 tons per year, depending upon the pollutant. However, most mobile sources (such as vehicles) and stationary sources that emit less than these threshold quantities do not require issuance of a CDPHE Air Quality Permit. The CAA, as well as 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)].

The BLM is responsible for developing RMPs that provide for compliance with applicable pollution control laws, including State and Federal air, water, noise, and/or other pollution standards or Implementation Plans. The BLM is also required 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. RMPs may also establish management goals and objectives for Federal lands and resources that require managing activities in order to attain, or maintain, a higher standard of air quality than required by the CAA.

Air resource management is accomplished by establishing Desired Outcomes (Goals and Objectives) and Allowable Uses (Management Actions) in RMPs 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 in order 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 objectives for this RMP are summarized in Chapter 2, Table 2-2.)

Activities on BLM-managed public lands that produce PM₁₀, PM_{2.5}, 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. Combustion processes in wildfires, prescribed burns, and other vegetation burns produce reactive organic compounds, nitrogen oxides, carbon monoxide, PM₁₀, PM_{2.5}, and GHG emissions. Similarly, fuel combustion in vehicle engines produces reactive organic compounds, nitrogen oxides, carbon monoxide, PM₁₀, PM_{2.5}, and GHG emissions. Vehicle travel on unpaved roads, or in off-road areas, generates fugitive dust that contains PM₁₀ and PM_{2.5}. Energy development, mining operations, and mineral extraction activities use vehicles and equipment that produce reactive organic compounds, nitrogen oxides, carbon monoxide, PM₁₀, PM_{2.5}, 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 activity 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 PM_{2.5}.

Air pollutant emissions caused by BLM management activities include work-related vehicle travel by BLM personnel, prescribed burning programs, and 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 grazing leases 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 within 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; however, based upon emission levels and other factors, they are considered likely to be meeting air quality standards.) Currently, Steamboat Springs operates under a Maintenance Plan for PM₁₀ (which means the area was once in Non-attainment, but has since demonstrated that it meets the PM₁₀ standard). The area will be covered under the Maintenance Plan until 2015. In most regions of the Rocky Mountain west, ozone and particulate matter are the most common air quality problems.

The Monitoring Stations most relevant to the Planning Area are in Steamboat Springs (outside of the Planning Area) and in Breckenridge (inside of the Planning Area). A Monitoring Station previously operating in Silverthorne is now closed. All of the current and former Monitoring Stations measure PM₁₀ concentrations. The Monitoring Station in Steamboat Springs also measured PM_{2.5} concentrations between 2000 and 2005. Table 3.2.1-1, Concentrations of Criteria Air Pollutants—Planning Area, is a summary of ambient PM₁₀ and PM_{2.5} concentrations from monitoring stations near the Planning Area.

Table 3-1 Concentrations of Criteria Air Pollutants—Planning Area									
Location	Averaging Time	Current Standard	Pollutant Concentration						
			2000	2001	2002	2003	2004	2005	2006
Inhalable Particulate Matter (PM₁₀)									
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; maximum 24-hour values do not always indicate a violation of Federal standards. Some of the high PM₁₀ 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 within 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. $PM_{2.5}$ 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 3-1, Concentrations of Criteria Air Pollutants–Planning Area, PM_{10} is monitored at 2 locations within, 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; however, 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 $PM_{2.5}$ within 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

Ozone (O_3) is a gas composed of 3 oxygen atoms. Ozone has the same chemical structure whether it occurs miles above the Earth or at ground-level and can be "good" or "bad," depending upon its location in the atmosphere. "Good" ozone occurs naturally in the stratosphere, approximately 10 miles to 30 miles above the Earth's surface, and forms a layer that protects life on Earth from the sun's harmful rays

In the Earth's lower atmosphere, 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. Hot weather and sunlight cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant. Ozone is a regional air quality issue because winds carry ozone, and the pollutants that form it, 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 within, or near, the Planning Area. The USFS, however, operates a portable ozone Monitoring Station at Ripple Creek Pass (located

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). (The CASTNET is a national air quality monitoring network designed to provide data to assess trends in air quality, atmospheric deposition, and ecological effects due to changes in air pollutant emissions. Visit: <http://java.epa.gov/castnet/> for more information.) Data from these ozone monitors has not been subjected to quality assurance/quality control (QA/QC) evaluation; therefore, such data 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 Governor's 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; however, the modeling conducted for this report, as well as 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 NO_x and VOCs. Elevated ozone concentrations have not been measured in the Planning Area; however, given the regional nature of ozone and predicted future concentrations, ozone and its precursor gases are pollutants of concern for the Planning Area.

Hazardous Air Pollutants

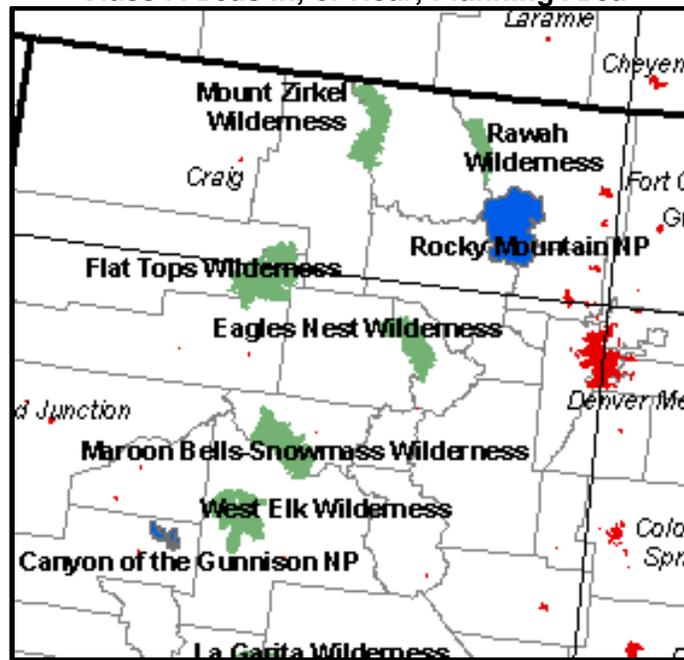
There is no data available concerning (HAP concentrations within the Planning Area. There is 1 Monitoring Station at Buffalo Pass (located at the south end of the Mount Zirkel Wilderness) that measures wet deposition of mercury. That Monitoring Station began operation in 1999; however, it did not collect 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

Under sections 169 and 401 of the CAA, there are several programs in place that are designed to protect visibility across the United States. These programs include the National Visibility Program, Prevention of Significant Deterioration for the review of potential impacts from new and modified sources, the secondary National Ambient Air Quality Standards for PM₁₀ and PM_{2.5}, and provisions for acid deposition control. In 1987, the Interagency Monitoring of Protected Visual Environments (IMPROVE) visibility network was established as a cooperative effort between the EPA, the National Oceanic and Atmospheric Administration (NOAA), the National Park Service (NPS), the USFS, the USFWS, the BLM, and State governments in order to establish current conditions, track progress towards national visibility goals, and to provide information on types and sources of pollutants. (For more information on the IMPROVE Program, visit: <http://vista.cira.colostate.edu/improve/>)

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 3-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, the Planning Area.) All of the areas outside of the Class I Areas are designated as Class II Areas. There are no Class III Area designations within the Planning Area.

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



The CAA requires the protection of visibility conditions within 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 2 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 6 IMPROVE monitoring locations in Colorado, 3 of which are in, or near, the Planning Area. The National Park Service (NPS) operates 1 Monitoring Station on the east side of Rocky Mountain National Park. The USFS operates Monitoring Stations at Buffalo Pass (located at the south end of the Mount Zirkel Wilderness) and at the Aspen Mountain Ski Area (located east of the Maroon Bells-Snowmass Wilderness).

Visibility in Class I Areas

Table 3-2, 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 3-2 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 3-3, 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 3-3 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

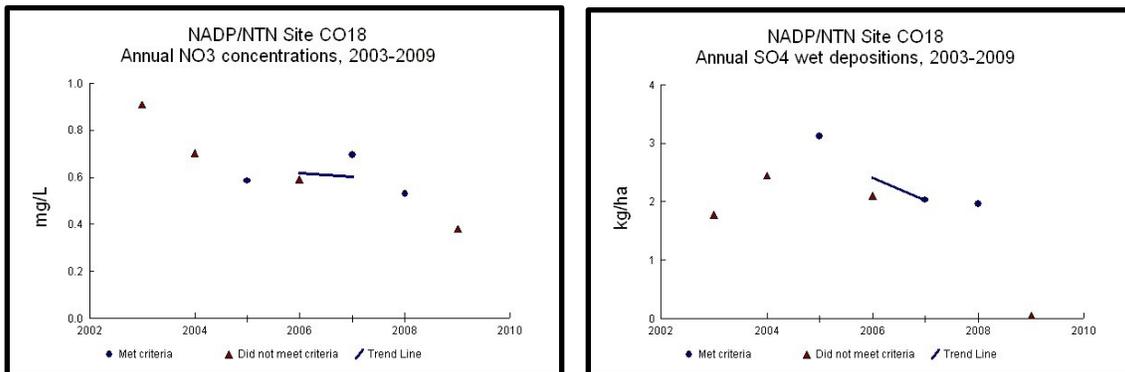
Table 3-3 Summary of Visual Range Data for the Buffalo Pass (Mount Zirkel Wilderness) IMPROVE Site				
Year	Standard Visual Range in miles			
	Annual Average	Worst 20 Percent of Days	Mid 20 Percent of Days	Best 20 Percent of Days
1996	113.79	75.77	109.61	157.36
1997	123.54	90.27	118.32	167.94
1998	111.03	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), a cooperative effort between many different groups (including local, State, Native American Tribal, and Federal agencies; educational institutions, private companies, and non-governmental agencies), measures atmospheric deposition and studies its impacts on the environment. (Visit: <http://nadp.sws.uiuc.edu/NADP/> for more information for more information.) NADP data are not available as convenient summaries by Monitoring Station; however, where specific impact analyses require reference to historical deposition rate data, it is included in Chapter 4. Trend charts obtained from the NADP, and shown in Figure 3-2, which show that nitrate (NO₃) and sulfate (SO₄) deposition rates at the Ripple Creek Pass Monitoring Station site as either stable or improving.

**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 3-1, 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 monitored values of "exceptional events" are often captured by particulate Monitoring Stations; however, values associated with those events are not included when determining compliance with regulatory standards because they are considered to be events not caused or influenced by humans. Exceptional events are defined under 40 CFR Parts 50 and 51.)

The visibility data in Table 3-2, Summary of Visual Range Data for the Rocky Mountain National Park IMPROVE Site, and Table 3-3, 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 (Colorado Air Pollution Control Division 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 NO_x and VOCs, while unlikely to create localized air quality problems within 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; therefore, 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. Appropriate application of climatic information is important when conducting land use planning, and when applying site-specific management actions.

Current Conditions

The southern portion of the Planning Area lies within the Colorado River headwaters drainages. The northern part of the Planning Area lies within the Platte River headwaters drainage. Areas of high topography primarily occur along the eastern and western sides of the Planning Area. Typically, January is the coldest month, and July the warmest month. The average daily temperature range for January in lower elevation portions of the Planning Area is approximately 0° F to 32° F. The average daily temperature range in July is approximately 37° F to 81° F. High elevations can experience temperatures below freezing in any month.

The annual average total precipitation at lower elevations is approximately 11 inches to 16 inches, with 50 inches to 90 inches of annual snowfall. Communities in the southern portion of the Planning Area (such as Dillon, Winter Park, and Breckenridge) receive from 16 inches to 25 inches of total annual precipitation, including 120 inches to 230 inches of annual snowfall. (Table 3-4 Summary of Climate Data for Locations within the Planning Area, summarizes readily available temperature, precipitation, and wind speed 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 3-4
 Summary of Climate Data for Locations within the Planning Area**

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Berthoud Pass	Average Daily Temperature, ° F	1950-1985	11.3	13.1	17.4	24.9	34.1	43.1	50.5	49.0	42.0	31.7	20.1	13.2	29.2

**Table 3-4
 Summary of Climate Data for Locations within the Planning Area**

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
	Maximum Daily Temperature, ° F	1950-1985	21.2	24.2	28.7	36.2	45.0	54.2	61.9	59.9	53.0	42.4	30.4	23.2	40.0
	Minimum Daily Temperature, ° F	1950-1985	1.4	2.0	6.2	13.6	23.1	32.0	39.1	38.0	31.0	20.9	9.8	3.2	18.4
	Days Below 32° F	1950-1985	31	28	31	30	29	16	1	3	16	30	30	31	276
	Days Above 90° F	1950-1985	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Precipitation, inches	1950-1985	3.59	2.90	4.11	4.43	3.85	2.23	2.45	2.63	2.05	2.36	3.36	3.63	37.49
	Days With Measurable Precipitation	1950-1985	19	16	20	17	16	11	14	14	10	10	15	18	180
	Snowfall, inches	1950-1985	49.7	42.4	57.9	54.6	37.1	11.8	0	0.3	8.7	27.9	49.0	51.3	390.7
Breckenridge	Total Precipitation, inches	1948-2007	1.40	1.37	1.67	1.75	1.66	1.49	2.39	2.26	1.54	1.19	1.40	1.37	19.49
	Days With Measurable Precipitation	1948-2007	11	10	12	11	10	9	13	14	9	7	10	10	126
	Snowfall, inches	1948-2007	22.0	21.0	24.8	22.6	10.0	1.6	0	0	3.6	11.2	23.4	22.8	163.0
Dillon	Average Daily Temperature, ° F	1909-2007	15.1	17.6	23.3	32.6	42.1	50.1	55.6	54.2	47.4	37.7	25.4	17.0	34.8
	Maximum Daily Temperature, ° F	1909-2007	31.3	34.0	39.0	47.8	58.6	68.8	74.2	72.4	66.2	55.2	40.9	32.8	51.8
	Minimum Daily Temperature, ° F	1909-2007	-1.1	1.3	7.6	17.4	25.6	31.4	37.1	35.9	28.7	20.2	9.8	1.2	17.9
	Days Below 32° F	1909-2007	31	28	31	30	28	18	5	9	22	30	30	31	291
	Days Above 90° F	1909-2007	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Precipitation, inches	1909-2007	1.08	1.16	1.43	1.61	1.43	1.14	1.88	1.79	1.36	1.07	1.01	1.09	16.05
	Days With Measurable Precipitation	1909-2007	9	8	10	9	8	7	11	11	8	6	8	8	105
Snowfall, inches	1909-2007	18.8	18.8	21.4	17.0	6.7	0.8	0	0	2.0	6.7	16.1	18.1	126.4	

**Table 3-4
 Summary of Climate Data for Locations within the Planning Area**

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Hot Sulphur Springs	Average Daily Temperature, ° F	1953-1981	14.7	17.8	25.9	36.2	46.4	54.5	60.8	58.7	51.4	41.5	27.6	16.3	37.7
	Maximum 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
	Minimum 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
	Days Below 32° F	1953-1981	30	28	30	28	23	8	1	5	16	28	29	30	257
	Days Above 90° F	1953-1981	0	0	0	0	0	0	0	0	0	0	0	0	1
	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
	Days With Measurable Precipitation	1953-1981	6	5	7	7	7	6	7	8	6	5	4	6	75
	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	Average Daily Temperature, ° F	1948-2007	13.7	17.2	28.9	38.8	47.9	56.3	62.3	60.3	52.0	41.2	27.2	15.3	83.9
	Maximum 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
	Minimum 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
	Days Below 32° F	1948-2007	30	28	30	27	18	6	1	2	15	27	29	30	240
	Days Above 90° F	1948-2007	0	0	0	0	0	0	2	0	0	0	0	0	2
	Total 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
	Days With Measurable Precipitation	1948-2007	7	6	6	6	9	7	9	10	9	6	6	6	86
	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
Walden	Average Daily Temperature, ° F	1948-2007	16.4	19.1	26.2	35.5	44.7	53.6	59.1	56.7	49.0	39.0	26.3	18.3	37.0

**Table 3-4
 Summary of Climate Data for Locations within the Planning Area**

Area	Parameter	Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
	Maximum Daily Temperature, ° 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
	Minimum Daily Temperature, ° 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
	Days Below 32° F	1948-2007	31	28	31	28	23	7	2	6	19	28	29	31	262
	Days Above 90° F	1948-2007	0	0	0	0	0	0	0	0	0	0	0	0	1
	Total 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
	Days With Measurable Precipitation	1948-2007	6	6	7	7	9	7	9	9	7	6	6	6	86
	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
Winter Park	Total Precipitation, inches	1948-2007	2.34	2.05	2.65	3.03	2.60	1.85	2.10	2.18	1.86	1.72	2.24	2.32	26.94
	Days With Measurable Precipitation	1948-2007	14	12	14	12	11	9	11	12	9	7	11	13	135
	Snowfall, inches	1948-2007	36.1	31.0	36.1	31.5	10.7	1.3	0	0	2.6	11.7	30.8	34.9	226.7

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 has a significant potential to influence public lands and their associated resources, as well as the management of those lands and resources. 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 concentrations” (IPCC 2007). The IPCC defines climate change as a “change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and persists for an extended period, typically for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.” The Report states that the warming of the climate system is *unequivocal*, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (IPCC 2007). The general consensus is that as atmospheric concentrations of greenhouse gases

(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; however, recent industrialization and the burning of fossil carbon sources, have caused carbon dioxide equivalent (CO₂e) 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. Management Planning made 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 DOI 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 378,884 acres (extending west to Steamboat Springs, north to the Wyoming border, and east to the Continental Divide). The KFO manages approximately 5 percent of the BLM-managed public lands in Colorado, which encompasses 8.3 million acres, and approximately 1 percent, of the size of Colorado.

There are uncertainties associated with the science of climate change; however, 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 DRMP/DEIS will have no meaningful direct impacts on area weather conditions; however, such decisions can have indirect impacts resulting from activities that release GHG air pollutants, or from activities that terrestrially sequester carbon that 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

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 (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), 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; however, 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 carbon dioxide, methane, and nitrous oxide are also affected by emissions from industrial processes, transportation technology, urban development, agricultural practices, and other human activity. In addition to these GHGs, 3 industrially generated GHGs also contribute to climate change: sulfur hexafluoride (SF₆), 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 wildland fires, and activities using combustion engines (such as generators and vehicles). Quantification of GHG emissions for this DRMP/DEIS includes only carbon dioxide, methane, and nitrous oxide.

A GHGs ability to contribute to global warming is based upon 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 (CO₂e). The CO₂e for each GHG is calculated by multiplying the quantity of emissions by the GWP for that GHG. Total CO₂e emissions for all GHGs are then determined by adding the CO₂e emissions of each GHG. GWPs used for GHG emission calculations and reporting are CO₂ = 1, CH₄ = 21, and N₂O = 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 carbon dioxide have risen from a pre-industrial background of 280 parts per million by volume (ppmv) to 386 ppmv in 2009;

atmospheric concentrations of methane have risen from a pre-industrial background of approximately 0.70 ppmv to 1.79 ppmv in 2009; and

atmospheric concentrations of nitrous oxide 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 winter is expected to be greater than during the summer, 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; however, these changes are more uncertain and difficult to predict.

Eleven (11) 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

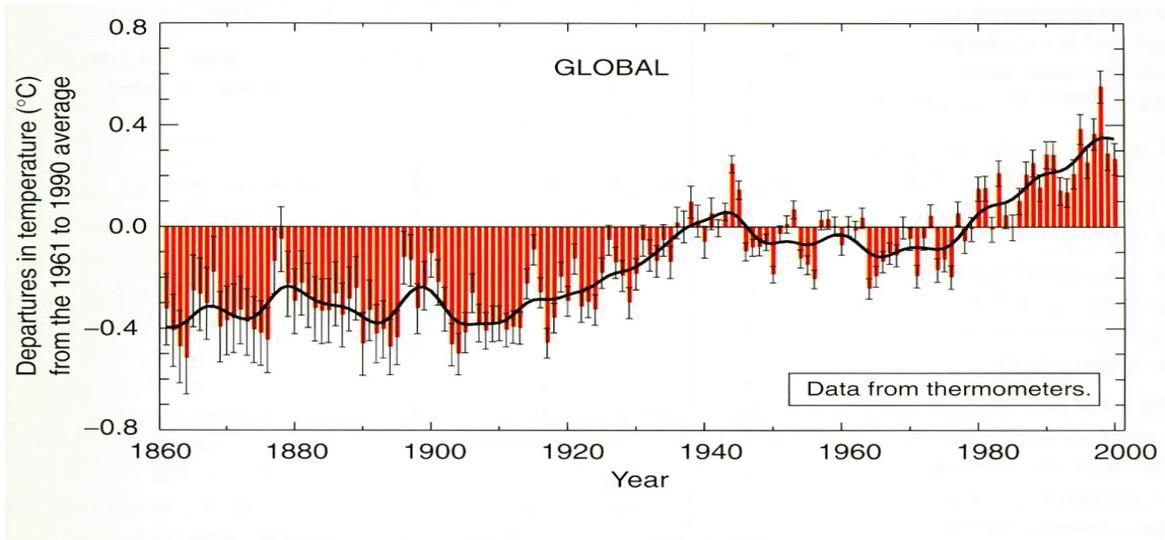
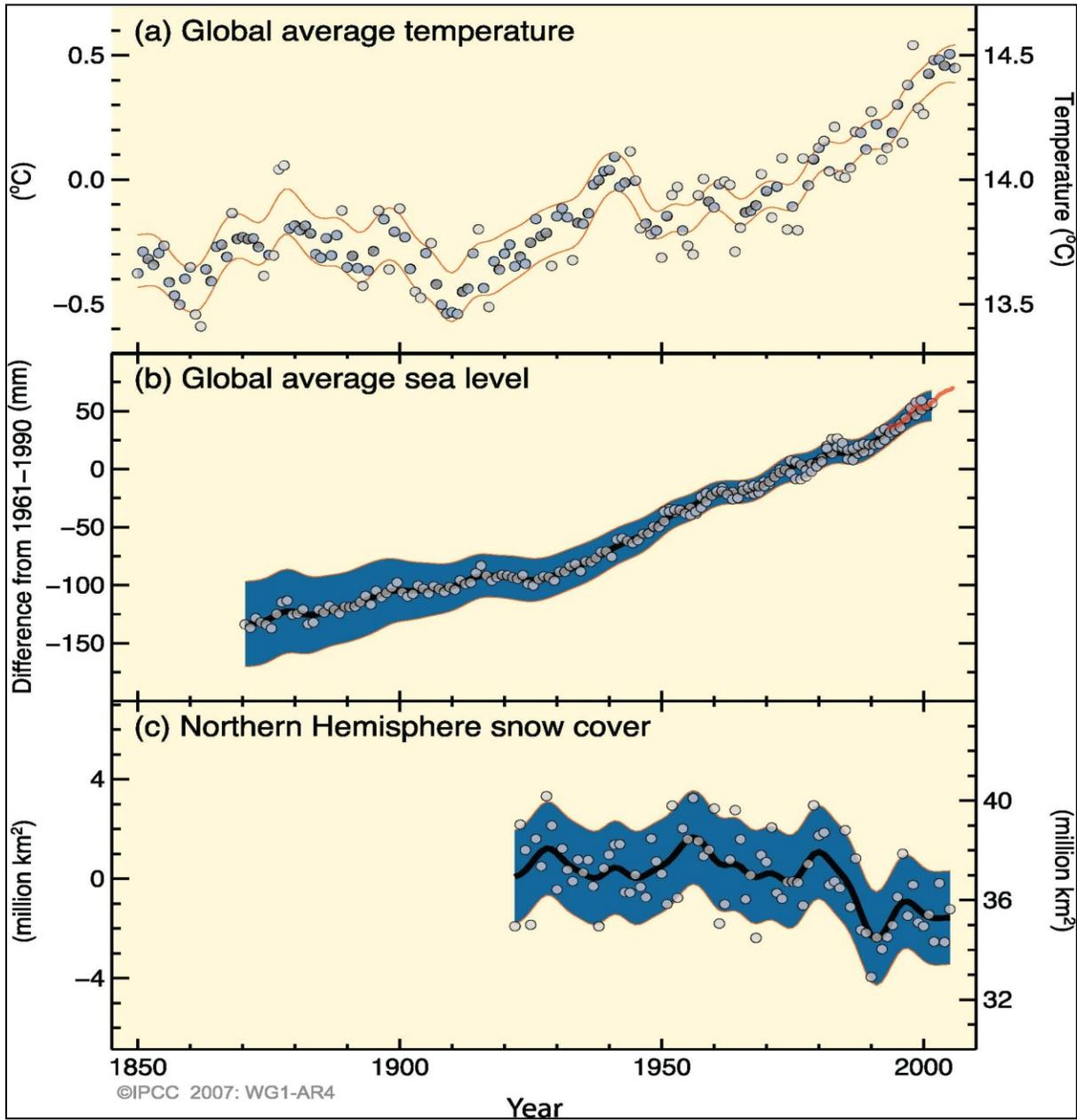


Figure 3-4 demonstrates changes in global surface temperatures over an even longer period of time: 1,000 years.

Figure 3-4
Global Surface Temperatures over the Past 1,000 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 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; therefore, many of the projected changes associated with climate change described below may not be measurable within the reasonably foreseeable future. However, research on climate change science is ongoing, 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 Climate Change Impacts on a Southwest Regional Scale

The southwest region encompasses 6 western states, from the Rocky Mountains to the Pacific Ocean. Recent warming 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.

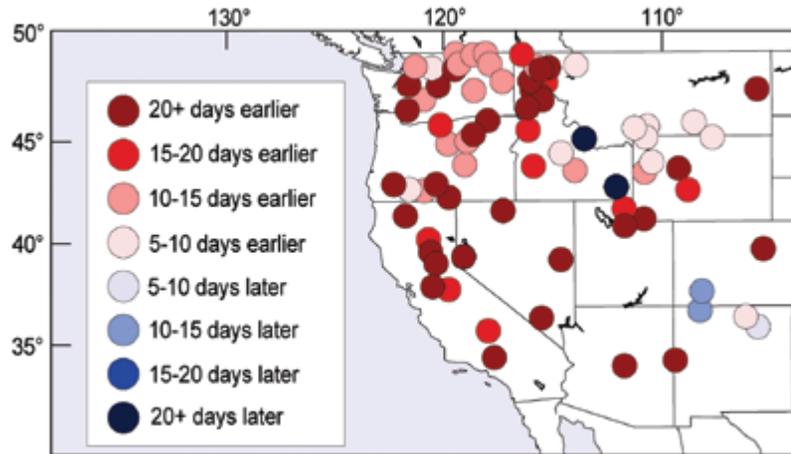
Summarily, water supplies are projected to become increasingly scarce, which may lead to conflicts among cities and agricultural users. Changes in stream morphology and aquatic habitat may occur, due to changes in the magnitude, timing, and frequency of streamflows. Prolonged drought and dry periods 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.) How climate change will affect wildfire activity is not well understood; however, 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; therefore, researchers are using "downscaling" and other techniques in order 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; therefore, 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); therefore, 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):

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 winter than in summer, more at night than during the day, and more in the mountains than at lower elevations.

The annual number of days above 90°F and the frequency of extreme heat events will increase.

Annual average precipitation increased between 5 percent and 15 percent between 1958 and 2008. Based upon modeling using a high emissions scenario, predicted precipitation changes indicate increased precipitation in the winter (up to +15 percent) and substantial decreases in the spring (from -5 percent to -20 percent) and summer (-5 percent to -15 percent). Fall precipitation is predicted to be within -5 percent to +5 percent.

End-of-summer drought has increased during the last 50 years, and drought is expected to be more prevalent in the future.

Due to the high variability in precipitation across the State, current climate models have not been able to identify consistent long-term trends in annual precipitation. However, projections do indicate a seasonal shift in precipitation, with a significant increase in the proportion of precipitation falling as rain rather than snow. A precipitous decline in snowpack at lower elevations [below 8,200 feet (2,499 m)] is expected by 2050.

Annual run-off will decrease by 10 percent to 20 percent for the period 2041 to 2060, compared to period 1901 to 1970.

Snowfall is predicted to decline in, and near, the Planning Area.

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; however, seasonal shifts in precipitation are likely. A widespread and large increase in the proportion of precipitation falling as rain rather than as snow, and a reduction in snow water equivalent (SWE) have been observed elsewhere in the West. Peak streamflow from melting snow is occurring earlier. In 2002, peak streamflow occurred up to 5 days earlier

than during 1948. From 2080 to 2099, peak streamflow is predicted to occur 15 days to 35 days earlier than during the 1951 to 1980 period.

Very heavy precipitation occurred up to 10 percent more often between 1958 and 2007.

Winter projections show fewer extreme cold months, more extreme warm months, and more strings of consecutive warm winters. Typical projected winter monthly temperatures, although significantly warmer than current, are between the 10th and 90th percentiles of the historical record. In all seasons, the climate of the mountains is projected to migrate upward in elevation, and the climate of the Desert Southwest to progress up into the valleys of the Western Slope.

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.

Recent hydrology projections suggest declining runoff for most of Colorado's river basins in the 21st century; however, 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).

Earlier snowmelt means that peak stream flows occur earlier in the year, weeks before the peak needs of ranchers, farmers, recreationists, and others. In late summer, rivers, lakes, and reservoirs have lower flows and less capacity, which result in the following impacts:

- less water availability for irrigating crops and watering animals;
- reduced crop and livestock productivity if additional irrigation is not available;
- increased water temperatures that adversely affect cold-water fish and reduce recreational fishing; and
- reduced mid- and late-summer stream flows that shorten tourism and recreation opportunities (such as whitewater rafting and boating).
- More frequent, more severe, 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.

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 waves stress some individuals, especially older adults.

There is high confidence that impacts to hydrological systems are occurring; such as, increased run-off, earlier spring peak discharge in many glacier- and snow-fed rivers, and warming of lakes and rivers in many regions, with impacts on thermal dynamics and water quality (IPCC 2007). Secretary of Interior Ken Salazar released a report (on April 25th, 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 Bureau of Reclamation (BOR), is the first coordinated assessment of risks to future water supplies across 8 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 increase of 5°F to 7°F;
- precipitation increase over the northwestern and north-central portions of the western United States, and a decrease over the southwestern and south-central areas;

- decrease for almost all of the April 1st snowpack (a standard benchmark measurement used to project river basin run-off); and
- An 8 percent 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).

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 adaptiveness of the community and component species 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, which, in turn, affects atmospheric concentrations of carbon dioxide (CO₂), and, thereby, affects 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 within 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 3 pools:

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- 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); however, there is no inventory information on which to base more refined expansion factors for trees within 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 within 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); however, 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 within the Planning Area.

Under average historic (pre-1850s) conditions, the Planning Area is thought to have stored somewhat more carbon on rangelands, but less carbon 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

Soil refers to the loose material composed of weathered rock, as well as other minerals and partly decayed organic matter that covers large parts of land surfaces. Soil provides habitats for a great variety of organisms, functions as an essential component of terrestrial ecosystems, and is the essential medium for plant growth (Wild 1993). Healthy soil is fundamental to high functioning ecosystems. Soils contain a diverse, thriving community of organisms, and function in a manner to protect down-gradient ecosystems by functioning as a physical and biological filter of chemicals in the environment (BLM 2009h).

The concept of soil quality encompasses a soil's capacity to function and to sustain plant and animal productivity, air and water quality, and human health (Soil Quality Institute 2001). It is a function of each soil's inherited properties (texture, type of minerals, depth), as well as more dynamic properties that can change with management (porosity, infiltration, effective ground cover, and aggregate stability). The ability of a soil to filter, buffer, degrade, immobilize, and detoxify herbicides is a function of the soil quality.

The soil resources present within 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 within the Planning Area, especially in erodible soil areas, have the potential to be affected by surface-disturbing activities analyzed under the alternatives in the DRMP/DEIS. For example, proposed management decisions regarding the type, location, amount and/or use level 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 within 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. Generally, soils within the Planning Area do not receive moisture during the growing season; therefore, the ability of the soil to store moisture from winter precipitation is critical to site productivity. Fine textured soils (greater percentages of silt and clay) store more moisture than coarse textured soils (BLM 1984b).

The most productive soils within 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 include: Mollisols, and Alfisols, to a lesser extent (NRCS 2006).

Detailed soil surveys prepared by the NRCS are available for the Planning Area. Each soil survey applicable to the Planning Area 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 and/or sensitivity to land uses. Many of the impacts to soils were from past uses and practices. General objectives were included in order 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 Junction Butte Area and Barger Gulch; 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, 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 within the KFO, 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. Biological crusts are well adapted to severe growing conditions; however, they are extremely susceptible to physical disturbances, domestic livestock grazing, and recreational activities (such as hiking, biking, and off-road driving). Fire can also damage the crust. Low-intensity fires, however, do not remove all of the crust structure, which allows for regrowth without significant soil loss. Shrub presence (particularly sagebrush) may increase fire intensity, thereby decreasing the likelihood of early vegetative or crust recovery after a burn (BLM 2009h). Within the Planning Area, there are many areas 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; however, they are easily disturbed by grazing and human activities.

In general, BLM-managed public lands include many areas of low productivity (12.9 percent), 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. In this DRMP/DEIS, erodible soils are defined as those where small changes in vegetative cover or level of disturbance can result in large changes in erosion rates.

Soil Compaction

Soil compaction occurs when moist or wet soil aggregates are pressed together and the pore space between them is reduced. Compaction changes soil structure, reduces the size and continuity of pores, and increases soil density. Wheel traffic, large animals, vehicles, and people can result in soil compaction. Generally, soils made up of particles of about the same size compact less than soil with a variety of particle sizes. Numerous rock fragments can create bridges that reduce compaction. Plant litter and roots, and soil organic matter, structure, moisture, and texture all affect a soil's ability to resist compaction. In areas where compaction exists, compacted soil extends generally less than 6 inches below the soil surface, although it can be as deep as 2 feet under heavily used tracks and roads (NRCS 1996). Compaction becomes a problem when the increased soil density limits water infiltration, increases run-off and erosion, or limits plant growth or nutrient cycling (Soil Quality Institute 2001).

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 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. 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."

Indicators of adequate soil health include appropriate canopy and ground cover, accumulation of vegetative litter, and the presence of appropriate organic matter in the soil to support a diversity of plant species with a variety of root depths. Other indicators of soil conditions include upland swales having greater or denser vegetation cover than adjacent uplands, minimal expression of rills, soil pedestals, or actively eroding gullies. In this DRMP/DEIS erodible soils are defined as those where small changes in vegetative cover or level of disturbance can result in large changes in erosion rates.

The KFO regularly evaluates the grazing allotments within the Planning Area. 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 within 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 within 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 within the Planning 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 within 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; however, 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. During the rangeland health assessments, areas of accelerated erosion, resulting from unmaintained roads and an abundance of trails, have been observed. Maintaining current soil resources will continue to be a priority within the Planning Area.

3.2.3 Water Resources

Water resources in the western U.S. and Alaska are important for fish and wildlife habitat and a variety of human needs (such as domestic consumption, industrial activities, crop irrigation, livestock watering, and recreation). Numerous legal and policy requirements have been established to manage water resources for these multiple needs, including the Clean Water Act of 1972 (CWA), the Colorado River Basin Salinity Control Act of 1974 (CRBSCA), the Safe Drinking Water Act of 1974 (SDWA), and Executive Order (EO) 11988, Floodplain Management.

Water resources are classified as either “surface water” or as “groundwater.” Surface water resources include rivers, streams, lakes, ponds, reservoirs, and wetlands. Major river systems

(such as the Colorado, Columbia, Snake, Missouri, Arkansas, Rio Grande, and Yukon Rivers) and their tributaries are important sources of water in the western U.S and Alaska.

The quantity and quality of surface water resources are affected by precipitation, topography, soil type, vegetation, agricultural practices, urbanization, and general land use practices, especially for large tracts of public land. The alteration of vegetative cover from land use practices can result in significant impacts to water infiltration, soil erosion, and stream sedimentation.

The largest quantities of useable freshwater occur as groundwater (which provides drinking water for rural populations without access to public-water supplies, and water used for agriculture). Groundwater is obtained primarily from wells that tap into aquifers. (Aquifers are layers of permeable rocks that are recharged with freshwater from precipitation that percolates through the unsaturated zone to the water table, typically in upland, mountainous areas.) Generally, recharge rates range from a tiny fraction to about one-half of the average annual precipitation. Streams are commonly a significant source of recharge to groundwater downstream from mountain fronts and steep slopes in arid and semiarid areas (BLM 2009h).

Wetlands and Riparian Areas

Wetlands and riparian areas are defined as areas inundated or saturated by surface water or groundwater at a frequency, and duration, sufficient to support vegetation that is typically adapted for life in saturated soil. Wetlands include bogs, marshes, shallows, muskegs, wet meadows, estuaries, and riparian areas. Wetlands and riparian areas comprise approximately 9 percent of public lands. However, the benefits of these vital areas far exceed their relatively small acreage. The functions of wetland and riparian areas include water purification, stream shading, flood attenuation, shoreline stabilization, groundwater recharge, and habitat for aquatic, semi-aquatic, and terrestrial plants and animals (EPA 2001b).

According to the 1987 U.S. Corps of Engineers Wetland Delineation Manual, an area must exhibit evidence of at least 1 positive wetland indicator from each of the following parameters to be defined as a wetland (Environmental Laboratory 1987):

- **soils** -- the substrate is predominately undrained hydric soil, or the soils possess characteristics that are associated with reducing soil conditions;
- **hydrology** -- the area is inundated, either permanently or periodically, at a mean water depth of less than 6.6 feet; or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation; and
- **vegetation** -- the land supports predominately hydrophytes (hydrophytes are macrophytic plants with the ability to grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content and depleted soil oxygen levels).

The BLM defines properly functioning wetlands and riparian areas those that:

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- support adequate vegetation, landform, or debris to dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality;
 - filter sediment and aid floodplain development;
 - improve floodwater retention and groundwater recharge;
 - develop root masses that stabilize islands and shoreline features against cutting action;
 - restrict water percolation;
 - develop diverse ponding characteristics that provide the habitat and water depth, duration, and temperature necessary for fish production, waterbird breeding, and other uses; and
 - support greater biodiversity.

Wetlands and riparian areas are influenced by human activity, natural disturbance, and local physical and biological conditions. Under natural conditions, wetlands and riparian area plant communities have a high degree of structural and species diversity, reflecting past disturbances from floods, fire, and fish and wildlife use (Gregory et al. 1991).

Since European settlement, many wetlands and riparian areas have been drained or altered and, as a result, their functions and values have been lost or reduced. The CWA and EO 11990, Protection of Wetlands and Floodplains, identified the importance of wetlands and riparian areas and directed Federal and State agencies to focus more attention on the health of these areas. As a result of legislative and policy guidance, the BLM and other land management entities have spent considerable effort and money in order to restore wetland and riparian functions and values during the past several decades.

Current Conditions

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

Surface Water

The Planning Area covers 3 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 within the Planning Area consist of the streams forming the headwaters of the North Platte and Colorado Rivers, as well as 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 within the Planning Area, and ranges in elevation from 6,700 feet to 13,000 feet above sea level. Only 10 percent (approximately 266 square miles) of the watershed area is under BLM management. 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 the 8,000 foot elevation mark. 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 River, Williams Fork River, Fraser River, Willow Creek, and Muddy Creek) are 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 the Big Thompson Project. The Windy Gap Reservoir provides additional water to the Big Thompson system (BLM 1984b). Approximately 60 percent of the stream flow that originates within the Upper Colorado River Basin is diverted to the eastern slope. Water remaining within the Basin is primarily used for agriculture, snow-making, and municipal uses. Less than 10 percent of the Colorado River watershed within the Planning Area boundaries is managed by the BLM. 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 covers North Park. 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 major water uses in the North Platte basin are agricultural. Water for livestock and irrigation for hay meadows are provided. The Michigan 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).

The Laramie River is separated from the headwaters of the North Platte by the Medicine Bow Mountain Range. 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 Glendevy) 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. Water within the basin is primarily used for irrigation purposes (BLM 2007k).

Surface Water Quality

Water quality is defined in relation to its specified and/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, as well as the Safe Drinking Water Act (SDWA), in order to maintain waters that meet or surpass designated beneficial uses, 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. [Water quality data for the surface and groundwater resources of the western states, including Colorado, are available from the USGS National Water Information System (NWIS) database (USGS 2002b), the USGS National Water Quality Assessment (NAWQA) Program (USGS 2002c), the EPA's Index of Watershed Indicators (EPA 1999), the EPA's National Water Quality Inventory (EPA 2000), and the USGS Groundwater Atlas of the United States (USGS 2000).]

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 (such as 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.

Within the Planning Area, water quality is generally good, 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 within 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 3 streams appears to be largely geologic, and outside of the BLM's control (BLM 2007k).

Within the Planning Area there are many public stream segments 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, as well as 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 within the 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).

Surface Water Use

The BLM has an absolute water right on most developed water sources, as well as on inventoried undeveloped springs, within the Planning 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 within the Planning Area. 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 within the Planning 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, then a decrease in animal unit months (AUMs) is recommended (BLM 2007k).

In order to ensure water availability for multiple-use and sustained-yield management, as well as the functioning of healthy riparian and upland systems, the BLM files for water rights on water sources (such as springs) when the opportunity arises. 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 in order to "support the natural environment to a reasonable degree.") The BLM has been collecting field data on streams within the Planning Area in order to recommend in-stream flows on public stream segments. Currently, there is only 1 in-stream flow within the Planning Area, in North Park on a segment of Grizzly Creek. Most of the eligible streams in Middle Park and the Laramie River Valley have in-stream flows; however, some of the filings are older and do not include seasonal variations; they have one flow for the entire year (BLM 2007k).

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 1 well providing public drinking water (at a recreation site) (BLM 2007k).

The geology and groundwater hydrology of North Park and Middle Park is 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, however, 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 the major interior ridges. The center of the Park has very low transmissivity. 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. However, in some areas 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 (BLM 1984b).

Characterization

Indicators

BLM Colorado's Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997a) describe conditions necessary in order 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:

Standard 2 -- Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance (such as fire, severe grazing, or 100-year floods). Riparian vegetation captures sediment, and provides forage, habitat and biodiversity. Water quality must be improved or maintained. Stable soils store and release water slowly. Indicators include:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.

-
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
 - Streambank vegetation is present, and is comprised of species and communities that have root systems capable of withstanding high streamflow events.
 - Plant species present indicate maintenance of riparian moisture characteristics.
 - Stream is in balance with the water and sediment being supplied by the watershed (no headcutting and no excessive erosion or deposition).
 - Vegetation and free water indicate high water tables.
 - Vegetation colonizes point bars with a range of age classes and successional stages.
 - An active floodplain is present.
 - Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.

Standard 5 -- The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM-managed lands achieve or exceed the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the CWA. Indicators include:

- Appropriate populations of macroinvertebrates, vertebrates, and algae are present.
- Surface water and groundwater contain substances attributable only to humans within the amounts, concentrations, or combinations as directed by the Water Quality Standards established by the State of Colorado (5 CCR 1002-8). (Examples of these substances are sediment, scum, floating debris, odor, and heavy metal precipitates on channel substrate.)

Trends

The BLM primarily monitors riparian and wetland conditions, and does limited chemical analyses. The overall conditions of riparian areas and wetlands within the Planning 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. In order to help meet the Public Land Health Standards related to riparian areas and wetlands, grazing plans, upland improvements, and allowable use are being developed based upon the unique qualities and needs of these areas. In the more recent drought years, many riparian areas and wetlands actually continued to improve as permittees opted not to use their allotments or shortened their grazing season. Some riparian areas, however, were grazed heavier as upland water developments dried up and livestock stayed along 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 riparian areas and 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 within 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 in order 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 in order 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; however, in developing Total Maximum Daily Load calculations (TMDLs) for impaired streams, 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 within the Planning Areas have TMDLs that involve the BLM.

Increased energy production may occur within the Planning Area, especially in the North Park area. An adequate review of the geohydrology of North Park is needed in order to help reduce concerns of groundwater quality and quantity impacts related to energy productions. 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, including riparian areas and wetlands and livestock wells, are in the North Park area.

3.2.4 Vegetation Resources

The BLM's primary goal for vegetation management is as follows:

Through an interdisciplinary collaborative process, plan and implement a set of actions that improve biological diversity and ecosystem function and which promote and maintain native plant communities that are resilient to disturbance and invasive species. Healthy functioning plant communities will enhance the ability to attain economic benefits on public lands (BLM 2006g).

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

Generally, environmental resources research, assessment, monitoring, and, ultimately, management require appropriate spatial structures. Ecoregion Frameworks are well suited to these purposes. (Ecoregions are defined as areas of relative homogeneity in ecological systems and their components.) Factors associated with spatial differences in the quality and quantity of ecosystem components, including soils, vegetation, climate, geology, and physiography, are relatively homogeneous within an ecoregion. Ecoregions separate different patterns of human stresses on the environment and different patterns in the existing and attainable quality of environmental resources. They have proven to be an effective aid for inventorying and assessing national and regional environmental resources, for setting regional resource management goals, and for developing biological criteria and water quality standard. (Source: . <http://www.epa.gov/bioindicators/html/usecoregions.html>.)

Ecoregions have been designated by the EPA and the Commission for Environmental Cooperation (CEC). The CEC was established in 1994 by the member states of Canada, Mexico, and the United States in order to address regional environmental concerns under the North American Agreement on Environmental Cooperation (NAAEC), the environmental side accord to the North American Free Trade Agreement (NAFTA). The Commission's 1997 report, Ecological Regions of North America, provides a framework that may be used by government agencies, non-governmental organizations, and academic researchers as a basis for risk analysis, resource management, and environmental study of the continent's ecosystems. In the United States, the EPA and the USGS are the principal Federal agencies working with the CEC in order to define and map ecoregions. The ecoregion levels include:

- **Level I** -- North America has been divided into 15 broad, Level I Ecological Regions. These highlight major ecological areas and provide the broad backdrop to the ecological mosaic of the continent, putting it in context at global or intercontinental scales.
- **Level II** -- The 50 Level II Ecological Regions that have been delineated are intended to provide a more detailed description of the large ecological areas nested within the Level I regions.

- **Level III** -- Level III Ecological Region mapping describes smaller ecological areas nested within Level II Ecoregions. At Level III, the continent currently contains 182 ecological regions. These smaller divisions enhance regional environmental monitoring, assessment and reporting, as well as decision-making. Because Level III Ecological Regions are smaller, they allow locally defining characteristics to be identified, and more specifically oriented management strategies to be formulated. (Source: http://www.epa.gov/wed/pages/ecoregions/na_eco.htm.)

The Planning Area lies within 2 Level III Ecoregions; most of the area is within the Southern Rockies; however, a small portion is within 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 within this ecoregion are organized by elevation zones, with grass and shrublands found in 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 found within 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 3-5, KFO Vegetation Communities; Map 3-3, KFO General Vegetation Zones). In spite of the diversity in vegetation communities, over 80 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 consists 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.

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 2 different ecological provinces of the North American ecoregions (see Map 3-4, KFO General Ecological Provinces). Most of the Planning Area is within the Southern Rockies Ecoregion, which is composed of steep, rugged mountains over 8,000 feet in elevation. Vegetation types (dominated by coniferous forests), as well as soil and land use, follow a pattern of elevational banding. Generally, the lowest elevations (7,000 feet) are grass or shrub communities. Low- to mid-elevations (7,000 feet to 8,500 feet) include a variety of vegetation types, including Douglas-fir, ponderosa pine, aspen, and pinyon-juniper

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

Table 3-5 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
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.

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 inches 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. Generally, forests are mostly coniferous, with Englemann spruce and subalpine fir 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 found on the wetter, cooler north-facing slopes. Grasslands and shrublands are found 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 within the Planning 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 Planning 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 Planning Area. Woodland communities are found on dry, warm slopes, mesas, and ridges.

The following discussion summarizes key characteristics of forest and woodland communities within the Planning Area.

Lodgepole Pine

Lodgepole pine communities are common throughout the Rocky Mountains, and they are the dominant forest community within 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, coarse 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. 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; however, they 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, as well as 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 within the State of 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 Planning Area 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 percent to 16 percent of the total lodgepole pine acres. General stand conditions (tree density, age, mortality) has 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 within the Planning Area. Typically, aspen communities occur in a mosaic with conifer and sagebrush communities. Understory vegetation is often a dense mix of grasses and forbs, as well as 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 necessary in order to maintain aspen communities as mature trees become increasingly susceptible to insect and disease, and conifer encroachment (NNHP 2005).

Most aspen stands within the Planning Area are mature and starting to decline. In the absence of disturbance, aspen is vulnerable to insects and disease. 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 within the Planning Area are displaying increased mortality of mature and over-mature trees, and suckering response (regeneration) is limited or not occurring at all. The combination of these factors has resulted in the deterioration of many aspen stands within the Planning Area, and has increased the risk of insects, disease, and fire.

Spruce/fir

Spruce/fir forest is a minor, but important, community within the Planning 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 resulted in mortality in some spruce/fir stands. The spruce beetle is still active in some areas; however, 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 within the Planning Area. Generally, they occur on steep north or northeast facing slopes at mid-elevations. Typically, understory communities are shrubby with a perennial grass component. Usually, soils are 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 which, in turn, is increasing the likelihood of insect and disease infestation.

Pinyon-juniper

Pinyon-juniper woodlands within the Planning 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. Typically, the understory is dominated by shrubs and perennial bunchgrasses. These woodlands are found on warm, dry slopes at lower to mid-elevations with a variety of soil textures (ranging from stony, cobbly, gravelly, or sandy loams to clay loam or clay) (CNHP 2005).

Within the Planning Area, pinyon-juniper stand density and canopy cover are also increasing, and are inhibiting understory diversity and productivity. Many of the pinyon-juniper communities exhibit a lack of well-developed biological soil crusts, which are important for stabilizing soils in arid and semi-arid vegetation communities, and, in some cases, account for up to 70 percent of the living cover (DOI 2001). Intact crusts have also demonstrated the ability to inhibit seed germination for some species, including the exotic annual cheatgrass (DOI 2001). Biological crusts are sensitive to soil disturbance from activities such as grazing and OHV use.

Ponderosa pine

Ponderosa pine is limited within the Planning Area. Typically, this species occurs at lower treeline ecotones, between foothills grasslands and more mesic coniferous forests (CNHP 2005). Typically, understory communities are 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 component within the Planning Area. Limber pine 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 within the Planning Area. It is also susceptible to the MPB, and many of the mature trees are dead or dying. Limber pine have no commercial value; however, 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 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 and forbs. Rhizomatous, sod-forming sedges are the dominant graminoids, and prostrate and mat-forming plants with thick rootstocks or taproots characterize the forbs. Dominant species include *Artemisia arctica*, *Carex elynoides*, *Carex siccata*, *Carex scirpoidea*, *Carex nardina*, *Carex rupestris*, *Deschampsia caespitosa*, *Festuca brachyphylla*, *Festuca idahoensis*, *Geum rossii*, *Kobresia myosuroides*, *Phlox pulvinata*, and *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 within the Subalpine Zone where finely textured soils, snow deposition, and/or wind-swept dry conditions limit tree establishment. Typically, it is 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 *Erigeron* spp., *Asteraceae* spp., *Mertensia* spp., *Penstemon* spp., *Campanula* spp., *Lupinus* spp., *Solidago* spp., *Ligusticum* spp., *Thalictrum occidentale*, *Valeriana sitchensis*, *Balsamorhiza sagittata*, *Wyethia* spp., *Deschampsia caespitosa*, *Koeleria macrantha*, and *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 within the Planning Area. It is where most livestock grazing occurs, and provides valuable winter habitat for big game. Most of the livestock grazing systems within the Planning 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 Planning 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). However, the forb component is highly variable from year-to-year, depending heavily on precipitation timing and amounts.

Three (3) of the 4 subspecies of Big sagebrush are found within 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** -- 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; therefore, many acres have been treated for sagebrush control within 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** -- Wyoming Big sagebrush is the shortest of the subspecies (24 inches to 36 inches), and grows on the driest sites of the sagebrush subspecies. It can grow in areas with a 7-inch to 11-inch average annual precipitation. It is often found on shallow fine soils. Generally, the understory is 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; however, the recent drought and browsing by big game has 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 within the Planning Area.
- **Subalpine Big Sagebrush** -- Subalpine Big sagebrush is similar to Mountain Big sagebrush; however, it is usually found on moister sites at higher elevations (8,500 feet to 10,000 feet). Usually, this vegetation community produces a dense understory of grasses and forbs; however, it is not highly grazed due to the high elevation and short grazing season.
- **Basin Big Sagebrush** -- 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; however, these ecological conditions exist only in very small areas within the Planning Area. Basin Big sagebrush does not grow in North Park, and very little grows in Middle Park or Larimer County.

Other shrubs that are found within the sagebrush steppe communities include antelope bitterbrush, mountain mahogany, serviceberry, snowberry, rabbitbrush, currant, Wood's rose, broom snakeweed, and winterfat. These species comprise a small percentage of the shrubs within the sagebrush steppe vegetation communities; however, 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. Typically, irrigated meadows 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 within the Planning Area. They are primarily composed of serviceberry and true mountain mahogany, with

some snowberry, gooseberry, 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 is found in lower-elevation drainages in both 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 surface. Salt shrub is primarily dominated by greasewood, 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, western wheatgrass, bottlebrush squirreltail, and scattered hardy forbs that do not, generally, provide much forage value.

Native grasslands

Generally, native grasslands within the Planning Area consist of 2 distinct types: dry and moist/wet. The dry grasslands occur as small isolated areas, often on exposed ridges or hilltops, where winds reduce available moisture and prevent shrub growth. Typically, soils at these sites 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/wet grasslands occur primarily as high mountain meadows. Typically, these plant communities are productive and diverse. These grasslands can be found in areas with ample moisture and gentle topography (such as mountain valleys, swales, and parks, as well as 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.

In 1997, the BLM adopted the Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a). These Standards and Guidelines were developed in order 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 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)

Riparian plant communities attract populations of mammals, birds, and amphibians; help protect water quality; and provide habitat for diverse vegetation communities. Riparian vegetation, and its ability to stabilize stream banks, is critical to the proper functioning condition (PFC) of the systems. (If riparian vegetation is in poor condition, streams will lose their ability to dissipate energy from high flow events and will be less resistant to other impacts, including livestock grazing, recreation activities, etc.)

The BLM uses an ID Team to review vegetation, soils, and hydrology of riparian areas/wetlands, and to determine PFC. (PFC is a methodology the BLM uses in order to assess the physical functioning of riparian areas and wetlands. The term PFC is used to describe both the assessment process, as well as the defined, on-the-ground condition of riparian areas and wetlands. In either case, PFC defines a minimum or starting point.) 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, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of riparian areas and wetlands. The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow riparian areas and wetlands systems to hold together during a 25-year to 30-year flow event, sustaining that system's ability to produce values related to both physical and biological attributes (Source:

http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pa/rangeland_management/final_rangeland_health.Par.8729d1fd.File.pdf/APPENDIX_23.pdf).

PFC assessments have been performed on most riparian areas and wetlands within the Planning Area. Upstream diversions and private water use have altered the streamflow of many public stream segments; however, if the associated riparian communities meet the Standards for a healthy stream, these segments may still receive a rating of PFC. Streams rated Functioning at Risk (FAR) are functional, but at risk. Within the Planning 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/wetlands values due to current on-site conditions. Areas where these factors are not known need to be inventoried in order for the Field Office to determine the current condition; including some streams that have not been inventoried for many years. Most stream segments within the Planning Area have received PFC

assessments, and are repeatedly evaluated due to the changes in land use that can affect riparian areas and wetlands. (See Table 3-6, Streams and Riparian Areas within the KFO, for a summary of PFC assessments for riparian areas and wetlands.)

In relation to wetlands within the Planning Area, there is still a need for better inventory, especially in timbered areas where aerial photographs do not necessarily reveal small seeps. Acreages of wetlands also need to be mapped in order to improve acreage estimates. In the North Park area, there are several small swales that support wetlands that have not been mapped. Included within the wetland acreage are non-jurisdictional wetlands and constructed water impoundments that support wetland vegetation. (See Table 3-7, Wetlands within the KFO, for a summary of wetlands within the Planning Area.)

According to the BLM Standards (BLM 1997a), riparian areas/wetlands are subject to Public Land Health Standard 2, as follows:

Standard 2 -- Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance (such as fire, severe grazing, or 100-year floods.) Riparian vegetation captures sediment and provides forage, habitat, and biodiversity. Water quality is improved or maintained. Stable soils store and release water slowly.

Indicators that relate to this standard are as follows:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Streambank vegetation is present, and is comprised of species and communities that have root systems capable of withstanding high streamflow events.
- Plant species present indicate maintenance of riparian moisture characteristics.
- Stream is in balance with the water and sediment being supplied by the watershed (no headcutting and no excessive erosion or deposition).
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point bars with a range of age classes and successional stages.
- An active floodplain is present.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.

Table 3-6
Streams and Riparian Areas within the KFO 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 3-7
 Wetlands within the KFO 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, is defined as “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 the dominant vegetation on an estimated 35 million acres of public lands (BLM 2000e). The estimated rate of weed spread on western public lands in 1996 was 2,300 acres per day (BLM 1996). 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 3 categories: A, B, and C. List A includes those species in Colorado that are designated by the Commissioner for eradication. List B includes those species for which a State Noxious Weed Management Plan is being, or will be, developed and implemented in order to stop the continued spread. List C includes 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 3-8, Grand, Jackson, and Summit Counties Noxious Weed Species, provides a list of species compiled from the Grand, Jackson, and Summit Counties' Weed Lists).

The Planning Area has contracts with, and cooperates with, Grand, Jackson, and Larimer Counties for weed control efforts. Funding that the KFO obtains for weed control is transferred to the Counties in order to manage weed eradication efforts on BLM-managed public lands.

**Table 3-8
 Grand, Jackson, and Summit Counties Noxious Weed Species**

Common Name	Scientific Name	State List Designation
Black henbane	<i>Hyoscyamus niger</i>	B
Canada thistle	<i>Cirsium arvense</i>	B
Chamomile, mayweed	<i>Anthemis cotula</i>	B
Chamomile, scentless	<i>Matricaria perforata</i>	B
Field bindweed	<i>Convolvulus arvensis</i>	C
Hoary cress (whitetop)	<i>Cardaria draba</i>	B
Houndstongue	<i>Cynoglossum officinale</i>	B
Knapweed, diffuse	<i>Centaurea diffusa</i>	B
Knapweed, Russian	<i>Acroptilon repens</i>	B
Knapweed, spotted	<i>Centaurea maculosa</i>	B
Leafy spurge	<i>Euphorbia esula</i>	B
Musk thistle	<i>Carduus nutans</i>	B
Orange hawkweed	<i>Hieracium aurantiacum</i>	A
Oxeye daisy	<i>Chrysanthemum leucanthemum</i>	B

**Table 3-8
 Grand, Jackson, and Summit Counties Noxious Weed Species**

Common Name	Scientific Name	State List Designation
Scotch thistle	<i>Onopordum acanthium</i>	B
Toadflax, Dalmatian	<i>Linaria genistifolia</i>	B
Toadflax, yellow	<i>L. vulgaris</i>	B
Yellow starthistle	<i>Centaurea solstitialis</i>	A
Bull thistle	<i>Cirsium vulgare</i>	B
Chamomile, corn	<i>Anthemis arvensis</i>	B
Dame's rocket	<i>Hesperis matronalis</i>	B
Dyer's Woad	<i>Isatis tinctoria</i>	A
Salt cedar	<i>Tamarix chinensis</i>	B
Wild caraway	<i>Carum carvi</i>	B
Chinese clematis	<i>Clematis orientalis</i>	A
Common tansy	<i>Tanacetum vulgare</i>	A
Knapweed, meadow	<i>Centaurea pratensis</i>	A
Perennial pepperweed	<i>Lepidium latifolium</i>	B
Plumeless thistle	<i>Carduus acanthoides</i>	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, and density and decadence.

Rangelands

In 1997, the BLM adopted the Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a). These Standards and Guidelines were developed in order 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 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 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.

Riparian

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

Weeds

Indicators of noxious weed invasion, as well as the potential for invasion, are the same as those used in order 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

Past decisions regarding forest and woodland vegetation management within the Planning Area emphasized commodities, including wood products and grazing production. Vegetation management policy on Federal lands has changed, emphasizing forest health and hazardous fuel reduction. Much of the current forest management is guided by the National Fire Plan [DOI and USDA 2000] and the Healthy Forests Restoration Act of 2003 (HFRA). The National Fire Plan established an intensive, long-term hazardous fuels reduction program. Provisions to hasten hazardous-fuel reduction and forest-restoration projects are provided in the HFRA, which also emphasizes retaining larger trees and removing smaller diameter (in-growth) trees in order to promote healthy, more fire-, insect-, and disease-resistant forests. Guidance is also provided by the Final Vegetation Treatment Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS (PEIS) (BLM 2009h), as well as all other applicable laws, rules, regulations, policies, and guidelines.

Aging stands and stand conditions, as well as climatic conditions (such as drought), have led to a decline in forest health. Currently, 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 within 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) in order to significantly decrease beetle numbers, or when the beetles have infested all of the lodgepole pines. Trees are still being attacked and killed throughout the Planning Area; however, 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 will be an increase in ground vegetation as more sunlight reaches the forest floor. Live understory trees would then 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 where 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 will accelerate as time-since-death (tsd) increases. Ground fuel levels will 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 are 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; however, some increase in aspen suckering is likely to occur in beetle-killed lodgepole pine stands where aspen is present.

Pinyon-juniper woodland communities also have 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; however, range improvements have been made through the grazing permit renewal process. Improving upland communities in order to support animals was identified as a planning issue to be addressed in this DRMP/DEIS analysis process. Range management would include a focus on supporting domestic animals, as well as animal and plant species and their habitat. 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 the 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 3 actions). Future permit renewals would continue to be guided by the BLM Standards and Guidelines, as a permit renewal prerequisite. Appropriate actions would be taken, as necessary, in order to meet the requirement that all allotments comply with, or are heading toward complying with, the Standards and Guidelines (BLM 1997a).

Sagebrush steppe

Historically, poor livestock management policies (such as season-long grazing and high livestock numbers) 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 grazing preference, and removing livestock when utilization levels for key forage species are met, the long-term trend of the vegetation within the Planning Area is positive. The ultimate goal for the Field Office is for all vegetation to comply with the Standards and Guidelines (BLM 1997a).

Irrigated meadows

Irrigated meadows play 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 within the Planning 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 perturbations (such as drought or extensive recreational use, including OHV riding), could place undo stress on this vegetation community.

Salt shrub

The health of these vegetation communities remains relatively constant; however, 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 seed bank; otherwise, seeding would be required following vegetation treatment.

Native grasslands

Generally, the wet meadow grassland vegetation is in good condition. Wet meadows, however, require more intense management in order to maintain or improve the condition of the vegetation. This is 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 also provide important wildlife habitat.

Many projects have been designed to ease livestock pressure on meadows within the Planning Area. Vegetation treatments and water developments are used in order to draw livestock away from the meadows. Fencing has also been used in order 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 BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a).

Riparian

The total acres of riparian areas and wetlands within the Planning Area are approximately 1 percent of the total acreage; however, these areas 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 all of their necessities (food, water, and shelter). Riparian areas and wetlands are also popular with recreationists. Sedges and rushes are common within the riparian/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 wildlife 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. Generally, outside of the Colorado River corridor, weeds in riparian and wetland areas 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. However, if aggressive annual weeds dominate a site, it could take a significant amount of time for the area to recover, even with a weed control program in effect.

Riparian improvements within the Planning Area began in the late 1980s, when allotments were reprioritized in order 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 in order to improve grazing practices and, consequently, the quality of the riparian areas and wetlands throughout the Planning Area has improved. 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 in order to limit the amount of time livestock spend in these areas. In renewing livestock grazing permits or in developing grazing plans, utilization levels within the riparian or wetland areas are used in order to help determine the need for additional management. Utilization levels may 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 in order to achieve desired plant communities and overall long-term health.

Continued population growth within the surrounding areas has increased the usage of BLM-managed public lands, which threatens riparian areas and wetlands. New trails, paths, and roads crossing, or travelling within riparian areas and wetlands, can disrupt the 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 and/or to wetlands. Currently, there are water rights that are leased to agricultural users until they are needed by municipal and industrial users. Changes in use may greatly affect the hydrology of streams and riparian areas/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.

In general, the condition of riparian areas and wetlands are 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. In the past, livestock grazing 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, as well as 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 within 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:

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- **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 2 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 within 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), as well as by natural events (such as wildfire and insects). Special management attention may be needed in order to restore, maintain, and/or enhance priority species and their habitats. Integrating habitat management with other resource programs requires careful planning in order to minimize impacts to wildlife species and to their habitats.

The BLM is responsible for managing habitats for fish and wildlife communities; however, the BLM is not directly responsible for managing fish and wildlife populations. Responsibility for direct population management belongs to USFWS and to the Colorado Division of Wildlife (CDOW). 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 CDOW in order 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), 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.

One method the BLM uses in order to measure the health of the land that it manages is through land health assessments. These assessments follow several standards that the BLM developed in response to public concern about livestock grazing management on western public lands. This concern prompted the BLM to develop new regulations for administration of livestock grazing. This process, which involved preparation of an EIS and extensive public involvement, resulted in new livestock regulations that became effective on August 21, 1995. One of the requirements of the regulations was that each BLM State director would, in consultation with the Resource Advisory Councils (RAC) in that State, develop standards for public land health and guidelines for livestock grazing management. The Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado were approved by the Secretary of the Interior on February 3, 1997 (BLM 1997a):

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

- **Standard 1** -- Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimize surface run-off.
- **Standard 2** -- Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance (such as fire, severe grazing, or 100-year floods). Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.
- **Standard 3** -- Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and the habitat's potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.
- **Standard 4** -- Special status, Threatened and Endangered Species (State and Federal), and other plants and animals (and their habitats) officially designated by the BLM are maintained or enhanced by sustaining healthy, native plant and animal communities.
- **Standard 5** -- The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM-managed lands achieves or exceeds the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.

Guidelines 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:

Grazing management practices must promote plant health by providing for one or more of the following:

- periodic rest or deferment from grazing during critical growth periods;
- adequate recovery and regrowth periods; and
- opportunity for seed dissemination and seedling establishment.

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- Grazing management practices must address the kind, numbers, and class of livestock, season, duration, distribution, frequency, and intensity of grazing use and livestock health.
 - Grazing management practices must maintain sufficient residual vegetation on both upland and riparian sites in order to protect the soil from wind and water erosion, in order to assist in maintaining appropriate soil infiltration and permeability, and to buffer temperature extremes. In riparian areas, vegetation must dissipate energy, capture sediment, recharge ground water, and contribute to stream stability.
 - Native plant species and natural revegetation must be emphasized in the support of sustaining ecological functions and site integrity. Where reseeding is required on land treatment efforts, emphasis must be placed on using native plant species. Seeding of non-native plant species will be considered based upon local goals, native seed availability and cost, persistence of non-native plants and annuals and noxious weeds on the site, and composition of non-natives in the seed mix.
 - Range improvement projects must be designed in a manner consistent with overall ecological functions and processes, with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.
 - Grazing management must occur in a manner that does not encourage the establishment or spread of noxious weeds. In addition to mechanical, chemical, and/or biological methods of weed control, livestock may be used where feasible as a tool to inhibit or stop the spread of noxious weeds.
 - Natural occurrences such as fire, drought, flooding, and prescribed land treatments should be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape. This must include the maintenance, restoration, or enhancement of habitat in order to promote and assist the recovery and conservation of Threatened, Endangered, or other Special Status Species, by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors, and thus minimizing habitat fragmentation.
 - Colorado BMPs, and other scientifically developed practices that enhance land and water quality, should be used in the development of activity plans prepared for land use.

Another method used to evaluate habitat is to assess the PFC 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 PFCs have been conducted as part of land health assessments on various landscapes within the Planning 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 platyrhincus*), 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, North Park, Lake John, and Delaney Lakes contain several large reservoirs that provide important recreational fisheries. Rainbow trout (*Oncorhynchus mykiss*) and Kokanee salmon (*Oncorhynchus nerka*) are the 2 major fish species that occur in the reservoirs. Other sport fish found in the reservoirs are lake trout (*Salvelinus namaycush*), brown trout (*Salmo trutta*), and cutthroat trout (*Oncorhynchus clarki*) as well as 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 CDOW stocking programs.

Of the 5 trout species found within the Planning Area, 2 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 3 species of trout, brook trout, rainbow trout, and brown trout, are considered competitive non-native species within the Planning Area. Rainbow trout are especially prevalent in the reservoirs located within the Planning Area, as discussed above. The 3 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 within the Planning Area.

Amphibians

Three (3) species of Special Status amphibians are found within the Planning Area: the wood frog (*Rana sylvatica*), boreal toad (*Bufo boreas boreas*) and the northern leopard frog (*Rana pipiens*). These amphibians are Special Status Species, and are discussed in Section 3.2.6, Special Status Species.

Aquatic habitats within 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; however, it is likely that most of the perennial waters within the Planning Area support an abundance of aquatic insects. The Planning 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 within the Planning Area. Within 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 within the Planning Area are depicted in Map 3-5, KFO Fisheries.

Wildlife

The priority 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 CDOW, provide information on the distribution of terrestrial wildlife within the Planning Area. In addition, the CDOW maintains statistics on big game harvests, recreational use days, and population trends. Wildlife species of primary interest within the Planning Area are provided in Table 3-9, Wildlife Species of Primary Interest within the Planning Area.

Table 3-9 Wildlife Species of Primary Interest within the Planning 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
Pronghorn antelope	High economic and recreational value
River otter	High interest and protected by law
White-tailed prairie dog	High interest; association with federally listed black-footed ferret

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 within 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 within the Planning Area.

Upland Game Birds

Upland game birds common to the Planning Area are dusky grouse (*Dendragapus obscurus*) 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; however, 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. (and 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, other types of coniferous forests, and riparian areas and wetlands support many species. The most abundant species found within the Planning Area include the mourning dove (*Zenaida macroura*), common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), sage thrasher (*Oreoscoptes montanus*), green-tailed towhee (*Pipilo chlorurus*), sage sparrow (*Amphispiza belli*), and Brewer's sparrow (*Spizella breweri*). 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 within 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 within 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 and/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 within the Planning Area include the tree swallow (*Sialia Mexicana*), barn owl (*Tyto alba*), and the common goldeneye (*Bucephala clangula*).

Big Game Species

The 3 primary big game species found within 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, but not to the extent that habitat is extensively managed for these species. Table 3-10, Big Game Population Status within the KFO depicts big population status by management areas within the KFO.

Species	DAU	Hunt Areas	Population Estimate 2007 Postseason	Population Trend	Average Buck:Doe	Population Objective
Mule Deer	3 North Park	6, 16, 161, 17, 171	6,140	Stable	44:100	5,400-6,000
	4 Larimer	7, 8	5,780	Stable	34:100	10,000-12,000
	8 Middle Park	15	3,640	Decreasing	30:100	3,375-4,125
	9 Middle Park	18, 181, 27, 28, 37	12,800	Stable	30:100	10,500
Elk	3 North Park	6, 16, 161, 17, 171	8,348	Increasing	15:100	4,000-4,500
	4 Larimer	7, 8	3,830	Decreasing	33:100	3,300
	7 Middle Park	15, 27	5,990	Stable	18:100	4,000-5,000
	8 Middle Park	18, 181	4,150	Increasing	24:100	2,700
Moose	1 North Park	6, 16, 17, 161, 171	520	Increasing	49:100	500-600
	2 Larimer	7, 8	220	Increasing	55:100	200-250
	3 Middle Park	18, 28, 36, 37, 181	230			
Pronghorn	3 North Park	6, 16, 161, 17, 171	1,410	Increasing	32:100	1,500-1,600
	36 Larimer	7, 8	600	Decreasing	25:100	600
	37 Middle Park	18, 181, 27, 28, 37	620	Decreasing	27:100	450

Source: CDOW 2007.

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 in the area. Critical winter ranges for elk, mule deer, and pronghorn antelope are essential to the survival of these species within the Planning Area. Typically, mule deer concentrate in the winter along Peterson Ridge, the western foothills of the Medicine Bow Mountains, and along the major highways surrounding Kremmling. 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 along Highway 40 north of Kremmling, 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 within the Planning Area for

these species are shown in 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, KFO 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 grass/grasses; while cattle diets comprised less than 92 percent grass/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.

Within the Planning Area, mule deer are managed under Data Analysis Units (DAUs) 3, 4, 8, and 9. Most of the DAUs are meeting the objectives set forth by the CDOW. The exception is DAU 4, where the population of mule deer is approximately half of the population objective. Within the Planning Area, elk are managed by the CDOW 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 within the Planning Area. Moose concentrate in the Laramie River Valley area, northeast Grand County (along major streams and water bodies), and in Jackson County (along major rivers and their tributaries, such as the Michigan River, Colorado River, Illinois River, Williams Fork River, Troublesome Creek, and the Upper Muddy Creek) (See Map 3-10, KFO Moose Range.) Bighorn sheep occur primarily on National Forest System lands and National Park Service (NPS) lands within Rocky Mountain National Park; however, 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, KFO 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, 14 sheep were released (all but 1 were fitted with radio collars). Releases will continue over the next 2 years, depending upon the availability of animals. Moose are managed within the Planning Area by the CDOW 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 within the Planning Area. They include black bear (*Ursus americanus*), mountain lion (*Felis Concolor*), river otter (*Lutra Canadensis*), and white-tailed prairie dog (*Cynomys leucurus*). Black bears and mountain lions occur within all habitat types, and the documented overall range for black bears encompasses much of the Planning Area, with the exception of the interior of Grand and Jackson Counties. (See Map 3-12, KFO Black Bear Range.) Summer and fall concentrations in North Park occur between Owl Mountain and Gould Mountain, as well as 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 approximately 5 miles to 10 miles south to the area around Grouse Mountain and west of Vasquez 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, KFO Mountain Lion Range.) The CDOW has not mapped known areas of human conflict with mountain lions (using GIS data) within the Planning Area. River otters occur in several rivers within the Planning Area. (See Map 3-14, KFO River Otter Range.)

Other predatory species known to reside within 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 within the Planning Area, including ground squirrels, mice, chipmunks, rabbits, skunks, and raccoons. Many of these small mammals provide the main prey for raptors and larger carnivores.

Within the Planning Area, limited habitat exists for white-tailed prairie dogs. This species is found primarily on lands that contain salt desert shrub and mountain shrub habitats. White-tailed prairie dog towns create unique vegetative conditions that provide potential habitat for mountain plovers, black-footed ferrets, and burrowing owls (see Section 3.2.6, Special Status Species). White-tailed prairie dog colonies within the Planning Area are located in the interior of Jackson County and northwest Larimer County, and are most abundant in the area surrounding the Arapahoe National Wildlife Refuge. (See Map 3-15, KFO White-tailed Prairie Dog Colonies.)

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 made up of the following 8 primary habitat types:

1. sagebrush, which covers approximately 247,064 acres (65 percent) of the Planning Area;
2. conifer 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 woodland, which covers 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 poor condition. Many stands are even-aged and hedged by browsing, and are showing signs of pinyon-juniper encroachment. In 2009, approximately 70 percent of BLM-managed public lands within the Planning Area have 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; however, 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.

Sagebrush habitats within the Planning Area vary from poor to good condition, with evidence of light-to-heavy use by browsers. In many areas, the perennial grass and forb understory is poorly established, and non-native annuals (most notably cheatgrass), have outcompeted native species. Some sagebrush stands are decadent, with little herbaceous understory, a tall dense canopy, and poor recruitment. 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. 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; however, 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 throughout 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 and Oak -- Mixed mountain shrub and oak habitats are important to turkey, black bear, mule deer, and elk, among other wildlife species. Generally, mixed mountain shrub and oak 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. However, 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 within the Planning Area have been heavily infested with bark beetles, and are no longer in good condition. 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 over, making it difficult for larger animals to move through the stand. 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 (as a result of erosion, lowered water table, or degraded vegetation composition or structure) provide decreased wildlife habitat values.

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 a new wildlife community 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 3 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 CDOW tracks for species of game animals and, increasingly, for key non-game species. The BLM, in managing that 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 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 CDOW, 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).

Wildlife

The Kremmling RMP was approved and implemented in 1984; therefore, wildlife population trends will be addressed using 1984 as a benchmark. Population estimates for 1984 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 in order to establish population trends for the species for the period of 1984 through 2005, where data are available.

Certain species are of high interest to the CDOW due to their economic and recreational values. The CDOW, 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 2005 due to climate factors. 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 2005 levels.

Upland Game Birds -- The 2 important upland game bird species that inhabit the Planning Area are dusky grouse and Greater sage-grouse. Since 1984, dusky grouse populations have increased in years with favorable weather during the nesting season, and have decreased during cold and wet nesting seasons. Habitat for this species has not changed to any large extent since 1984; however, some timber harvesting has occurred in dusky grouse habitat. The current population of dusky grouse within the Planning Area is considered stable, or increasing. (Greater sage-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 within the Planning Area. Most information collected since 1984 was gathered from the sagebrush steppe habitat type. Since 1984, 4 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 both 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 in order 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 within the Planning Area offers nesting and hunting habitat for these species. Inventory and monitoring efforts to assess the status of raptors within 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 lands and public lands within 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 CDOW classifies all of the species described below as big game animals, except for the white-tailed prairie dog. 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 found within the Planning Area equate to high economic value to the CDOW, as well as to the economy 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 CDOW). 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 CDOW objectives for both North Park and Middle Park. Mule deer in Larimer County are estimated at approximately 5,780 and stable; however, this population is about half of the CDOW 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; however, 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; however, liberal hunting seasons have helped reduce the numbers back down to the 2007 levels. The elk numbers are above the CDOW 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 CDOW.

Pronghorn -- Pronghorn numbers steadily increased within the Planning Area from 1984 to 2007. Historically, pronghorn have occupied North Park; however, they have been only been year-long residents in Middle Park since the late 1970s. Historically, pronghorn occupied Middle Park; however, 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 2005, the moose population had increased to approximately 640 in North Park; and approximately 260 in Middle Park.

Rocky Mountain Bighorn Sheep -- Recently, Bighorn sheep were reintroduced in North Park, and were released in Middle Park in 2009. Releases will continue over the next 2 years, depending upon the availability of animals. The sheep in North Park occupy a tract of BLM-managed habitat in the western portion of North Park. 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 CDOW indicated that populations of these species are stable, and likely increasing (Martens 2006; Yost 2006).

White-tailed Prairie Dog -- White-tailed prairie dog towns are present on BLM-managed public lands in North Park; however, none exist in Middle Park. Prairie dog towns are considered important, as the reintroduction of the black-footed ferret into suitable towns is now a high priority within the BLM. 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.

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 within the Planning Area. Beginning in 1998, approximately 236,200 acres of public lands within 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 within the Planning Area. The land health assessments indicate that most of all public lands within 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;
- 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 vegetation by undesirable and weedy species, most notably cheatgrass.

The trend of the assessed habitat within the Planning Area is stable; that is, 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 CDOW, 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 CDOW as State Endangered or Threatened Species, and those identified as 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 3 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, as well as 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 in order to maintain viable populations of these species. Principal considerations include management of species habitat in order to ensure continued use by these species; identification of areas where other resource activities may conflict with Special Status Species, and their habitat requirements; and incorporation of programmatic consultations and conservation strategies.

Species discussed in this Section have been listed by the USFWS or by the State of Colorado, or have been placed on the Colorado BLM State Director's Sensitive Species List. The USFWS manages Threatened and Endangered Species and designated critical habitat, in cooperation with other Federal agencies, in order to support recovery. The BLM cooperates with the USFWS in order to determine and manage habitats to support the species. Candidate species are managed in a manner designed to maintain viable populations, with the objective of preventing the need for them to be listed by the Federal government. Under the ESA, federally listed Threatened and Endangered Species require specific management. The ESA requires a consultation with the USFWS (a Section 7 Consultation) on any actions taken that are planned to occur where these species reside. There are 49 federally Endangered, Threatened, BLM Sensitive, and BLM Species of Concern listed within the Planning Area.

The BLM Special Status Species Manual (Manual 6840; BLM 2008I) 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-managed 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, 45 Special Status Species. Information on these species, their habitats, and their listing status is included in Table 3-11, Special Status Fish, Wildlife, and Plant Species within the Planning Area.

**Table 3-11
Special Status Fish, Wildlife, and Plant Species within the Planning Area**

**Table 3-11
 Special Status Fish, Wildlife, and Plant Species within the Planning Area**

PLANTS					
Species	Status	Likelihood of Occurrence	Species	Status	Likelihood of Occurrence
North Park phacelia	FE, G1/S1	C			
Osterhout milkvetch	FE, G1/S1	C	Harrington's beardtongue	BLM-S; G3/S3	C
Penland alpine fen mustard	FT, G4/S1S2	U	Crescent bugseed	BLM-S; G1?/S1	C
Penland beardtongue	FE, G1/S1	C	Pale blue-eyed grass	BLM-S, G2G3/S2	C
Ute ladies'-tresses orchid	FT, G2/S2	U	Fragile rockbrake	BLM-S, G5/S2	C
Western prairie fringed orchid [▲]	FT, GS32				
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, S4N	P
Mexican spotted owl	FT, ST, G2/S1B	P	Greater sage-grouse	BLM-S, SC, FC, 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	BLM-S, SC, G2/S2B	P
Western yellow-billed cuckoo	BLM-S, FC, 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 pelican	BLM-S, G3/S1B	C
Brewer's sparrow	BLM-S, G5/S4B	C	Mountain Plover	PT, BLM-S, G2S2B	SC
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	Colorado River cutthroat trout	BLM-S, SC; G4/S3	C
Colorado pikeminnow*	FE, SE; G1/S1	P	Roundtail chub	BLM-S, SC; G3/S2	C
Razorback sucker*	FE, SE; G1/S1	P	Flannelmouth sucker	BLM-S; G3G4/S3	C

**Table 3-11
 Special Status Fish, Wildlife, and Plant Species within the Planning Area**

Humpback chub*	FE,SE; G1/S1	P	Bluehead sucker	BLM-S	C
Greenback cutthroat trout	FT,ST; G4/S2	C	Pallid Sturgeon [▲]	FE, GS21	
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	N.A. Wolverine	G4S!, SE	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 within 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 3-11, Special Status Fish, Wildlife, and Plant Species within the Planning Area, Harrington penstemon (*Penstemon harringtonii*), North Park phacelia (*Phacelia Formosula*), Osterhout milkvetch (*Astragalus osterhoutii*), Penland beardtongue (*Penstemon*

penlandii), and pale blue-eyed grass (*Sisyrinchium pallidum*) have been documented as occurring within the Planning Area.

Federally Listed Threatened, Endangered, and Candidate Species

The USFWS lists 6 plant species within the Planning Area as Endangered, Threatened, or Candidate, which are discussed below.

Penland alpine fen mustard (*Eutrema penlandii*) 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 within the Planning Area.

The Ute ladies'-tresses orchid (*Spiranthes diluvialis*) has been recorded in eastern Larimer County, outside the boundaries of the Planning Area. This plant occurs at 4,265 feet to 5,250 feet, and no BLM-managed public lands below 7,600 feet occur in Larimer County.

Slender moonwort (*Botrychium lineare*) is found in forest habitat with old disturbance, forest edges, and meadows above 8,500 feet. There is no occurrence reported within the Planning Area, and there are no confirmed sites within the Planning Area. The "probable cases" reported in Summit and Grand Counties are on NPS and National Forest System lands. The closest confirmed case is in Clear Creek County, approximately 2 air miles from Grand County.

North Park phacelia (*Phacelia Formosula*) occurs in central Jackson County and northwest Larimer County, primarily within 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*), are both indigenous to Grand County, and are found primarily within the Planning Area. Osterhout milkvetch prefers selenium-rich clay soils derived mostly from Niobrara and Pierre shale. The plant occurs in alkaline clays between 7,500 feet and 7,700 feet, and, typically, grows 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 Species

Eight (8) plant species on the Colorado BLM State Director's Sensitive Species List are known to occur within the Planning Area, and are discussed below.

Porter feathergrass (*Ptilagrostis porter*) and Weber's sawwort (*Saussurea weberi*) are found at the extreme southern boundary of the Planning Area, on National Forest System lands, approximately 40 miles from BLM-managed public lands within the Planning Area. No habitat exists for these plants on BLM-managed public land within Summit County.

Low northern sedge (*Carex concinna*) occurs in northern Summit County, on National Forest System lands, and northern twayblade (*Listera borealis*) occurs in Summit, northeast Grand, and western Larimer Counties on National Forest System and NPS lands. Both species are

found in moist forest habitat above 8,700 feet (very little of this habitat occurs within the Planning Area).

Slender cottongrass (*Eriophorum gracile*) has been recorded in Rocky Mountain National Park, and green sedge (*Carex viridula*), slender cottongrass, and pale blue-eyed grass are all found in northwest Jackson County on National Forest System lands. Pale blue-eyed grass (*Sisyrinchium pallidum*) has also been recorded in northwest Larimer County (NatureServe 2006). These species prefer fens, wet meadows, and stream edges. Their distribution within the Planning Area is unknown.

Harrington penstemon (*Penstemon harringtonii*) is the only BLM-listed Sensitive Species of plant within 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 (4) 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 3 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 3 Colorado subspecies look very similar, and all 3 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 3 cutthroat subspecies could not be reliably identified visually, or with traditional genetic techniques; therefore, 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 3 subspecies. However, the new genetic findings are challenging the current paradigm on the heritage of cutthroat trout in the State. The studies confirm the existence of 3 genetically distinct subspecies in Colorado; however, they also suggest that some key Greenback cutthroat trout populations in eastern Colorado may actually be descendents 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 hopes 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 in order to possibly infer the influence of historic undocumented stocking on present distribution. Until additional information clarifies the relationship between the 2 subspecies, biologists are recognizing 2 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.

Within the Planning Area, 2 streams are currently identified as being lineageGB: Antelope Creek and Spruce Creek. This is considered outside of their “native range;” however, 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 2 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 3 subspecies 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. However, greenbacks, typically, do not reach a large size (1 pound to 2 pounds maximum).

Greenback distribution, as well as numbers of fish, declined rapidly beginning in the 1800s. By 1973, when the ESA was passed into law, Greenback were believed to only exist in 2 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 CDOW, 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, as well as in many streams throughout the South Platte and Arkansas River basins. Within the Planning Area, 2 streams 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 3 subspecies 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.

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; however, 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 CDOW. In addition, the Colorado River cutthroat trout is classified as a Sensitive Species by the BLM in Colorado. (See Table 3-12, Special Status Fish, Wildlife, and Plant Species within the Planning Area.) 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, the Yampa, the Colorado, the Gunnison, and the 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)]. Usually, stream gradients 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; however, a more rigorous assessment indicates that the true number lies closer to 14 percent (Hirsch et al. 2005).

Within the Planning Area, there are 2 streams 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 Fishes

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. Adult bonytail are gray or olive-colored on the back, with silvery sides and a white belly. The adult bonytail has an elongated body with a long, thin caudal peduncle. The head is small and compressed compared to the rest of the body. The mouth is slightly overhung by the snout, and there is a smooth low hump behind the head that is not as pronounced as the hump on a humpback chub. Adults attain a maximum size of approximately 550 mm total length (Bozek et al. 1984) and 1.1 kg in weight (Vanicek 1967). Currently, the bonytail is listed as Endangered under the ESA, as amended, under a final rule published on April 23, 1980 (45 FR 27710). A Recovery Plan was approved on September 4, 1990 (USFWS 1990). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374), and the final designation became effective on April 20, 1994.

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 within 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). Adults attain a maximum size of approximately 1.8 m total length and 36 kg in weight (Miller 1961). Currently, the Colorado pikeminnow is listed as Endangered under the ESA, as amended. It was first included in the List of Endangered Species issued by the Office of Endangered Species on March 11, 1967 (32 FR 4001), and was considered Endangered under provisions of the Endangered Species Conservation Act of 1969 (16 USC 668aa). The Colorado squawfish (pikeminnow) was included in the U.S. List of Endangered Native Fish and Wildlife issued on June 4, 1973 (38 FR No. 106), and it received protection as Endangered under Section 4(c)(3) of the original ESA of 1973. The latest revised Recovery Plan was approved on August 6, 1991 (USFWS 1991). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374), and the final designation became effective on April 20, 1994.

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).

Currently, Colorado pikeminnow are restricted 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 within 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 is located within 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). Adults attain a maximum size of approximately 1 m total length and 5–6 kg in weight (Minckley 1973). Currently, the razorback sucker is listed as Endangered under the ESA, as amended, under a final rule published on October 23, 1991 (56 FR 54957). A Recovery Plan was approved on December 23, 1998 (USFWS 1998). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374), and the final designation became effective on April 20, 1994.

Historically, razorback suckers were found 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 within 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 is located within the Colorado River and its 100-year floodplain from the Highway 13 Bridge at Rifle, Colorado to Lake Powell.

Humpback chub (*Gila cypha*) -- The humpback chub (*Gila cypha*) is a large cyprinid fish endemic to the Colorado River Basin (Miller 1946). Adults attain a maximum size of approximately 480 mm total length and 1.2 kg in weight (Valdez and Ryel 1997). Currently, the humpback chub is listed as Endangered under the ESA, as amended. It was first included in the List of Endangered Species issued by the Office of Endangered Species on March 11, 1967 (32 FR 4001), and was considered Endangered under provisions of the Endangered Species Conservation Act of 1969 (16 USC 668aa). The humpback chub was included in the United States List of Endangered Native Fish and Wildlife issued on June 4, 1973 (38 FR No. 106), and it received protection as Endangered under Section 4(c)(3) of the original ESA of 1973. The latest revised Humpback Chub Recovery Plan was approved on September 19, 1990 (USFWS 1990b). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374), and the final designation became effective on April 20, 1994.

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 within 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. Within the mainstem of the Colorado River, Designated Critical Habitat is located 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).

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); however, historically 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).

Flannelmouth suckers mature at 4 to 5 years of age. Males mature earliest (McAda 1977; Sigler and Sigler 1996). Females ripen at water temperatures of 10 °C, whereas males ripen earlier in the spring (6.1 to 6.7 °C), and remain fertile for longer periods than females (McAda 1977; Sigler and Sigler 1996). 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) and documented long-range movements (ca. 98-231 km) among adult and sub-adult fish; however, 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. A female will produce 9,000 to 23,000 adhesive, demersal eggs. After fertilization, the eggs sink to the bottom of the stream and attach to substrate or drift between crevices (Sigler and Sigler 1996). After hatching, larvae drift downstream and seek out near-shore, low-velocity areas (Robinson et al. 1998).

The flannelmouth sucker is on the Colorado BLM Director's Sensitive Species List and the CDOW 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.

Primarily, within the Planning Area, this species is found in the mainstem of the Colorado River from State Bridge upstream to Radium, Colorado. 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 further away from shore that have more cover (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).

Bluehead sucker mature at 2 years of age, and/or at 127 mm to 179 mm in length. Spawning occurs in shallow areas when water temperatures reach 15.6 °C. Time of spawning varies by elevation (spring and early summer at low elevations and warm water temperatures, and mid-to-late summer at higher elevations and cooler temperatures) (Sigler and Sigler 1996). Fecundity is related to length, body weight (Holden 1973), and water temperature (McAda 1977). A 38 cm to 44 cm female may produce over 20,000 eggs (Andreason 1973). Eggs hatch in 7 days at water temperatures of 18 °C to 21 °C (Holden 1973). Bluehead sucker, when disturbed during spawning, will compress to the bottom of the stream, and can be captured by hand (Sigler and

Sigler 1996). After hatching, larval fish drift downstream and seek out near-shore, slow-velocity habitats (Robinson et al. 1998).

The bluehead sucker is on the Colorado BLM Director's Sensitive Species List and the CDOW 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.

Within the Planning Area, this species is primarily found in the mainstem of the Colorado River from State Bridge upstream to Radium, Colorado. 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).

Sigler and Sigler (1996) report that roundtail chub mature at 5 years of age, and/or 254 mm to 305 mm in length. Spawning begins in June to early July, when water temperatures reach 18.3 °C. However, Peter Cavalli, of the Wyoming Fish and Game Department, has collected unpublished data indicating that roundtail chub in Upper Green River drainage lakes may mature at sizes as small as 150 mm in water temperatures of 14.4 °C (Colorado River Fish and Wildlife Council 2006). Eggs from 1 female may be fertilized by 3 to 5 males over gravel in water up to 9.1 m. A 305 mm female can produce 10,000 eggs, 0.7 mm in diameter. The eggs are pasty white and adhesive, sticking to rocks and other substrate or falling into crevices (Sigler and Sigler 1996).

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 Colorado BLM Director's Sensitive Species List and the CDOW 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 within the Planning Area. Suitable habitat is found downstream, where temperature and habitat complexity are more conducive to occupancy.

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 within the Planning Area occur at the periphery on National Forest System lands (NatureServe 2008). Very few occurrences have been recorded within the Planning Area over the last 10 years. These include Pole Creek in west 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 Colorado BLM Director’s Sensitive Species list and the CDOW 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 at Jackson Butte Wetland in Grand County.

Wood frog (*Rana sylvatica*) -- This frog is on the CDOW list as a Species of Concern, and is found within 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*) is a Colorado Threatened species. Most likely, it was present in most, if not all, major drainages in Colorado. By the early 20th century, however, it had been extirpated from the State. 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 within 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 within Grand County, are also mapped as overall range for river otters. (See Map 3-14, KFO 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 of Federal agency concern. Species discussed in this Section have been listed by the USFWS or by the CDOW, or have been placed on the Colorado BLM State Director's Sensitive Species List, (See Table 3-12, Special Status Fish, Wildlife, and Plant Species within the Planning Area.) The USFWS manages Threatened and Endangered Species, and designated critical habitat, in cooperation with other Federal agencies, in order 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 in order 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 CDOW have developed formal and informal agreements designed to guide the management of species within 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.

Within the Planning Area, there are 25 federally listed, State Species of Concern, or BLM Sensitive Species that have suitable habitat or documented populations. Of these 25 species, only the bald eagle, Greater sage-grouse, white-tailed prairie dog, American white pelican, northern goshawk, and Canada lynx are known to occur regularly within the Planning Area. The other species listed are addressed in this DRMP/DEIS because there is suitable habitat; there are historical or occasional sightings; or management actions taken within the Planning Area may affect these species elsewhere.

Generally, within the Planning Area, the distribution of most of the Special Status Species is known as the result of land health assessment comments, the CNHP and CDOW 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 within the Planning Area.

Birds

Of the birds listed in Table 3-12, Special Status Fish, Wildlife, and Plant Species within the Planning Area, only 4 are regularly addressed within the Planning Area. These include the bald eagle, American white pelican, Greater sage-grouse, and northern goshawk. The least tern, piping plover, and whooping crane are not found within the Planning Area; however, 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; however, they are not likely to be found within the Planning Area because they are rare; there have only been historical occurrences; or they have no suitable habitat within the Planning Area.

Bald eagle (*Haliaeetus leucocephalus*) -- Bald eagles are listed as State Threatened Species. Recently, however, they were 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). Primarily, bald eagles are winter residents; however, several active nests occur within the Planning Area (including along

the Laramie, Colorado, Blue, and Williams Fork Rivers, as well as along Muddy and Troublesome Creeks). In Colorado, as well as in the rest of the lower 48 states, the bald eagle population has increased substantially. In 1974, there was 1 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. On February 7, 1990, the USFWS published an advance notice of a proposed rule to reclassify the bald eagle from Endangered to Threatened in 43 States where it was classified Endangered, and to retain the Threatened status for the remaining 5 States (55 FR 4209). On July 12, 1994, the USFWS published the proposed rule for this reclassification (59 FR 35584), and the final rule was published on July 12, 1995 (60 FR 36000). After reclassification, bald eagles continued to improve to the point where the USFWS believes that the species no longer meets the definition of a Threatened Species. On July 6, 1999, the USFWS published a proposed rule (64 FR 36454) to delist the bald eagle in the contiguous 48 States, and requested public comments. The comment period on the proposal to delist was reopened on February 16, 2006. The bald eagle was delisted in 2007; however, it is still protected under the Migratory Bird Treaty Act of 1918 (MBTA) (16 USC Sec. 703-712). The final rule on delisting and the Notice of Availability (NOA) of the Draft Monitoring Plan were published simultaneously in the *Federal Register* on July 9, 2007 (Volume 72, Number 130).

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 feet 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 1 to 3 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).

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 7 breeding pairs in 1993. The owl's extremely low numbers, exacting habitat requirements, and low productivity makes them susceptible to extirpation from the State (CDOW 2008c). Limited potential exists for Mexican spotted owl habitat within the Planning Area. To date, no Mexican spotted owls have been observed within the Planning Area. Critical habitat for the Mexican spotted owl has been designated within the State; however, none exists within 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 within 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.”) However, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of active nests occurs (USFWS 2008a).

No individuals have been recorded or confirmed to nest within the Planning Area. Habitat analysis shows that there are 3 identified sites as potential western yellow-billed cuckoo habitat within the Planning Area. Those sites total 83 acres of potentially suitable habitat at 2 sites; and 28 acres as potential habitat at 1 site. All 3 sites are located along the Colorado River.

Ferruginous hawk (*Buteo regalis*) -- The ferruginous hawk is listed as a Colorado BLM Sensitive Species and a CDOW 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 within 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 2 or more male sage-grouse have attended in 2 or more of the previous 5 years. Normally, the area is located in a very open site in, or adjacent to, sagebrush-dominated habitats. Generally, lek sites are traditional, with the same lek sites used year after year. Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day (Colorado Greater Sage-grouse Steering Committee 2008). Typically, leks are positioned within proximity of nesting and brood-rearing habitat; therefore, they are often considered an excellent reference point for monitoring and habitat protection measures.

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

In March of 2010, the USFWS concluded that the Greater sage-grouse warranted protection under the ESA; however, the USFWS determined that proposing the species for protection is precluded by the need to take action on other species facing more immediate and severe extinction threats. As a result, the 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 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 CDOW Species of Concern, inhabit much of the Planning Area. (See Map 3-16, KFO Greater Sage-grouse Range.) Throughout the year, Greater sage-grouse will move between select habitats within 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 3 inactive leks (2006 data). Eight (8) 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; however, in 2006, 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 (3) 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; 34 percent (approximately 140,025 acres) of occupied habitat in the North Park population; and 29 percent (approximately 74,065 acres) of the occupied habitat in the Middle Park population. The BLM is a partner in all 3 local working groups, as well as in relation to 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, oakbrush, 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).

Some limited potential habitat may exist within the Planning Area; however, no records exist. Portions of the Planning Area are within the historic range of the species, but populations are now limited to the extreme northwest portion of the State. In 2001, this population of Columbian sharp-tailed grouse was estimated to have a minimum of 6,080 birds. At the end of 2006, there were a total of 250 known leks in this population, 89 percent of which occur on private land. Of the remaining 28 leks on public land, only 4 occur on BLM-managed public lands (Hoffman and Thomas 2007). None of these leks occur within the Planning Area.

In the fall of 2006 and the spring 2007, the CDOW reintroduced 39 males and 44 females to private lands in Middle Park. At least 5 years of 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.

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 owl 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 limited white-tailed prairie dog colonies; therefore, it is unlikely that high numbers of burrowing owls would inhabit the area. However, there is a possibility that owls would use ground squirrel colonies, which are found within 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 Reservoir and MacFarlane Reservoir 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. Usually, this species 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); however, 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. Within the Planning Area, 3 active nest sites have been recorded: Green Ridge in Jackson County, and Inspiration Point and Kinney Creek in Grand County. Probable sightings have also been reported north of Kremmling and east of Granby, in Grand County. Areas with suitable habitat within 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 tern's 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 within the Planning Area; however, actions within the Planning Area could result in water depletions within 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 within the Planning Area; however, actions within the Planning Area could result in water depletions that affect the plover's habitat downstream. There is no critical habitat for piping plovers within 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 2003, there were only 198 whooping cranes in the only self-sustaining natural population. 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 within the Planning Area. Critical habitat has been designated for the whooping crane; however, none exists in Colorado.

Barrow's goldeneye (*Bucephala islandica*) -- Barrow's goldeneye, a species of duck, is recognized as a Sensitive Species for the BLM in the State of Colorado. Habitat for Barrow's goldeneye includes wooded lakes and beaver ponds in the northwest. Colorado is in the extreme southern portion of its range. This species is a cavity nester, and uses nest holes among beetle-killed trees near montane lakes (Kingery 1998). Kingery lists breeding habitat alterations from logging as the major threat to this species. There may be some habitat within the Planning Area; however, there are no reported sightings of this species.

Black tern (*Chlidonias niger*) -- The Black tern is listed as a Sensitive Species by the BLM in Colorado. Colorado is within the breeding range for Black terns. Breeding habitat is commonly shallow freshwater marshes with emergent vegetation, including prairie sloughs, margins of lakes, and, occasionally, river or island edges and sometimes cultivated rice fields. Most nests are found in semi-permanent ponds. The species prefers marshes or marsh complexes of 50 acres or larger. The loss and degradation of marshes and wetlands is likely the primary cause of decline for this species. There may be some habitat within the Planning Area; however, there are no reported sightings of this species.

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 1 of 9 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. Generally, habitats with trees, high density of shrubs, and tall, dense grass are avoided. The loss of grasslands suitable for nesting is considered to be the greatest threat to the species. Within Colorado, nesting habitat is found primarily on the eastern third of the State; however, migrants may occasionally occur within the Planning Area. There are no known reported sightings of this species within 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; however, 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 within the Planning Area. CHHP records indicate 3 occurrences on private land: 2 in 1978, and 1 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 within 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; however, 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 within the Planning Area; however, 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 within the Planning Area. 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 utilize 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 (*Erethizon 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 4 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; however, they primarily occur on National Forest System Lands. Lynx reported within the Planning Area are, generally, just passing through the area 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 within 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. (Critical habitat has been designated for the Canada lynx; however, none exists in Colorado. Habitat for the lynx within the Planning Area is depicted in Map 3-17, Canada Lynx Potential Habitat).

In addition, 3 lynx linkages occur within 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) within 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 within 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. Within the Planning Area, this species most likely occurs in parts of Larimer County; however, 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 document 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 Federal forests and grassland 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, cave gear, and other equipment). The closure is expected to be in effect for 12 months (USFS 2009).

Gray wolf (*Canis lupus*) -- Gray wolves, within 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 within the Planning Area would likely be individuals from these areas. Outside of the Northern Rocky Mountain Distinct Population Segment, the wolves are still protected by the ESA, and by the State as Endangered. Gray wolves once inhabited Colorado; however, they 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, especially single males, 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 (within the Planning Area). 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 within the Planning Area; however, a few active white-tailed prairie dog towns exist within the Planning Area, as well as on private lands and on 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; however, 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 2010, researchers from the Greater Yellowstone Wolverine program confirmed the first wolverine in Colorado in 90 years. A male wolverine, tracked via GPS-satellite collar, was confirmed in the north-central part of Colorado in Rocky Mountain National Park. Very little, to no, habitat exists on BLM-managed public lands within the Planning Area; therefore, wolverines would likely occur at the periphery of the Planning Area, on National Forest System or National Park Service lands.

Characterization

Indicators

Primary indicators for Special Status Species are their population numbers, population viability, and habitat stability. According to the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a), Standard 4, 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. Special Status, Threatened, and Endangered Species, and their habitats, are being maintained or enhanced when:

All of the indicators associated with the plant and animal communities standard apply, including:

- 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.
- There are stable and increasing populations of endemic and protected species in suitable habitat.
- Suitable habitat is available for recovery of endemic and protected species.

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 CDOW, and others, have reversed the downward trend for a number of these populations; however, 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. The recent drought has reduced the amount and/or quality of habitat in some areas, further stressing populations of these species.

Trends

Special Status Plants

Primary indicators for Special Status Species are their population numbers, population viability, and habitat stability. For most of the Special Status Species, habitat loss and fragmentation have been, and remain, the primary cause of their imperiled status. By definition, the populations of all Special Status Species have historically suffered downward trends. Management efforts by the BLM, the USFWS, the CDOW, and others, have reversed the downward trend for a number of these populations; however, 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 plants varies with hydrologic and soil conditions. The recent drought has reduced the amount or quality of habitat in some areas, further stressing populations of these species.

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 make a trend determination difficult, and should be left at “unknown” until further research and inventory efforts can establish a trend for these 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 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 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 4 Colorado Endangered fishes, managed by the USFWS, has been underway for several years.

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, Special Status Fish, Wildlife, and Plant Species within the Planning Area, the following wildlife species have been documented as occurring within the Planning Area: bald eagle, 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 2005 indicate they inhabit the Planning Area, and are either stable or in an upward trend. Imprecise data for Townsend's big-eared bat make a trend determination difficult, and should be left at "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 within the Planning Area indicate that these are stable or expanding in range and population numbers. Information for species possibly occurring within 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 CDOW 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 between these years. According to these counts, 1984 Greater sage-grouse 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 Greater sage-grouse; in 2007, total population were recorded at 912. In Middle Park, counts have varied from 215 to 313 since the year 2000, with a population of 215 in 2007. The trend in Greater sage-grouse populations within the Planning Area is increasing (North Park Greater Sage-grouse Working Group 2000; Middle Park Greater Sage-grouse Working Group 2001).

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 in order 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/or 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 CFR, 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 4 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; however, the BLM has no responsibility for their long-term protection. 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. However, such properties will qualify if they are integral parts of districts that do meet the criteria, or 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 4 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; however, 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 within 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. Known religious sites and culturally sensitive areas exist that are of interest to Native American.

Based upon a series of amendments to the NHPA, TCPs must now be identified prior to commencement of potentially destructive Federal undertakings, such 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 include:

Scientific Use -- Scientific Use Category sites have intact cultural deposits;

Conservation for Future Use -- The Conservation for Future Use Category is reserved for especially fragile and unique resources.

Traditional Use -- Traditional Use Category sites include human burials and sites identified by BLM archaeologists as having special value to Native American, or to other ethnic or social groups;

Public Use -- Public Use Category sites include prehistoric sites that have yielded valuable information or that have features sufficiently suitable for public interpretation, whether or not they are eligible for listing in the NRHP. This category also includes historic sites that have visual appeal or that are still in current use (such as ditches, bridges, and roads); and

Experimental Use -- Experimental Use Category sites include sites well suited for controlled scientific study, even when such study results in substantial alteration to or loss of the site. Insignificant sites are classified for discharge from use.

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; however, 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, railroads, and 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 undertakings occur, are not protected. Agricultural developments, urban expansion, and other ground-disturbing activities commonly occur on private lands without regard to significant archaeological resources.

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 3-12 Cultural Resource Mandates and/or 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 21 st 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
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 found within 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. Within 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 Statewide 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. In total, 138 eligible sites, and 1 site listed on the NRHP, are within the Planning Area; as well as 287 “Need Data” sites (Reed et al. 2008).

Within the Planning Area, 3 landscape units have been defined: the Middle Park Unit, the North Park Unit, and the Larimer Unit. The Middle Park Unit, which covers approximately 1,632,864 acres, is the largest of the 3 units. This unit contains the towns of Kremmling and Winter Park,

and is bisected from southeast to northwest by U.S. Highway 40. Within the Middle Park Unit, a total of approximately 157,909 acres have been inventoried for cultural resources, comprising 9.7 percent of the total acreage. A total of 3,784 resources are known to occur within 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 3 landscape units within the Planning Area, the Middle Park Unit has the highest site density, with 9 sites and isolated features per square mile inventoried.

The North Park Unit covers approximately 1,048,824 acres, and contains the town of Walden. A total of 122,388 acres within 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 within 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 5 sites and isolated features per square mile inventoried.

The Larimer Unit is the smallest of the 3 units, covering approximately 451,768 acres. This Unit, which is largely undeveloped, contains the town of Glendevey. 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 resources have been identified within 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 within 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 within 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 within the Planning Area; however, it is possible to identify some trends that characterize the condition of the resource as a whole.

Within 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.

Within 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, as well as 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 within the Planning Area as OHV use has increased, and ever-increasing numbers of routes are needed in order to accommodate recreationalists. 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 hire Law Enforcement personnel to patrol the North Sand Hills SRMA, and 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 within 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 as the result of surface trampling or unauthorized collection. Disturbance is also likely to occur when campers move site features (such as rock walls or brush structures) in order to improve campsites.

The Planning Area has experienced only small and concentrated oil and gas development in the past; however, 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 within 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; however, 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 within the Planning Area 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 within the Planning Area; however, 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 within 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. However, the impacts from grazing 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, in many cases, prior to the implementation of current cultural resource management practices, it is often difficult to protect cultural resources on grazed land. When permits are renewed, there is a review designed to determine the number and the type of historic properties, and to assess the potential for impacts to these sites within the allotment.

Land exchanges and sales are another source of impacts to cultural resource sites within the Planning Area. Land exchanges on the KFO have become less common than they have been in the past (such as during the 1990s); however, 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 are mitigated through data recovery or, alternatively, protected through long-term conservation easements.

Overall, the general condition of the cultural resource base within 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-caused activities. Additional cultural resource sites will be discovered and recorded in the future; however, 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 within 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 within 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, in order 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.

Within the Planning area, the BLM Potential Fossil Yield Classification (PFYC) system is used to classify paleontological resource potential in order 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; however, 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.

Within 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; however, many studies have been conducted. Over 1,000 paleontological localities have been documented within 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 3-13, Geologic Formations within the Planning Area with Paleontological Resources presents formations classified as Class 4 or Class 5.

**Table 3-13
 Geologic Formations within the Planning Area with Paleontological Resources**

Formation	Fossils	Classification*
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 4
Qg, Gravels and Alluviums (Pinedale and Bull Lake Age)	Same as Quaternary	Class 4
Qgo, Older Gravels and Alluviums	None known	Class 4
Qe, Eolian Deposits	None known	Class 4
Qd, Glacial Drift of Pinedale and Bull Lake Glaciations	None known	Class 4
Qdo, Older Glacial Drift	None known	Class 4
Ql, Landslide Deposits	None known PFYC 3	Class 4
Td, Dry Union	Mammals, rodents, and other vertebrates	Class 4
Tgv, Bouldery Gravel on Old Erosion Surfaces in Front Range	None known	Class 4

Table 3-13 Geologic Formations within the Planning Area with Paleontological Resources		
Formation	Fossils	Classification*
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 4
Tm, Middle Park Formation, Windy Gap Member	Plants	Class 4
Mz, Mesozoic Rocks	Various	Class 4
MzPz, Mesozoic and Paleozoic Rocks	Various	Class 4
Kp, Pierre Shale, Undivided	Ammonites (marine mammals), baculites (marine mammals), nautilus, bivalves, clams, gastropods, mosasaurs, (marine reptiles), scaphites (cephalopod), and oysters	Class 4
Kc, Colorado Group - Niobrara Formation, Benton Shale, and Graneros Formations	Various	Class 4
Kn, Niobrara	Clams and oysters, fish scales, marine reptiles, mosasaurs, and ichthyosaurs	Class 4
Kc, Benton Shale	Clams, scaphites, baculites, and oysters	Class 4
Kcg, Kc, Kpg, Graneros	Forams	Class 4
Kdp, Kd, Dakota Sandstone	Dinosaur bones and tracks	Class 4
Kdp, Purgatoire	None known	Class 4
Jmr, Jmre, Ralston Creek	None known	Class 4
Jme, Jmse, Jmce, Entrada Sandstone	None known	Class 4
Jms Sundance	Ammonites, belemnites (cephalopod), and oysters	Class 4
TRPs, State Bridge	Brachiopods, vertebrates	Class 4
TRPjs, Jelm	None known	Class 4
TRPI, Lykins	None known	Class 4
TRch, TRcc, Chugwater	Fossil plants	Class 4
TRPjs, TRPennlf, Lyons	None known	Class 4
TRPjs, Satanka	None known	Class 4
TRPr, Triassic and Permian Rocks	Various	Class 4
PPennm, PPennwm Maroon	None known	Class 4
Penmb, Penmbe Minturn	Scientific invertebrates, shark teeth, and also conifer	Class 4
PPenncf, Casper	None known	Class 4
TRPennlf, PPennf, PPenncf, PPennif, Fountain Formation, Lower Part	None known	Class 4
MCamb, MDO, MD, MDCamb, MdCamb, Leadville Limestone	Algal layers and mixed invertebrate skeletal packstones from an intertidal environment	Class 4
MCamb, MDO, DOCamb, Williams Canyon Limestone	None known	Class 4
MD, MDCamb, Gilman	None known	Class 4
MD, MDCamb Dyer	None known	Class 4
MD, MDCamb, DO Parting	None known	Class 4

**Table 3-13
 Geologic Formations within the Planning Area with Paleontological Resources**

Formation	Fossils	Classification*
DOCamb, OCamb, Manitou Limestone	None known	Class 4
MDCamb, Cambs, Sawatch Quartzite	None known	Class 4

*Formations were originally evaluated in accordance with the BLM Handbook H-8270-1, for Paleontological Resource Management. Class 4 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 within the Planning Area, including the Kremmling Cretaceous Ammonite Locality, which has been designated a National Natural Landmark 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

BLM-managed public lands contain many outstanding scenic landscapes. Visual resources in these landscapes consist of land, water, vegetation, wildlife, and other natural or human-made features visible on public lands. Roads, rivers, and trails on public lands pass through a variety of characteristic landscapes where natural attractions can be seen, and where cultural modifications exist. Visual resources contribute to the scenic or visual quality/visual appeal of the landscape. Activities occurring on these lands (such as recreation, mining, timber

harvesting, grazing, or road development) have the potential to disturb the surface of the landscape and impact scenic values. Visual impact is considered the creation of an intrusion or perceptible contrast that affects the scenic quality of a landscape. A visual impact can be perceived by an individual or group as either positive or negative, depending upon a variety of factors or conditions (such as personal experience time of day, weather/seasonal conditions).

Visual Resource Management System

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. Where appropriate, 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 system called Visual Resource Management (VRM). The BLM, using this system, systematically identifies and evaluates visual values in order to determine the 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 system provides an objective and systematic method for identifying and evaluating scenic values in order to determine the appropriate levels of management. It provides a way to analyze potential visual impacts on visual resources, apply visual design techniques in order to ensure that resource uses and management activities are in harmony with their surroundings, and meet the assigned VRM Class objectives. VRM is a tool to identify and map essential landscape settings in order to meet public and community preferences and recreational experiences today, as well as into the future. 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 3 stages:

- visual resource inventory (VRI) and assignment of VRI classes;
- designation of VRM management classes during the land use planning process; and
- analysis stage (visual contrast rating) during RMP implementation.

The inventory stage involves identifying the visual resources of an area and assigning them to inventory classes. The process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. [The process is described in detail in BLM Handbook H-8410-1, Visual Resource Inventory (BLM 1986a).] Overlaying the 3 layers of inventory data (scenic quality, sensitivity, visibility) VRI class designations I through IV are established, with I having the highest value and IV having the lowest visual value. The area's visual resources are then assigned to management classes with established objectives. (See Table 3-14, BLM Visual Resource Management Class Descriptions.)

The VRM system provides an objective and systematic method for identifying and evaluating scenic values in order to determine the appropriate levels of management (BLM 1986a). It provides a way to analyze potential visual impacts on visual resources; apply visual design techniques in order to ensure that resource uses and management activities are in harmony with their surroundings; and meet the assigned VRM Class objectives. VRM is a tool to identify and map essential landscape settings in order to meet public and community preferences and recreational experiences today and into the future.

Table 3-14 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 VRM 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 in order 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 system, therefore, provides a means to identify visual values; 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 in order 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 additional mitigation through stipulations, Conditions of Approval (COAs), or through special design requirements designed to bring the proposal into compliance. The BLM may also work with the proponent to modify the 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 order to mitigate the potential for short-term and long-term impacts resulting from all resource uses and management activities. Examples of management resource uses and activities include energy development, utility corridors, road construction, recreational activities and OHV use, wildland fires, mining, vegetation treatments, and increased urban infrastructure needs and associated development (such as roads, power lines, water tanks, and communication towers).

Current Conditions

The landscape within 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. The diverse topography and vegetative types allow these lands to have a high degree of visual absorption capability. Most of the valley bottoms are privately owned and within the foreground of the viewsheds; however, adjacent public lands serve as important scenic backdrops and visual open space.

Portions of the Planning Area are still largely undeveloped; however, an increase in development and urbanization has changed the visual landscape since the 1984 KFO RMP (BLM 1984b) was written, which is most evident within 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 power 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. In order to minimize the changes to the viewshed, timber removal areas are designed to

look like naturally occurring clearings. However, 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 within the Planning Area due, at least 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 2 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 within the Planning Area provide the foreground and middle-ground landscapes of scenic mountain vistas. Development on these lands have 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 (4) 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; however, there are a few other small towns within 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, however, 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 soil strata. Pinyon-juniper-covered hills provide a diversity of color and texture along the riverway. The main highway intersects Byers Canyon, allowing travelers to see the steep, dark, vertical canyon walls. Several major power lines, however, and a railroad, cut across the landscape.

The human features on the east side of Middle Park are mainly the result of tourism. The largest town is Granby; other communities include Hot Sulphur Springs, Grand Lake, Fraser, Tabernash, and Winter Park. The east side provides a Ski Area, several subdivisions, gateway access to Rocky Mountain National Park, and recreational access to 3 large lakes. Many homes on this side of the 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 (3) large reservoirs are scattered throughout the west side of Middle Park, giving this area additional variety and interest.

In preparation for this DRMP/DEIS, 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 3-15 summarize the acreages of this updated inventory.

In addition to the viewshed analysis, the VRM update (Otak 2007) included outreach, as well as a data gathering process, with all towns and counties, the State, and adjacent National Forests (the White River and the Routt National Forests) within 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 discrepancies were identified. Those discrepancies and management conflicts were eliminated through changes in VRM classes under Alternative B and Alternative C in order to ensure that BLM objectives were aligned with neighboring communities and “other” agency planning objectives.

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

Characterization

Indicators

The 4 visual inventory classes represent the relative quality of the visual resources. The inventory classes are the basis for visual values, and they serve as an indicator for visual quality, as well as a baseline measurement for scenic values. Designation and management of VRM classes allows the BLM to control resource uses and management activities in a manner consistent with natural features and existing uses throughout the area. VRM classes are assigned to areas based upon the combination of scenic quality, visual sensitivity, and distance zones. The 4 VRM classes range from completely natural landscapes to landscapes containing extensive human modification. Visual values are considered throughout the DRMP/DEIS planning process. The area's visual resources are then assigned in order to meet those management class objectives.

Trends

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

recreation and scenic beauty were the most commonly cited reasons that people live in, or visit, the communities within the Planning Area;

communities are concerned about impacts to forest visual resources resulting from the MPB;

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, as well as 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 in order 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;

People in Hot Sulphur Springs indicated that scenic values are important; and

People 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).

The population is not evenly distributed across the Planning Area; however, human influences have altered the visual landscape, especially with respect to land use and land cover. In some

places, intensive human activities (such as 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 within 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), landscape characteristics, including allowable uses (land use allocations), 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 attitudes and 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; however, it is now increasingly seen as having a natural role in the ecosystem (one, in fact, that management can seek to emulate or guide).

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 the site. The function and process of ecological systems has changed. Fire is not the agent of change that it once was, and tree species composition and density has lead 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. For example, in many locations where fires normally occurred in sagebrush and pinyon-juniper communities, 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; however, 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 within the Planning Area. Growth has changed the way communities relate to surrounding public lands, as well as 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.

The BLM, in partnership with local communities, must coordinate the planning process with the Fire Management Plan for fire protection, hazardous materials management, and abandoned mine land (AML) reclamation. As more development occurs, natural disasters (such as major storms, catastrophic wildfires, and subsequent flooding) may result in greater property damage. Planning for the WUI will lessen the risk of permitting developments, facilities, and recreational opportunities in areas that are inappropriate, or place the public at unnecessary risk.

As communities continue to expand into the WUI areas, more private values are exposed to potential losses from catastrophic wildland fires. Counties within 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, and the Approved Plan to guide hazardous fuels management, and to help determine the appropriate management response to each incident.

Current Conditions

The current fire management program in the Planning Area includes suppressing wildfires when appropriate (in order to protect resource values), managing wildland fire and prescribed fire (in order to achieve identified resource objectives), reducing accumulations of high risk fuels (in order to mitigate the risk from wildfire), and engaging in collaborative prevention and mitigation programs with local, County, State, and other Federal agencies, as well as with Fire Districts (in order to improve local fire mitigation and response capabilities to protect public and private lands). Currently, the goals of the Fire Management Program is to take appropriate management action on all wildland fires based upon considerations (including firefighter and

public safety, threats to private property, and at-risk resource; as well as potential resource benefits that can be derived from an incident, anticipated management costs, and economic and social concerns).

The complex regional topography within the Planning Area results in considerable variation in vegetation patterns, storm patterns, and burning conditions. Within the Planning Area, there are 6 vegetation communities 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). Generally, fires in this type are 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, and/or function of these forests.

Mixed-Conifer Forests

The naturally cool, moist environment of these forests makes them relatively fire resistant; however, 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 forest were approximately 20 years 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

Generally, aspen forests in the southwestern part of Colorado had historic mean fire-return intervals of 18 years to 48 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 conifer (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 over 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 areas tend to support wildland fires on a large scale at a moderate-to-long 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; therefore, 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 fire 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.

Generally, lodgepole lives 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 a spruce or mixed fir/pine forests will develop.

Grass Sagebrush Community

Grass sagebrush, the most predominant vegetation type within the Planning Area, has a fire history interval that is largely unknown. Recent fire occurrence data from, 1981 to 2000, however, 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 within the Planning Area, needs specific weather regimes, in relation to the availability of the fuels, in order to burn.

Fire History

Generally, the fire season for the Planning Area 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 within 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, is from the historic condition to the present condition. It is used in order to classify existing ecosystem conditions. (See Table 3-16, FRCC Definitions and Acreages within 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 within the last 100 years, far fewer acres have burned on this schedule. As a result, 98 percent of the Planning Area is in FRCC II, indicating that most of the area should have burned once, but has not.

Table 3-16 FRCC Definitions and Acreages in the Planning Area	
Condition Class¹	Fire Regime Example Management Options
FRCC I Acres: 5,299 1.4 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

**Table 3-16
 FRCC Definitions and Acreages in the Planning Area**

Condition Class¹	Fire Regime Example Management Options
	by treatments (such as fire use).
FRCC II Acres: 373,192 98.6 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 1 or more return intervals (either increased or decreased). The change in frequencies result in moderate changes to 1 or more of the following: fire size, intensity and severity, and/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) in order to be restored to the historical fire regime.
FRCC III Acres: 0 0 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 1 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 3-17, 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 5 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 3-17
 Fire Regimes within 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)	0	0
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)	0	0
Fire Regime IV (35 years to 100+ year frequency and high severity: stand replacement fires)	261,159	69
Fire Regime V (200+ year frequency and high severity: stand replacement fires)	117,332	31
Unclassified (water, barren, and alpine/tundra)	0	0

Source: BLM 2007g

Fuel Conditions

The fuel structure within 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); however, 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 forested areas, 80 percent mortality from MPB has created heavy fuel loadings. The dead trees have allowed grass 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 and USFS 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 2008q) 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 Craig Fire Program. In the event of multiple wildland fire ignitions, or limited resources/funding, priorities are derived from local, State, and Federal guidance, using a rating system of low, moderate, and high for wildland fire suppression, wildland 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 (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, as well as 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

In accordance with the FLPMA, through the land use planning process, the BLM is required to consider all available information in order to determine the mix of resource use and protection that best serves the multiple-use and sustained-yield mandate. Under the FLPMA, the BLM has numerous authorities requiring the agency to maintain inventories of all public lands and their resources, including wilderness characteristics, and to consider such information during the land use planning process.

During the planning process for this DRMP/DEIS, the BLM completed a review of the public lands within the KFO (and, originally, the CRVFO) in order to determine whether or not they possess wilderness characteristics. Wilderness characteristics include naturalness and outstanding opportunities for solitude, and for primitive and unconfined recreation. (The results of this Wilderness Characteristics Assessment are in Appendix H.) This review includes only BLM-managed public lands, and does not include portions of proposals on National Forest System lands or existing WSAs. For the purposes of this DRMP/DEIS, proposals involving lands exclusively within existing WSAs will not be analyzed; however, any additions to the WSAs (lands outside of, or adjacent to) will be assessed for wilderness characteristics. All wilderness characteristic proposal areas that occur within existing designated WSAs would be managed in a manner designed to protect those wilderness characteristics, under the BLM's Interim Management policy, until Congress designates them as Wilderness or releases them for other uses.

Based upon this assessment, the Planning Area is meeting its obligations for updating and maintaining an inventory of wilderness resources under Section 102, Section 201, and Section 202 of the FLPMA. In addition, BLM Handbook 1601-1 (Land Use Planning Handbook) identifies broad-scale decisions that guide future land management actions and subsequent site-specific implementation decisions. Specifically, Appendix C (Part K, Wilderness Characteristics) of the Handbook directs Field Offices to identify decisions designed to protect or preserve wilderness characteristics (naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation) (BLM 2005a).

The assessment of lands with wilderness characteristics is designed to answer the following question: Does the area meet the overall criteria for wilderness character. The assessment reflects current conditions, and will be used in order to update wilderness inventories. The process entails the identification of Wilderness Inventory Units, an inventory of roads and wilderness character, and a determination of whether or not the area meets the overall criteria for wilderness character (naturalness, outstanding opportunities for solitude, and primitive and unconfined types of recreation). Units found to possess such character are being evaluated during the land use planning process in order to address future management. The following factors are documented:

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

Supplemental Values -- Does the area contain ecological, geological, or other features of scientific, educational, scenic, or historical value?

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

Current Conditions

In 1979, the Troublesome, Drowsy Water, Yarmony Mountain and Strawberry (Behler Creek) areas were proposed for intensive wilderness inventory. An intensive wilderness inventory was conducted in 1980 for all the areas identified except for Strawberry(Behler Creek). In 1994, Colorado conservationists presented the Conservationists' Wilderness Proposal for BLM Lands to the BLM. This compiled numerous citizen wilderness inventories and area-by-area justification for the Statewide Citizens' Wilderness Proposal. The 1994 Citizens' Wilderness Proposal did not include any areas within the Planning Area. In 2001 and 2007, based upon new citizen inventories, the Citizens' Wilderness Proposal was expanded to include 1 area within the Planning Area, the Troublesome area.

In conjunction with the Resource Management Plan revision process the KFO considered public scoping comments, and conducted a preliminary review for the purposes of updating the original wilderness characteristic inventory. This review indicated that 3 of the areas initially proposed for inventory in 1979 merited assessment for wilderness characteristics. The Strawberry (Behler Creek) area was included for assessment based on scoping comments and the fact 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 as follows:

Troublesome

Size: 11,915 acres intensively inventoried
9,595 acres were proposed as a WSA in 1980 recommendations
8,250 acres were subsequently identified as a WSA

1,345 acres were deleted as a result of a public comment regarding a road in the western portion of the unit. The BLM field checked the road and determined that it represented a significant imprint of man, due to its cut along hillsides and through forests for much of its length. Other roads accessing private inholdings in the southeast portion of the unit were found to not impact the naturalness and were used to form the boundary of the unit.

Naturalness: The unit was found to be generally natural in appearance and having retained its ecological naturalness, as well. Minor imprints included 2 ways, an abandoned irrigation ditch, several stock watering ponds, and other range improvements. Most of these imprints were noted to be well-screened by the dense forest vegetation and topography, and were “substantially unnoticeable.”

Opportunities for Solitude: The inventory documented that the Troublesome Unit had “outstanding opportunities for solitude,” due to its size, topographic variation, and forest and riparian vegetation. The drainages of Rabbit Ears and Troublesome creeks, and their tributaries, with intervening ridges, dense forest and riparian vegetation, would screen visitors from each other and provide opportunities to become isolated. The inventory noted that the unit afforded long-range views from the higher points in the northern portion, thus enhancing a feeling of vastness. Overall, the unit was found to provide numerous opportunities for solitude.

Opportunities for a Primitive or Unconfined Type of Recreation: The inventory determined that the unit possessed outstanding opportunities for primitive or unconfined recreation due to: (a) a variety of game and non-game wildlife; (b) opportunities for hiking, backpacking, horseback riding, cross-country skiing, and snowshoeing; (c) availability of stream and riparian habitat for fishing and wildlife viewing; (d) a variety of geologic features for viewing and non-technical climbing; and (e) opportunities for scenic viewing from higher elevations.

Drowsy Water

Size: 9,870 acres were intensively inventoried.

0 acres were proposed as a WSA

0 acres were identified as a WSA

Naturalness: The inventory found that the most significant imprints of man were 14 miles of ways that dissected the unit, and 2 miles of an irrigation ditch. The ways were graded by heavy equipment with numerous cuts and fills all in evidence on the landscape. Since the reclamation potential was determined to be low, the unit was found to not meet the naturalness criteria.

Opportunities for Solitude: The inventory found that some opportunities for solitude could be found in the forested areas in the northern half of the unit; however these opportunities were limited by the cumulative impacts of the existing ways, open sagebrush-covered areas, and steep-sided mesas. These limitations would tend to concentrate users, reducing opportunities for isolation. It was determined that the unit did not meet the criteria for solitude.

Opportunities for a Primitive or Unconfined Type of Recreation: The inventory found that the unit offered limited opportunities for hiking and backpacking. However the 14 miles of ways were said to be conducive to a “confined experience” and the 40 percent sagebrush cover offered little or no primitive recreation opportunity.

Yarmony Mountain

Size: 9,590 acres were intensively inventoried.

0 acres were proposed as a WSA.

0 acres were identified as a WSA.

Naturalness: The inventory found that 12 miles of ways dissecting the unit and numerous range improvements (springs and fences) detracted significantly from the apparent naturalness of the unit. The ways were found to have experienced heavy use, resulting in loss of parent material due to erosion, and they represented a significant visual contrast on the landscape. The unit was determined not to meet the criteria for naturalness.

Opportunities for Solitude: The Yarmony unit was found not to offer outstanding opportunities for solitude due to: (a) the restrictive nature of the topography (mesa-like with small gulches); (b) the lack of vegetation on the mesa tops; (c) the configuration of the unit in the north resulting from private land ownership. It was determined that overall the unit did not meet the criteria for solitude.

Opportunities for a Primitive or Unconfined Type of Recreation: The inventory determined that primitive recreational opportunities were limited due to the confining nature of the topography and configuration caused by private land in the northern portion. Most recreational activity would be confined to a relatively small area on the southern mesa top. Overall the unit was found to not offer outstanding opportunities for primitive, unconfined recreation.

Strawberry (Behler Creek)

Size: 4,600 acres

Since the Behler Creek area did not meet the size criteria of 5,000 acres during the initial inventory effort of 1979, this area was not proposed for intensive inventory in 1980.

Table 3-18, Lands with Wilderness Character outside Existing WSAs, shows the areas that were assessed as part of the planning process for this DRMP/DEIS.

Table 3-18 Lands with Wilderness Character Outside Existing WSAs					
Name	Total KFO Acres Included in Citizens' Wilderness Proposal	Acres in Existing WSAs	Acres Analyzed for Wilderness Character outside Existing WSAs	Acres with Wilderness Character	Acres with No Wilderness Character
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	0	5,834

Troublesome Inventory Assessment Area

Under the Citizens' Wilderness Proposal, the Troublesome Inventory Assessment Area includes a total of 11,771 acres; 8,158 acres of which are within the Troublesome WSA. The BLM's Assessment is for the 3,613 acres outside the Troublesome WSA. The area consists entirely of BLM-managed public lands. A total of 2,345 acres meet the overall required criteria for wilderness character, summarized as follows:

- the area is managed as VRM Class II;
- the area is closed to motorized travel;
- existing Recreation Opportunity Spectrum (ROS) physical settings show that the area is approximately 40 percent back country, 36 percent middle country, and 24 percent front country;
- livestock grazing occurs on 2 allotments; there are no known range improvements;
- Rabbit Ears Creek was evaluated for WSR eligibility in 2007, and found eligible;
- the area is open to oil and gas leasing; however, no land is currently leased;
- there are no known water rights within 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, its presence, however, 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 Assessment Area includes 7,508 acres. The area consists entirely of BLM-managed public lands. All 7,508 acres meet the overall criteria for wilderness character, summarized as follows:

- 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 ROS physical settings show that the area is 14 percent back country, 65 percent middle country, and 19 percent front country;
- livestock grazing occurs on 3 allotments; there are 2 developed springs in the area;
- there are 3 water rights within the unit;
- the area is open to oil and gas leasing; however, 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, as well as the area's topography, enhance opportunities for solitude in the area.

Strawberry Inventory Assessment Area

The Strawberry Inventory Assessment Area includes 6,147 acres. The area consists entirely of BLM-managed public lands. The area does not meet the overall criteria for wilderness character, summarized as follows:

- the area is managed as VRM Class II;
- the area is managed as open to cross country travel, with certain seasonal closures;
- existing ROS physical settings show that the area is 6 percent back country, 40 percent middle country, 30 percent front country, and 24 percent rural;
- livestock grazing occurs on 1 allotment; there are no known range improvements in the area;
- the area is open to oil and gas leasing; however, no land is currently leased;
- there are 6 water rights within 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 within the assessed area: Road End Seep and Behler Creek;
- limited access as a result of adjacent private lands, the area's topography, the Fraser River and US Forest Service-managed lands. The adjacent Forest Service lands are designated as backcountry non-motorized and do not provide connecting access routes;
- limited access points and the area's topography also 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 four cherry-stemmed roads within 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 these routes were likely created for access to timber resources, two of them are primarily within sage and all were tank-trapped to prevent travel along them, with the exception of Behler Creek Road. If travel was effectively restricted the routes would likely be part of the assessed area, with the exception of Behler Creek Road.

Characterization

Indicators

Within the Planning Area, the indicators for lands with wilderness characteristics outside existing WSAs consist of those documentation 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 for having wilderness characteristics.

Trends

All 3 areas considered have been impacted by the ongoing MPB epidemic. As public demand increases to reduce the wildland fire risk associated with the beetle-killed trees, the naturalness of these areas could be impacted.

Limited access, topography, and adjacent National Forest System lands will continue to hinder development within the Troublesome and Drowsy Water Inventory Assessment Areas; development that could impact naturalness and opportunities for solitude.

Currently, all 3 areas are open to oil and gas leasing; however, all 3 areas have been mapped as having low, or no, potential for oil and gas, with the exception of the southeast part of Drowsy Water, which is mapped as having moderate potential.

Current trends in motorized recreation have led to increased motorized use, and to the proliferation of motorized routes, within the Strawberry and Drowsy Water Inventory Assessment Areas. This trend would be expected to continue under current travel management decisions.

There are trespass issues, as well as potential issues related to user-created routes, associated with lands within the Troublesome Inventory Assessment Area adjacent to the Bighorn Subdivision. Currently, the BLM is completing land surveys in order 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 BLM 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 within the Planning Area.

3.2.13 Forestry Resources

The BLM manages 3.5 million to 4 million acres of forested lands in Colorado. Over 2.5 million acres are considered woodlands, dominated by pinon, juniper, and oak. The remaining forested acres consist of traditional commercial tree species (such as ponderosa pine, lodgepole pine and Douglas fir). Some of the wood products harvested include sawtimber, firewood, Christmas trees, post and poles, and biomass.

Management decisions, as analyzed in this DRMP/DEIS, 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 that affect the extent and/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. The following list, by no means inclusive, provides several more examples of decisions or actions made as part of the planning process that could also impact the quality and/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 (for example, 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 Planning 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 out 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 PQ 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 suitable commercial land (to determine acres 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 analysis project used a growth-and-yield model, which employed various silvicultural systems (prescribing various intermediate treatments and cutting methods) in order 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 Planning Area's mature and over-mature lodgepole pine stands, a determination of PSQ by alternative is hypothetical at best, as it is based upon what was possible before the epidemic.

Annual timber harvest within the Planning 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, as well as 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 post and pole, Christmas trees, and landscaping transplants. Within the Planning Area, these sales range from 150 trees to 500 trees annually. 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 (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 (such as recreational use) will be used as indicators to prioritize harvest treatments and harvest amounts.

Trends

Over the past 15 years, the sawlog market has decreased in Colorado. Recent declines in the national housing construction level has further reduced regional demand for sawlogs. In addition, the MPB epidemic has killed almost all of the commercial timber within the Planning Area (with only a few scattered, live trees remaining). Larger diameter dead trees would continue to be salvaged and sold as sawlogs; however, this activity 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 burning limitations in the area, and the availability of relatively cheap electric and natural gas. Recent increases in natural gas and fuel oil prices, however, may reverse this trend. The supply of firewood 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 in order to identify and promote the use of small sawlogs and woody biomass in Colorado. Woody biomass products are a small portion of the Planning Area's timber program; however, growth of this market sector is anticipated to continue, placing higher demands on small sawlogs and woodlands.

The DOI collaborates with the Department of Energy (DOE) and the USDA in order 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, in order to perform services designed 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 (such as biomass, sawlogs) for services (such as thinning, fuels reduction, and/or noxious weed control). Contractors purchase, through conservation credits earned for completing services, the goods generated through the project. 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.

The management of the public domain lands is focused on forest health restoration, reducing the risk of catastrophic wildfire, and forest product sales through commercial green and salvage timber sales, as well as through personal use permits. 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.]*

Any U.S. citizen, or validly licensed business, can apply for a BLM grazing permit or lease. In order to do so, one must either:

- buy or control private property (known as “base property”) that has been legally recognized by the BLM as having preference for the use of public land grazing privileges; or
- acquire property that has the capability to serve as base property, and then apply to the BLM to transfer the preference for grazing privileges from an existing base property to the acquired property (which would become the new “base property”).

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 and leases specify the grazing preference, 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 the State, 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 grazing preference, except for permits and leases for designated ephemeral rangelands, where the BLM authorizes livestock use based upon forage availability, or designated annual rangelands. Preference 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 case of designated ephemeral or annual rangelands.

The grazing preference specified is attached to the base property supporting the grazing permit or grazing lease. The animal unit months (AUMs) of grazing preference are attached to:

- the acreage of land base property on a pro-rata basis, or
- water-base property on the basis of livestock forage production within the service area of the water (43 CFR 4110.2-2).

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/leases may be cancelled or modified, as appropriate, in order 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. These include:

- **Standard 1** -- Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimize surface run-off.
- **Standard 2** -- Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance (such as fire, severe grazing, or 100-year floods). Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.
- **Standard 3** -- Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and the habitat's potential. Plants and animals at both the community and

population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.

- **Standard 4** -- Special status, Threatened and Endangered Species (State and Federal), and other plants and animals (and their habitats) officially designated by the BLM are maintained or enhanced by sustaining healthy, native plant and animal communities.
- **Standard 5** -- The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM-managed lands achieves or exceeds the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.

Guidelines 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:

Grazing management practices must promote plant health by providing for one or more of the following:

- periodic rest or deferment from grazing during critical growth periods;
- adequate recovery and regrowth periods;
- opportunity for seed dissemination and seedling establishment.

Grazing management practices must address the kind, numbers, and class of livestock, season, duration, distribution, frequency, and intensity of grazing use and livestock health.

Grazing management practices must maintain sufficient residual vegetation on both upland and riparian sites in order to protect the soil from wind and water erosion, in order to assist in maintaining appropriate soil infiltration and permeability, and to buffer temperature extremes. In riparian areas, vegetation must dissipate energy, capture sediment, recharge ground water, and contribute to stream stability.

Native plant species and natural revegetation must be emphasized in the support of sustaining ecological functions and site integrity. Where reseeding is required on land treatment efforts, emphasis must be placed on using native plant species. Seeding of non-native plant species will be considered based upon local goals, native seed availability and cost, persistence of non-native plants and annuals and noxious weeds on the site, and composition of non-natives in the seed mix.

Range improvement projects must be designed in a manner consistent with overall ecological functions and processes, with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.

Grazing management must occur in a manner that does not encourage the establishment or spread of noxious weeds. In addition to mechanical, chemical, and/or biological methods of weed control, livestock may be used where feasible as a tool to inhibit or stop the spread of noxious weeds.

Natural occurrences such as fire, drought, flooding, and prescribed land treatments should be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape. This must include the maintenance, restoration, or enhancement of habitat in order to promote and assist the recovery and conservation of Threatened, Endangered, or other Special Status Species, by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors, and thus minimizing habitat fragmentation.

Colorado BMPs, and other scientifically developed practices that enhance land and water quality, should be used in the development of activity plans prepared for land use.

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

Generally, impacts to livestock grazing occur as the result of activities that affect forage levels, livestock exclusion, and/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

Within the Planning Area, a total of 337,414 acres, or 89 percent, of BLM-managed public lands are allocated for livestock grazing. These public ranges are permitted at a level of 35,239 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). Section 3 allotments are those within a grazing district, as provided in the Taylor Grazing Act. Section 15 allotments are those outside of a grazing district. (The districts were designated during the passage of Taylor Grazing Act). (See Map 2-25, KFO Alternative A: Grazing Allotments; see Appendix K for allotment and grazing use data for all allotments currently permitted for grazing use.)

Within the Planning Area, there are 41,080 acres, or 11 percent, of BLM-managed public lands that are not allocated for livestock use. There are 6 allotments that have been voluntarily relinquished or that are not attached to private base property: Allotment 7561 Spruce Creek; 7573 Lawson Ridge; 7505 Sulfur Gulch; 7755 Selak E; 7522 Selak; and 7524 Fraser River. Allotments 07505 (Sulphur Gulch) and 07561 (Spruce Creek) are unallocated because they are critical winter wildlife habitat; the other 4 allotments are unallocated because they are unsuitable for livestock grazing (due to a number of factors, including vegetation, topography, or a combination of these factors).

Within the Planning Area, there are 254 allotments, composed of 121 permittees and 143 permits/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.

Within the Planning Area, the season of use is, generally, from May through October, with much of the use in spring (May and early June). Spring use occurs on the lower benches, and is designed to coordinate with the end of calving on private lands. 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 6 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; however, 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 would be implemented, in accordance with 43 CFR 4110.3-3.

Allotment Management

In 1982, the BLM developed 3 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 within the Planning Area were prioritized for management according to one of the three levels. The criteria used for placing allotments in a Management Category were the presence of resource conflicts or problems and the potential for improvement, as outlined in the BLM's Selective Management Policy. Within the Planning Area, a total of 20 allotments are in the M category; 76 are in the I category; and 215 are in the C category. The status of this decision 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 that have been completed since the 1984 KFO RMP (BLM 1984b), the exact number of which is unknown.

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, in order 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 in order 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/leases within the Planning 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 within the Planning Area. The decrease is a result of improved technology determining the number of acres of BLM-managed public lands (GIS), and the sale and exchange of BLM-managed public lands.

3.2.15 Recreation and Visitor Services

BLM-managed public lands within north-central Colorado offer a variety of outdoor recreation opportunities, including land-based, water-based, and snow sports activities. Typical recreational activities within the Planning Area include camping, hiking, horseback riding, mountain biking, OHV use, and cross-country skiing. Migrating and resident wildlife provide plentiful opportunities for hunting, photography, and observation. Renowned local rivers (the Eagle, the Colorado, the Blue, and the Roaring Fork), 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 Planning Area come from 3 primary sources: national and international locations, the Denver metropolitan area and Colorado's Front Range, and locally. Most of the Planning Area can be easily reached via 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 within the Planning Area.

Colorado's population has grown significantly (43.4 percent) since 1990 (Colorado State Demography Office 2007a), and an increasing number of people are living near, or seeking out, BLM-managed public lands for a diversity of recreational opportunities characterized by the "mountain resort or outdoor lifestyle." The Planning area is a year-round place to live and work; and, as a result BLM-managed public lands are absorbing the increasing recreational demand and use.

As the demand for BLM-managed public lands increases, so does the potential for conflicts among its users. OHV use within the Planning 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; as well as engines/motors associated with ATVs, OHVs, and vehicles) is also an important recreational activity that takes place within the Planning 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/road networks and aesthetic amenities. Within the Planning Area, community growth issues 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 within 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 the State of Colorado, and approximately 62 percent were repeat visitors to BLM-managed public lands (ASU 2008).

Outdoor Recreation Service Providers

Prominent recreation service providers within, or near, the Planning Area include the USFS and the NPS. The Planning Area is surrounded by the Arapahoe/Roosevelt, White River, and Medicine Bow-Routt National Forests. All 3 national forests manage leases for Ski Area Resorts: Winter Park on the Arapahoe/Roosevelt; Keystone, Breckenridge, Copper Mountain, and Vail/Beaver Creek on the White River; and Steamboat Springs on the Medicine Bow-Routt. These year-round 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 within the Planning Area include State Wildlife Areas (managed by the CDOW) and the Colorado Forest State Park (near Gould, and managed by Colorado State Parks.)

Tourism

Ease of access to the mountain communities is a relevant BLM planning factor. I-70 is a vital transportation corridor linking Denver International Airport (DIA), the Denver metropolitan area, and other Front Range population centers to the Planning Area. The area can be reached via an easy 2-hour drive from Denver on I-70, offering easy access to BLM-managed public lands, as well as many lodging and dining options, arts and entertainment venues, and renowned historical sites. In addition to the Ski Area Resorts, popular tourist attractions include multiple reservoirs (Shadow Mountain, Granby, Williams Fork, Green Mountain, and Wolford) and a National Scenic and Historic Byway. The reservoirs attract visitors during the summer (for fishing and boating) and during the winter (for fishing and snowmobiling). The Colorado Headwaters National Scenic and Historic 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).

Hunting

The nation's largest herd of elk attracts large numbers of hunters during the fall big game hunting season, beginning in late August and lasting into December. Colorado offers unlimited over-the-counter elk hunting licenses; therefore, big game hunting alone accounts for over 370,000 participants State-wide; and over 197,000 hunter days within 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 season 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).

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 2 SRMAs, totaling 13,687 acres. (See Table 3-19, SRMAs within the Planning Area, and Maps 2-36-39, KFO Special Recreation Management Areas.) These lands are characterized by a diversity of natural resource settings and a range of recreational opportunities.

Table 3-19

SRMAs within the Planning 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 2 recreation fees 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

BLM-managed public lands not delineated as an SRMA are 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. Within ERMAs, management, administration, marketing, information, education, and monitoring support actions 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, and/or resource protection.

The Planning Area has 1 ERMA, which makes up 88 percent of 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.

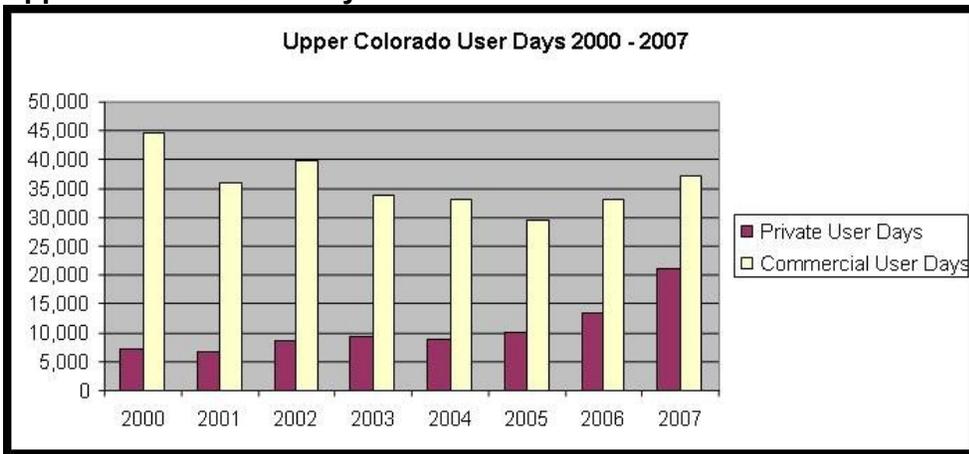
River Recreation Management

The KFO manages river-related activities along the Upper Colorado River, the Fraser River, the Blue River, and along Muddy Creek. The BLM invests minimal management along the Fraser River, the Blue River, and Muddy Creek. This is due to the fact that 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 a take-out area near the confluence of the Blue and Colorado Rivers; however, most river visitors use take-out areas located on private land, upstream of the BLM site. The BLM manages 1 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 5 walk-in fishing access sites between Parshall and Kremmling. Below Kremmling, the BLM manages 3 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 2 distinct sections of the river that are used for recreation. Gore Canyon is a nationally significant Class V whitewater section. This section experiences little use by boaters until late summer, when flows drop on other Class V sections around the State and nation. An annual whitewater race, which attracts participants from across the country, takes place in the canyon every 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 State Bridge. This section of river is the primary recreation attraction within the KFO. It is used for Class II through Class III whitewater boating, as well as for float fishing trips. Commercial outfitting accounts for the majority of use in this section; however, 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 - 2007



Developed Recreation Facilities

Within the Planning Area, developed recreation sites and facilities have been constructed in order to enhance recreational opportunities, protect resources, manage activities, and/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 within the Upper Colorado River SRMA and in the North Sand Hills SRMA. There are 2 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 seasonal toilets and parking. The North Sand Hills SRMA has 13 developed campsites, 2 single-vault toilets, 1 double-vault toilet, and 1 visitor informational kiosk site. (One of the single-vault toilets is on Colorado State Land Board land; however, 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.

Within the Planning Area, the BLM has signed a Memorandum of Understanding (MOU) with several local groups, including the:

- Kremmling Chamber of Commerce (in order 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 (in order 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 (in order to cooperate in the management and maintenance of the Mugrage Campground and the Radium Recreation Area); and
- the Mountain Metal Mashers (in order to monitor and maintain the Sidewinder technical 4x4 route in the Wolford Mountain Travel Management Area).

Additionally, in 2005, the North Sand Hills Working Group was created (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) in order 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 3-20, Stipulations for Recreation Opportunities within the Planning Area.)

Table 3-20 Stipulations for Recreation Opportunities within the Planning 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/or related waters for specified purposes. The use of public lands and/or related waters is a privilege subject to the terms and conditions of the permits. BLM Special Recreation Permits (SRPs) are the basis for the BLM's recreation fee program, and are used to implement REA's Standard Amenity, Expanded Amenity, and Special Recreation Permit Fees (BLM 2006h). SRPs are issued in order to authorize specified, and often time-restricted, recreational uses of the public lands and related waters. 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, and/or therapeutic institutions or non-profit organizations are considered commercial when the above criteria are met, 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 in order 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 the State Government, as provided for in Title II of the Sikes Act (16 USC 670a); or 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. Within the Planning Area, very few permanent camps/facilities are authorized on BLM-managed public lands. This is because most camps are on private lands.

As of 2008, the KFO issued approximately 54 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 felt 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 still feels that the demand for commercial river-related services continues to be met. As a result, the policy of not issuing new river-related permits is still in place.

The KFO issues 20 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 2007, the KFO collected over \$115,000 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, and/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. Within the Planning Area, all construction 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 DIA, 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 land marketing focuses on skiing and resort towns, including Winter Park, Steamboat Springs, Vail, 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 Chamber of Commerce to market outdoor recreational opportunities on BLM-managed public lands. The BLM also provides information to

the BLM Colorado State Office 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 within 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-formally managerial) were merged into 1 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.

Physical Setting Character Condition

For the protection of the physical RSCC, the KFO has 2 NSO stipulations covering SRMAs; 1 for the Upper Colorado River SRMA (4,870 acres) and 1 for the North Sand Hills SRMA (1,325 acres).

In addition, 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 was described as semi-primitive non-motorized (BLM 1984b). Currently, the Planning 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 Planning 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 Planning 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, and mechanized/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.) It is estimated that the Planning Area receives an estimated 348,000 visits per year. The BLM does not have precise visitation data; however, the adjacent Arapahoe/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.

Within the Planning Area, the evidence of humans 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. However, other upland areas, such as Wolford Mountain, Strawberry, and Kinney Creek, receive high use from motorized/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 in order 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, and mechanized/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 and adopted ROS physical setting classes adopted in 1984; however, 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, adds to their quality of life, and fosters 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 for awhile. 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/retire, and greater family bonding (ASU 2008). The ASU Study measured participant outcomes only; therefore, 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; however it is clear that recreation has grown to become the predominant use of BLM-managed public lands. The Planning Area region has become a year-round place to visit, live, and work; and 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); and an increasing number of people are living near, or seeking out, local BLM-managed public lands for a diversity of recreational opportunities characterized by the “mountain resort or outdoor lifestyle.” During the 1990s, 8 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 within 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 3.2.25, 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 3-21, Planning Area Acres with Travel Limitations (Open Areas not Included), is a summary of acres where OHV travel is restricted. Table 3-22, 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.

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 <i>Phacilia</i> <i>formosula</i> 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 3-22, 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 3-22 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)
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. 2769¹	Closed to motorized vehicles April 15 to June 1
Spruce Creek Road No. 2767¹	Closed to motorized vehicles Labor Day to 6/1
Spruce Creek Spur 1 No. 2770¹	Closed to motorized vehicles Labor Day to 6/1
Spruce Creek Spur 2 No. 2771¹	Closed to motorized vehicles Labor Day to 6/1
Wolford Mountain Single Track¹	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

**Table 3-22
 Seasonal Travel Limitations within the Planning Area**

Location	Description of Seasonal Route Limitation
	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 3-23, Over-the-Snow (Snowmobile) Travel within the Planning Area.]

**Table 3-23
 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 3-24, 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 3-24
 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 in order 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 within the Planning Area could also affect the Lands and Realty Program.

Current Conditions

Land Tenure

Within the Planning Area, surface land ownership is mixed. (See Table 3-25, Surface Land Ownership within 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 the 2000 RMP Amendment for Land Acquisition and Land Use Priorities (BLM 2000b). (See Map 1-1, KFO Planning Area and Land Status.)

Land Status	Acres	Percentage of Planning Area
BLM	378,884	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	3,116,272	100 Percent

Source: BLM 2011

Land Tenure Adjustments

Land tenure adjustments within the Planning Area are used in order 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 within the Planning Area.

Under the updated KFO RMP ROD (BLM 1999a), 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 national 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 within the Planning Area have been identified for special disposals under the updated KFO RMP ROD (BLM 1999a). 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.

Within 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;
- isolated tracts of land that:
- have no important wildlife habitat values;
- are not within a sensitive watershed or riparian area;
- are in areas where the BLM initiated range management opportunities that are limited due to size, isolation, and/or site potential;
- are lands where the BLM initiated forest management opportunities that are limited due to tract size, stand size, access difficulties, and/or adverse sites; and
- have no resource values of major significance.

The BLM's 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 within 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 in order 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 within 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 2 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 within the Planning Area with future potential for waterpower and reservoir resource use are assigned to 1 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 in order 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 within the legislation that designates the river as Wild and/or as Scenic.

FERC Sites -- Additional BLM-managed public lands within the Planning 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; however, 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; however, 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 in order to protect its special river-related recreation emphasis for approximately one-half mile on each side of the Upper Colorado River. Established in an Amendment to the 1984 Kremmling RMP in 2000, 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 2 ACECs within the Planning Area. None of the ACECs have been withdrawn.

Withdrawals that Create Federal Reserve 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 in order 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 in order 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, and/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; however, 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; however, 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 in order to preserve and protect in free-flowing condition the Outstandingly Remarkable Values (ORVs) associated with designation of the segment. Presently, there are no designated WSRs within the Planning 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 within 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 in order 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 within the Planning 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. 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).

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 3-26, Active Right-of-Way Authorizations within the Planning Area.)

Table 3-26 Active ROW Authorizations within the Planning 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

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 harass livestock or wildlife;
- avoid steep topography, poor soils, or other fragile areas (such as Threatened and Endangered habitats); and
- avoid cultural sites that are listed on, or are eligible for listing on, the NRHP.

Utility Corridors and Communication Sites

Multiple utility corridors and communication sites exist within the Planning Area. Land use authorizations for utility corridors are granted through a ROW grant. Land use authorization for communication sites are granted through a communication use 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 Draft Programmatic EIS (PEIS) for the Designation of Energy Corridors on Federal Land in the 11 Western States was published in October 2007 (DOE and BLM 2008). The PEIS 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 establishes an energy corridor north of Walden (Western Utility Group 1992). No other corridors to accommodate preferred routes for transportation and transmission facilities are proposed in the PEIS. (See Map 3-19, KFO Utility Corridors, shows the utility corridors within the Planning Area.)

Identifying corridors does not necessarily mandate that transportation and transmission facilities would be located within the corridor, especially if they are not compatible with other resource uses, values, and objectives in, and near, the corridors, or if the corridors are saturated.

Communication Sites

Several sites within the Planning 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 within the Planning Area. Co-location of communication sites is encouraged, and does occur within the Planning Area on North Cottonwood, Mount Chauncey, San Toy, and Peterson Ridge. There are no designated sites for establishing communication sites within the Planning Area. Table 3-27, Communication Sites within the Planning Area, provides the communication sites authorized by the KFO.

Table 3-27 Communications Sites within the Planning 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

Table 3-27 Communications Sites within the Planning Area			
Serial Number	Holder/Owner	Township, Range, Section	Tenant/Customer
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
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 within the Planning Area is surface land ownership. Any exchange, acquisition, or disposal of public lands within 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

Within the Planning Area, the BLM is consolidating public lands in order to benefit the public. In order to achieve this goal, candidates for land tenure adjustment through disposal, sale,

exchange, or acquisition include parcels that are difficult to manage; parcels that do not have public access; parcels that are relatively small, and are adjacent to other State- or federally managed lands; parcels that would increase conservation of natural resources; and parcels 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, Planning Area parcels eligible for disposal through sale or exchange 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 and potential sale 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; therefore, it is likely that the infrastructure would require replacement or upgraded technology. Additionally, many ROWs are expiring, or will expire, soon. Many corridors need to be enlarged in order to enable future maintenance activities to stay within the confines of the ROW.

Opportunities have been provided for the use of public lands within the Planning Area in order to develop facilities that benefit the public. At the same time, consideration is given to environmental and agency concerns through RPPA 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 within the Planning Area. The demand for utility corridors, as well as for access to communication sites within the Planning Area, would likely continue to increase. The DOE is identifying additional corridors for energy-related ROWs, and the potential for additional ROW corridors within the Planning Area may need to be considered.

As with other Field Offices in Colorado, the demand for communication site applications within the Planning 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 3 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.

In general, 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 in order 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 entire Planning Area, except for National Forest System lands. (See Table 3-28, Mineral Status within the Planning Area.) Energy and mineral decisions on National Forest System lands are addressed through separate USFS planning efforts, and are not addressed in this DRMP/DEIS. Within the Planning Area, National Parks, National Recreation Areas, and National Wildlife Refuges are all withdrawn from mineral entry. (Section 1.4, Description of the Planning Area, describes the Planning Area and the Federal mineral estate within the Planning Area.)

Table 3-28 Mineral Status within the Planning Area	
Land Status	Acres
BLM/Federal Minerals	378,397
Private Surface/Federal Minerals	230,248
USFS/Federal Minerals	1,489,514
State/Federal Minerals	18,652
National Park Service/ Federal Minerals	95,958

Table 3-28 Mineral Status within the Planning Area	
Land Status	Acres
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 within the Planning Area are described in the following sections.

Within the Planning Area, a total of 13,183 acres (less than 1 percent of the Federal mineral estate) is withdrawn from mineral entry, including the Windy Gap archaeological site, and the North Sand Hills and Colorado River SRMAs. Acres under consideration for wilderness designation remain open, provided that activities meet non-impairment criteria, and that the activities began before the passage of the FLPMA.

Within the Planning Area, approximately 19,200 acres are designated as Closed to leasing for oil and gas, including the Troublesome and Platte River Contiguous WSA. Approximately 7,190 acres are unsuitable for surface coal mining. Some lands are encumbered with specific surface use restrictions, including NSO stipulations on approximately 26,100 acres, TL stipulations on 1,942,000 acres, and CSU stipulations on 259,000 acres. (See Table 2-1, Comparative Summary of Alternatives.) Some of these restrictions overlap. NSO stipulations are used in order 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; Windy Gap Cultural RNA; Colorado River SRMA; the facilities at the USFS Sulphur Ranger District Office; and the North Sand Hills SRMA. TL stipulations are used in order 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 in order to protect riparian areas wetlands vegetation, and steep slopes.

Leasable Minerals

Leasable minerals within the Planning Area include conventional oil and gas, carbon dioxide, coalbed methane, and coal.

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 methane gas) is produced in Jackson County (North Park Basin). In Jackson County, 5 major and 10 minor oil and gas fields exist; 4 of the minor fields are no longer producing, and 6 include just 1 or 2 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 Moor Mountain). Some methane hydrocarbon gas is produced in the Lone Pine Field, as well as from the Canadian

River Field (early in its production life). Carbon dioxide gas is produced in the McCallum and North McCallum fields. (See Map 3-20, KFO Oil and Gas Leases as of May 2007.)

No oil and gas leases occur in the Laramie River area of Larimer County, or in Summit or Eagle Counties. A small area in the northwestern portion of Grand County is leased, including a portion of the Federal mineral estate. Jackson County has 115,177 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). Currently, a total of 638,000 acres are Open, and 19,200 acres are Closed to fluid minerals leasing within the Planning Area. None of the areas Closed to leasing overlap with high-potential areas.

No drilling has occurred over the past 20 years in Grand or Summit Counties. Only 3 exploratory holes have been drilled in the Laramie River area of Larimer County (Laramie Basin) in the past 20 years, bringing the total number of wells drilled in this area to 5, 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 (North Park Basin).

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, via 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 8 wells are permitted, or have been drilled, in northeast North Park for coalbed methane. In this same general area, 3 Federal exploration coalbed methane test coreholes have been permitted, with 2 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, 2 of 3 permitted test coalbed methane coal cores near McCallum have been drilled on Federal lands.

Coal

Currently, no coal is being mined within the Planning Area. Several areas of coal resources, with considerable historic mining, occur in North Park, and 1 small historic mine (Coal Mountain) occurs in northwest Middle Park. Recoverable coal reserves remain in North Park at 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 North Park. 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). Lands classified for coal remain in North Park. Future non-conventional uses, including in situ (in place) gasification, may likely have potential in this area.

Locatable Minerals

Within the Planning Area, locatable minerals 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 within the Planning 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 2,281,000 acres are Open to locatable mineral exploration or to development within the Planning Area.

Uranium

The Troublesome area includes 502 uranium lode mining claims that were located as a group in 2005 in Grand County on the Troublesome Formation (approximately 6 miles east/northeast of Kremmling). No mining or economic resources, and only trace mineralization, was discovered in the previous activity. No surface-disturbing activity is expected.

Gold

Independence Mountain in Jackson County includes 2 small individual gold placer claims. The Mitchell Placer Mine (including 4 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 filed the current claims at the same location as some of the previous claims.

Salable Minerals

Within the Planning Area, salable include sand and gravel, decorative stone, and moss rock. Currently, a total of 8,900 acres are Closed to mineral material sales within the Planning Area.

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; however, limited BLM jurisdiction occurs on the highest potential deposits in this valley. Most of the privately consumed gravel resources within 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

Within the Planning Area, a small-to-moderate market for decorative stone and moss rock exists, driven by the high value resort community home construction. High-quality decorative stone is not common within the Planning Area; however, 3 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

In 2007, new leases in Jackson County totaled almost 69,150 acres. Most of the requested area is located approximately 15 miles northwest of Walden. Most of this area has been deferred from leasing due to wildlife concerns. As of the publication of the KFO RFD (BLM 2008r), leasing interest in Jackson County had totaled approximately 3,500 acres, with most acres located 20 miles south of Walden, and the remainder located approximately 5 miles southeast and 12 miles southwest of Walden.

In 2007, leasing interest increased in Grand County, with over 54,500 acres requested for leasing. The areas of interest included are located 6 miles to 10 miles west, northwest, and southwest of Granby. Most of this area has been deferred from leasing due to wildlife concerns. As of the publication of the KFO RFD (BLM 2008r), the leasing interest in Grand County has been less than 1,000 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, and/or an increased market would be needed for significant future activity. The remaining fields within the Planning Area are on decline, and most are reaching their ultimate life (BLM 2008r).

Coalbed Methane

Within the Planning Area, further coalbed methane development is likely, 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 Planning Area, and most of the leasing in this specific area, is not likely for conventional oil and gas; however, 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 areas of North Park; however, 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; therefore, they may be interested in future drilling and exploration at these claims.

Salable Minerals

Continuing trends of urbanization in eastern and southern Grand Counties, 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 pits are in their last years of material supply, and

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; however, some issues are common to all renewable energy resources, including distance to existing power transmission facilities and compatibility with existing Federal land use.

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. (BLM and DOE 2003). The BLM also reviewed the potential for concentrated solar power, photovoltaic, wind, biomass, and geothermal energy on BLM, BIA, and National Forest System lands in the western United States.

Wind and solar resource facilities are permitted with 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

Data concerning solar resources are collected for both concentrating solar power and photovoltaic systems. The NREL has developed a National Solar Resource Assessment (BLM and DOE 2003). For photovoltaic systems, data for flat-plate collectors were used. (This is typical for a photovoltaic panel oriented due south at an angle from horizontal equal to the latitude of the collector's location.) The concentrating solar power analysis used direct normal data. These data are pertinent to concentrating systems that track the sun throughout the day (such as trough collectors or dishes). In coordination with the BLM, NREL identified the following as the most important screening criteria in locating solar resource facilities on BLM-managed public lands (BLM and DOE 2003):

Concentrated Solar Facilities

- direct solar resource is 5 kWh/m²/day or greater;

- terrain slope is less than or equal to 5 percent;
- site is within 50 miles of transmission lines at 115-345 kV;
- site is within 50 miles of a major road or railroad;
- the minimum parcel size of 40 continuous acres is available; and
- is compatible with BLM land use management.

Photovoltaic Facilities

- direct solar resource is 5 kWh/m²/day or greater;
- site is within 50 miles of transmission lines at 115-345 kV; And
- is compatible with BLM land use management.

Data from the NREL indicates that the yearly average solar resources available for flat-plate photovoltaic systems within the Planning Area are 5 kWh/m²/day. The yearly average solar resources available for concentrating solar power systems within the Planning Area is also, generally, 5 kWh/m²/day. Within the Planning Area, all 378,884 surface acres receive between 5 and 6 kWh/m²/day of insulation.

Currently, there are no commercial solar energy producing facilities, and no pending applications for solar facilities, within the Planning Area; however, with over 300 days of sunshine per year, Colorado is one of the prime locations for solar energy development. The potential for locating solar facilities on BLM-managed public lands within the Planning Area, and authorizing ROWs for solar resources, is primarily affected by the site-specific criteria listed above.

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 within 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 50m (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; however, a small non-commercial turbine can be used at Class 1. Areas of fair-to-superb wind power classes (Class 3 through Class 7) exist within the Planning Area. Areas of fair-to-superb wind power classes are located in the northwest 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, KFO 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, consistent with 43 CFR 2807.22 and the provisions of IM 2006-216 (BLM 2006a) beyond the initial 3-year term; 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 in order to meet transportation energy needs (DOI 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 2 pellet plants located within the Planning Area, neither of which is fully operational at this time. 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 kill green material per year (Lopez 2008). The Kremmling site produces enough wood pellets to meet the heating needs of approximately 40,000 homes (Confluence Energy 2007). Currently, Confluence Energy is working with Eagle and Summit Counties to use wood pellets in order to meet some of their energy needs. Another wood pellet plant located within 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 kill timber to produce commercial wood pellets.

In its NREL Study (BLM and DOE 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 (at a maximum) 50 miles to a town with at least 100 people; and
- is compatible with BLM and National Forest Systems land use management (BLM and DOE 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, KFO Biomass Potential.)

Geothermal

There is no region of known or potential geothermal resource within the Planning 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, and no geothermal leases have been issued to date.

Characterization

Indicators

The indicators for renewable energy within 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. Within the Planning Area, however, the potential for wind and solar energy is low to medium. The demand for biomass is expected to increase within the Planning Area.

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 (BLM and DOE 2003). The NREL study also listed the Planning Area as having high potential for wind and biomass energy resources (BLM and DOE 2003). The KFO was one of only 2 BLM planning units in

Colorado to have high potential for 2 renewable energy sources (Royal Gorge being the other). This high potential for wind and biomass resources within 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. Parabolic trough and power towers have the ability to store solar energy as heat and, therefore, 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 within the Planning Area, and are expected to continue into the future. Private wind turbines and solar facilities are being located within the Planning Area, providing renewable energy to localized structures and services.

1

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 in order 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. Under current guidelines, ACEC procedures also are used to designate Outstanding Natural Areas (ONAs), Instant Study Areas (ISAs), and other natural areas requiring special management attention.

Current Conditions

Within the Planning Areas, there are 2 ACECs/ RNAs:

- the Kremmling Cretaceous Ammonite ACEC/RNA; and
- the North Park Natural Area ACEC/RNA.

These ACECs/RNAs total approximately 516 acres. (See Map 2-52, Alternative A: KFO Special Designations.) The size of each area, and the values it is designed to protect, are listed in Table 3-29, Designated ACEC/RNAs within the Planning Area. Both were designated in 1984 (BLM 1984b).

Table 3-29 Designated ACEC/RNAs in the KFO		
ACEC	Size (acres)	Values
Kremmling Cretaceous Ammonite ACEC/RNA	198	Significant marine invertebrate fossils
North Park Natural Area ACEC/RNA	318	Endangered plant species
Total	516	

Kremmling Cretaceous Ammonite ACEC/RNA

The 198-acre Kremmling Cretaceous Ammonite ACEC/RNA 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 ACEC/RNA, the area contains important core habitat for Greater sage-grouse, a BLM-designated Sensitive Species (BLM 2007h).

North Park Natural Area ACEC/RNA

The 318-acre North Park Natural Area ACEC/RNA was designated in order to protect the federally 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 (5 or fewer occurrences in the world/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 in order 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 ACEC/RNA

Visitor use at the Kremmling Cretaceous Ammonite ACEC/RNA 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 ACEC/RNA) do not request access information, and it is unknown how many of these visitors use the site yearly. The inclusion of the ACEC/RNA in 2 book publications has stimulated much of the recent interest from the avocational community. In addition, the ACEC/RNA 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 out into the field in order 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 as the result of vandalism and theft. Increased interest has also brought about an increase in the availability, and monetary value, of fossils for sale by the commercial sector. Many of the fossil specimens are obtained legally from out-of-country and private land sources; however, many specimens are collected illegally from BLM-managed public lands for their commercial value. 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 ACEC/RNA

There are little data to indicate a specific trend; however, North Park phacelia (*P. formosula*) within the ACEC/RNA seems to be stable within its limited available habitat. Monitoring studies conducted at the ACEC/RNA 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 overall drought; and hot and dry temperatures with lack of precipitation events. Currently, no threats exist in the ACEC/RNA; however, 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

In 1964, Congress passed the Wilderness Act (PL 88-577), 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. However, 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 an "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, 3 areas within the Planning Area were identified as WSAs.

Section 603 of the FLPMA requires 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 that 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, and 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 Interim Management Policy (IMP) for WSAs (BLM Handbook H-8550-1, Interim Management Policy for Lands under Wilderness Review [BLM 1995]) 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). The BLM's IMP provides specific policy and guidance for management of most resource values and uses within WSAs. However, 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 character;
- 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 in order to determine the mix of resource use and protection that best serves the FLPMA multiple-use and sustained yield mandates.

No congressionally designated Wilderness Areas exist on BLM-managed public lands within the Planning Area. Portions of 12 Wilderness Areas administered by the USFS are within the Planning Area.

Current Conditions

Within the Planning Area, there are 3 WSAs, totaling approximately 8,872 acres. (See Table 3-30, Wilderness Study Areas within the Planning Area; Map 2-52, Alternative A: KFO Special Designations.)

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 ISAs), the area became an ISA. In 1980, a BLM inventory concluded that the area did not meet wilderness criteria. This did not release the area from ISA status. Approximately 681 acres of public land are contained within the ISA.

Platte River Contiguous WSA

Approximately 33 acres of public land are contained within the WSA. 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 within 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 feet to 600 feet deep river canyon). It is a vast remote region of northwest Colorado with little development. The WSA provides outstanding opportunities for primitive and unconfined recreation.

Troublesome WSA

Approximately 8,158 acres of public land are contained within the WSA. 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 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 streams. 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.

Table 3-30 Wilderness Study Areas in the Planning Area	
Proposal Name	Total Acres
North Sand Hills ISA	681
Platte River Contiguous WSA	33
Troublesome WSA	8,158
Total	8,872

A brief description of each WSA is provided in Table 3-32, Descriptions of WSAs within the Planning Area. All WSAs are managed according to the IMP, which recognizes valid existing rights and grandfathered uses. Grandfathered uses and valid and 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.

Table 3-31
Descriptions of WSAs within the Planning Area

Name	Natural Values	Current Uses	Management Prescriptions
North Sand Hills SRMA/ISA (10 miles northeast of Walden, in Jackson County)	<ul style="list-style-type: none"> • Open sand dune environment; • Primary vegetation is sagebrush and aspen; and • Provides scenic overview of North Park. 	<ul style="list-style-type: none"> • Heavy OHV use, camping, hunting, hiking, and scenery viewing; • Portions of 2 grazing allotments are within the ISA; • Heavy holiday use, with up to 4,000 visitors on Memorial Day weekend; and • 2 big game Outfitters' permitted uses are within, but not limited to, the ISA. 	<ul style="list-style-type: none"> • 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 2 allotments; • Fence enclosures to protect vegetation; • Minimal signage for public health and safety; • Monitored weekly during summer months; and • 519 acres managed for VRM Class II; 162 acres managed for VRM Class IV.
Platte River Contiguous WSA (18 miles north of Walden, in Jackson County)	<ul style="list-style-type: none"> • Steep rocky hillside covered with Douglas-fir, pinyon pine, juniper, and sagebrush; • 33 acres 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Closed to OHV use; • Within an existing grazing permit; • Annual monitoring began in 2007; and • Managed for VRM Class III.

Table 3-31
Descriptions of WSAs within the Planning Area

Name	Natural Values	Current Uses	Management Prescriptions
Troublesome WSA (18 miles north of Kremmling, in Grand County)	<ul style="list-style-type: none"> • Primary vegetation is lodgepole pine, spruce, fir, and aspen; • 2 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; and 	<ul style="list-style-type: none"> • Hunting, fishing, hiking, backpacking, and wildlife viewing; • Estimated use is 600 visitors per year; • Portions of 2 grazing allotments are within the WSA; and • 3 big game Outfitter/Guides permitted uses include, but not limited to, the WSA. 	<ul style="list-style-type: none"> • Closed to OHV use; • Livestock grazing management on 2 allotments; • 3 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 • 8,143 acres managed for VRM Class II; 15 acres managed for VRM Class IV.

Source: BLM 2007h

Characterization

Indicators

BLM-managed public lands under wilderness review are to be managed in a manner so as not to impair the suitability of such areas for preservation as Wilderness until Congress makes a determination to designate the area as Wilderness or release the area for multiple-use management. The BLM's IMP (H-8550-1, Interim Management Policy for Lands under Wilderness Review) sets guidelines for permitted uses in WSAs.

Trends

The area surrounding the Troublesome WSA has experienced increased motorized activity. Private lands to the west of the WSA have seen an increase in motorized use, primarily during hunting seasons. Additional motorized pressure has come from the Bighorn subdivision, south and east of the WSA. The Brown subdivision, an inholding with a cherry-stemmed access road also provides motorized opportunities to access the WSA. The public, and the BLM, must have permission to cross private land in order to access the south and east portions of the WSA. Due to user-created route proliferation, the current land ownership pattern, and limited access for BLM management and enforcement, a temporary road and area closure on adjacent BLM-managed public lands to the WSA was instituted in 2006. This temporary road and area closure provides additional protections to the surrounding BLM-managed public lands until comprehensive travel management designations are developed and implemented. As a result of limited access for BLM management and enforcement, the proliferation of user-created routes is expected to continue.

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). As a result, 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, and/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, and outstandingly remarkable values (ORVs) of select waterways. The WSRA was signed into law by President Lyndon B. Johnson (as Public Law 90-542) on October

2, 1968. Section 1(b) of the WSRA expresses Congressional policy for protecting these waterways:

It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers, or sections thereof, in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital conservation purposes.

The basic objective of WSR designation is to maintain the existing condition of a waterway. If a land use or development clearly threatens the ORVs 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. In order 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, and/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; however, it is extraordinarily rare in the western United States.

The National Wild and Scenic Rivers System (the National System)

In order to accomplish the goal of protecting wild and scenic waterways, Congress established the National Wild and Scenic Rivers System (NWSRS or "National System"). A waterway, or waterway segment or tributary, must be in a free-flowing condition and must be deemed to have one or more "outstandingly remarkable" scenic, recreational, geologic, fish and wildlife, historic, cultural, and/or other similar value(s) in order 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.

Congress created two mechanisms in the WSRA for the expansion of the National System. One way authorizes Federal agencies and land managers to study potential waterways for inclusion into the National System [Congressionally authorized under Section 5(a) or Agency authorized under Section 5(d)(1)]. After study, public scoping, and agency review, land managers nominate waterways to the Secretary of the Interior. The Secretary then forwards a recommendation to the President and to Congress. Congress, ultimately, decides whether to pass a law adding the waterway to the National System.

WSR Study

Under the WSRA, as well as all other applicable laws, rules, regulations, policies, standards, and guidelines, the BLM is required to evaluate potential additions to the National System. The BLM WSR study process includes 3 regulatory phases, which include:

- determining what waterway(s), and/or waterway segment(s), are eligible for WSR designation (eligibility determination);
- determining the potential (tentative) classification of eligible waterway(s), and/or waterway segment(s), with respect to a wild, scenic, and/or recreational designation (classification analysis); and
- conducting a suitability study of eligible waterway(s), and/or waterway segment(s), for inclusion into the National System, via recommendation to the Secretary of the Interior and subsequent legislative action (suitability assessment).

The eligibility determination and the classification analysis represent an inventory of existing conditions. Eligibility is an evaluation of whether or not a waterway is free flowing, and whether or not it possesses one or more ORV. If found eligible, a waterway is then analyzed as to its current level of development (water resources projects, shoreline development, and accessibility), and a recommendation is made that it be placed into one or more of 3 classes: 1) wild, 2) scenic, and/or 3) recreational.

The BLM's policy, as stated in BLM Manual 8351 (Wild and Scenic Rivers) is to protect and, where possible, enhance any identified waterway ORVs pending a subsequent suitability determination and/or designation decision by Congress. The decision to designate waterway segments for inclusion in the National System is outside the scope of the DRMP/DEIS, 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. This analysis is designed to determine whether a waterway is eligible to be tentatively considered for WSR designation. In order 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. The following are the guidelines used in applying the eligibility criteria on BLM-administered 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, and/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" in order 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. (A further discussion on "minimum flow" is contained in the policy clarification section below.)

According to BLM Manual 8351 (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 .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 in order 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, and/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/or
- 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, and/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 and/or shorelines are essentially primitive and unpolluted. They represent vestiges of primitive America. Basically, wild means undeveloped. Roads, dams, and/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, however, if a parallel road is unpaved and well screened from the waterway (by vegetation, a hill, and/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, as well as the existence of small dams or diversions, may be allowed in this classification. 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.

A wild river would be an undeveloped waterway with very limited access. A scenic classification would be applied to a waterway that is more developed than a wild river, but less developed than a recreational river. A recreational classification would be appropriate in developed areas (such as a waterway running parallel to roads or railroads with adjacent lands that have agricultural, forestry, commercial, and/or other developments, provided that the waterway remains generally natural and riverine in appearance).

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 and, as a result, are classified as recreational -- yet, the ORV is the fish resource. However, 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

Within the Planning Area, 16 BLM-managed river segments were identified as eligible in previous eligibility studies (BLM 2007c). A re-examination of the land ownership and management status revealed that 1 of the segments determined to be eligible in the March 2007 Study (Blue River Segment No 1) identified within the Planning Area 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 eligible segments are being studied for suitability as part of this DRMP/DEIS planning process.

Activities that would adversely affect eligible WSR stream segments include those that would adversely affect the ORV(s) or the free-flowing nature 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 Draft Suitability Report and subsequent determinations can be found in Appendix T. The Report contains detailed information on the suitability study process, and on draft 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 section) of this DRMP/DEIS.]

The Cache la Poudre River, designated on October 30, 1986, is the only river within the Planning Area designated as a WSR. Part of the 76.0-mile stretch is within Rocky Mountain National Park and the Roosevelt National Forest. It is classified and managed as wild and recreational by the USFS and by the NPS (Interagency Wild and Scenic Rivers Coordinating Council 2007).

The Big Thompson River in Rocky Mountain National Park was authorized as a Study River by the WSRA. The report was transmitted to Congress in October 1979, and designation was not recommended (Interagency Wild and Scenic Rivers Coordinating Council 2007).

Table 3-32, Eligible River Segments within the Planning Area, displays, the 15 eligible segments and their preliminary classification being studied for suitability. (See Map 3-22, KFO Stream Segments Eligible for Inclusion in the National Wild and Scenic River System.)

Indicators

All eligible stream segments must be managed in a manner designed to protect the free-flowing nature of the segment and the river-related ORVs of the segments. The river-related ORVs must be maintained so that the values continue to exist at the outstandingly remarkable level. If the BLM determines that one or more of the ORVs appears to be at risk of no longer meeting the ORV criteria, the agency can rely on existing monitoring information (if available) or initiate new monitoring efforts (possibly in concert with partners) in order to determine if the river-related ORVs have been, or are, at risk of being impaired.

Table 3-32 Eligible Stream Segments within the Planning Area					
River or Creek	Segment	Total Segment Length (miles)	Length on Public Lands (miles)	Preliminary Classification	ORVs
Blue River¹	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

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.

Trends

River-related recreation is increasing within the Planning Area, and relies on certain flow rates to support the activity. For example, fishing requires a certain flow rate in order to support the fisheries, and white-water boating relies on certain flow rates in order to create a white-water experience. Flow rates that are necessary in order 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 (such as anglers, float boaters, and kayakers), environmental groups, and local governments have expressed diverging interest in designating eligible segments within the Planning Area. One of the primary areas of disagreement is the best management approaches 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, and privately owned lands, and/or lands owned by other agencies, as well as the practices of, and on, those areas are outside of BLM control. The current management of railroads and utilities infrastructure is not incompatible with protection of ORVs; however, a change in management practice 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 formal WWAs within the Planning 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; however, no formal management plan exists. Junction Butte 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 the town 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 wetlands vegetation have been supported in the past by irrigating the area for hay production. Currently, there is a mixture of native and introduced grass and grass-like species with some willows and forbs constituting most of the vegetation in the wetland. Common species encountered in the wetland include chickpea milkvetch, Rocky Mountain iris, reed canarygrass, paniced 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 within 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 and riparian areas/wetlands habitat is 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 CDOW 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, in that it 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-managed 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). Primary indicators of 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 within the population, and the population's distribution relative to its historic range. These data are tracked by the CDOW 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 wetlands-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 within the Planning Area. Beginning in 1998, approximately 236,200 acres of BLM-managed public lands within the Planning 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 within the Planning 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; however, based upon the current condition, it is likely that it would meet BLM Standards for public land health.

3.2.24 National Trails and Scenic Byways

The National Trails System Act of 1968 (PL 90-543, as amended) authorized the creation of a National Trail System composed of National Scenic Trails, National Historic Trails, and National Recreation Trails:

- **National Scenic Trail** -- An extended trail that offers maximum outdoor recreation potential and provides enjoyment of the various qualities (scenic, historical, natural, and/or cultural) of the areas through which these trails pass.
- **National Historic Trail** -- A type of extended trail that follows as closely as possible, on Federal land, the original trails or routes of travel with national historic significance. Designation identifies and protects historic routes and their historic remnants and artifacts for public use and enjoyment. A designated trail must meet certain criteria, including having a significant potential for public recreational use or interest based on historic interpretation and appreciation.
- **National Recreation Trail** -- A trail of local and regional significance, designated in response to an application from the trails' managing agency or organization.

Only Congress can designate National Scenic Trails and National Historic Trails. National Recreation Trails are designated by the Secretary of the Interior or the Secretary of Agriculture.

Scenic Byways include All-American Roads, National Scenic Byways, Colorado State Scenic and Historic Byways, and BLM-designated Backcountry Byways. The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The program seeks to recognize, preserve, and enhance selected roads throughout the United States. The U.S. Secretary of Transportation recognizes 126 All-American Roads or National Scenic Byways, based upon one or more archaeological, cultural, historic, natural, recreational, or scenic qualities (National Scenic Byways Online 2007).

The National Backcountry Byway Program is the BLM's contribution to the larger National Scenic Byways Program. BLM State Directors designate BLM Backcountry Byways on BLM-managed public lands. Many BLM-designated byways cross other local, County, private, State, and Federal lands; therefore, 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 4 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.

The Colorado Scenic and Historic Byways program is intended to provide 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, at the same time, 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

There are no BLM-designated Backcountry Byways within the Planning Area. Portions of the Continental Divide National Scenic Trail (CDNST) occur within the Planning Area. It traverses the KFO from west to east, roughly following the southern Jackson County boundary. At U.S. Route 34, it turns south along the eastern edge of the Planning Area. The trail is primarily on National Forest System lands, with very little 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. Currently, trail users hike along Jackson County Road 53 near Indian Creek, which bisects public lands, in order to access the next designated portion of the trail. The trail is officially administered by the Secretary of Agriculture in consultation with the Secretary of the Interior (see *Federal Register* 150, August 5, 1981, page 39867).

There are no BLM-designated Backcountry Byways within the Planning Area; however National and State Scenic Byways include the Colorado River Headwaters National Scenic Byway, the Cache la Poudre-North Park National Scenic 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 on the Colorado National Scenic Byway Committee, and works with this group on interpretive planning and implementation.
- **The Cache la Poudre-North National Scenic 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** -- The Top of the Rockies National and State Scenic Byway begins approximately 10 miles southeast of Vail (near the town of 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.

Characterization

Indicators

The CDNST Comprehensive Plan contains guidelines for trail management, completion of new segments of trail, and trail monitoring. 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. The impacts to visual resources and quality recreational experiences, as well as the indirect impacts to the local economies, are relevant impact indicators for scenic trails and byways.

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).

In 1995 the Continental Divide National Scenic Trail Alliance was formed in order to assist the Federal land management agencies in the completion, management, and protection of the CDNST. Since its inception, the non-profit organization has increased 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 National Scenic Trail Alliance has also coordinated volunteer efforts designed to improve, or complete, portions of the CDNST. Currently, the organization is working with Federal land managers, and the public, in order to develop a CDNST Master Plan that will provide a blueprint for the approach to completion, management, and protection of the trail and its surroundings (Continental Divide Trail Alliance, undated).

3.2.25 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 2008jh. 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 within 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 3.2.17) is the identification, through the planning process for the DRMP/DEIS, of areas where foot, pack stock, and mechanized and motorized vehicle travel is appropriate, restricted, or not allowed, depending upon resource objectives and use considerations. This section addresses Federal, State, County, and BLM roads within the BLM Facility Asset Management System (FAMS). (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. 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 KFO, 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. I-70 and State highways carry the largest traffic volumes, followed by County roads. Due to the geography of the Planning Areas, 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 within 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 as a result of the 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.

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- **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” represents a group or set of roads, trails, and primitive roads that represents 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 4 or more wheels, and 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 in order 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; however, some access routes have portions plowed by County road maintenance crews, utility companies, or by private entities (if the roads provide access to utilities, homes, or to 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; however, 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. 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”

within the BLM FAMS system. It includes 4 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 (for example, 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 or planned annual maintenance activities.
- **Maintenance Funds** -- No annual maintenance funds provided.

Level 1

- **Maintenance Description** -- Routes where minimum (low intensity) maintenance is required in order 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, in order 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, in order 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, in order 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; no current description or objective.

Level 3

- **Maintenance Description** -- Routes requiring moderate maintenance due to low volume use (such as seasonally or year-round for commercial, recreation, or administrative access). Maintenance Intensities may not provide year-round access; however, 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 in order to provide a reasonable level of riding comfort at prudent speeds for the route conditions and intended use; brushing is conducted, as needed, in order 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, in order to protect adjacent lands and resource values;
 - perform preventive maintenance, as required, in order to, generally, 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 in order 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; 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; however, they are, generally, intended for year-round use;
 - meet identified environmental needs;
 - generally, maintained for year-round traffic;
 - perform annual maintenance, as needed, in order to protect adjacent lands and resource values;
 - perform preventive maintenance, as required, in order to, generally, 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 in order 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 authorized roads is the responsibility of the permittee.

Current Conditions

Within the Planning Area, road system maintenance 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.

Annually, the BLM maintains approximately 139 miles of roads within the Planning 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 gas resources. Temporary conflicts, including a potential for delays, dust, road degradation, and increased vehicle safety, occur during the well construction/drilling phase and during recompletion/work over activities. Impacts associated with traffic levels are lower after 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 3-33, Average Annual Daily Traffic (AADT) on Roads in Grand, Jackson, and Summit Counties, provides average daily traffic counts for access roads at significant locations in, and near, the Planning Area. It also shows traffic counts projected to occur at the same locations for the year 2030 (CDOT 2009).

Table 3-33 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, 6 th Street east of SH 125	1,400	2,205	58 percent
SH 14 at Walden, Washington Street south of 6 th 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 4 th Street	3,600	4,676	30 percent
SH 125 at Walden, south of 2 nd 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

Highway or Road Segment	Average Annual Daily Traffic		
	2007	2030	Percent Change (2007 to 2030)
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 (1, 3, or 5).

Trends

Table 3-34, Average Annual Daily Traffic (AADT) on Roads in Grand, Jackson, and Summit Counties, provides year 2030 average daily traffic projections for access roads at significant locations in, and near, the Planning Area. 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. However, while CDOT's projected traffic growth reflects a number of ongoing trends (such as 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 Federal budgets and rising fuel and equipment costs for contractors, this trend is likely to continue.

3.2.26 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 are also 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, and/or property, and/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, therefore, 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 USC

9601-9673) 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 the, approximately, 378,884 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 CDOW.

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, and/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, and/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 2 primary types of hazardous material sites on, or near, public land are related to mining or to agricultural use and/or 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. Periodically, the KFO 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 within the same area, in what has come to be called “promiscuous dumps.” Primarily, illegal dumping 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 those generated by clandestine drug labs. Illegal dumps are often created along railroad corridors, dirt roads, routes, and in the deserts. 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 Ski Area and Resort development. Due to unstable soil conditions, the current landfill site in Granby is shifting; and the landfill at the western end in Kremmling is nearing capacity. Illegal dumping could increase on easily accessible BLM-managed public lands at either end of the County (especially the west end) depending upon the fees associated with the County landfills.

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 2 target shooting sites on BLM-managed public lands within the Planning Area. The North Park Public Rifle Range (near Walden, in Jackson County) is maintained by volunteers, Jackson County, and the CDOW. The Troublesome shooting range is near the town of Kremmling, in Grand County. User conflicts between shooters and OHV/ATV users is a safety concern at this location.

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 within 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. Also, oil and gas Operators are required to comply with additional requirements imposed by the BLM as part of the land use lease or ROW grant.

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's 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 DRMP/DEIS, as well as beyond the expertise of the BLM. Instead, the BLM formally requested agencies with specific human health expertise and jurisdiction to review the DRMP/DEIS. In 2008, in order to help frame the discussion of potential health consequences related to oil and gas, the “Potential Exposure-Related Human Health Effects of Oil and Gas Development: A White Paper” (Witter et al. 2008) was prepared, summarizing health concerns, and other exposure data, in relation to Garfield County.

U.S. Department of Transportation data indicate that an average of 1 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 IM Number 2005-092 BLM 2005d). 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 in order 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 ACEC/RNA 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.

(For more details on the BLM rules related to Geocaching, see the BLM's Official Geocaching Policy: Instruction Memorandum: No. 2005-092 "[Geocaching Activities on BLM Public Lands.](#)")

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 Wilderness Interim Management Policy);
- 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 with 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 Field Manager reports; 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.

Target Shooting

The Law Enforcement Ranger conducts patrols for 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 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/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 (such as 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; therefore, the need for additional BLM law enforcement enforcers 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. However, an increase in hazardous materials and hazardous wastes associated with illegal dumping may occur if the local population grows and/or if dump fees at permitted sites increase.

Illegal Dump Sites

Illegal dumping occurrences are expected to remain at, or near, the current level. However, an increase in illegal dumping may occur if the local population grows and/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/problems 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/or recreational experiences.

Target Shooting

Jackson County and the CDOW are in the process of acquiring the North Park Public Rifle Range. The Troublesome shooting range, which is near the town of Kremmling in Grand County, 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 0 APDs were received. Within the last 3 years, the KFO has received 4 applications for seismic surveys in Jackson County, indicating new interest in oil and gas development in that area (Hodgson 2010). 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). However, 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 within 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 within the Planning Area, in conjunction with the popularity and more common use of GPS.

3.2.27 Socioeconomics

The nature of local economic and social activity is influenced, and shaped, by numerous factors associated with BLM-managed public lands, and their associated resources, including the dynamics the presence of, or proximity to, cities or communities; population rates; types of long-standing industries (such as agriculture and forestry), predominant land and water features, and unique area amenities. In its role as land manager, the BLM operates as a steward of many of these area resources and opportunities, and, therefore, plays a principal role in the socioeconomics of the region.

Current Conditions

The Planning Area is in Grand, Jackson, Larimer, and Summit Counties, and a small portion of Eagle County. (Most of Eagle County is within the CRVFO Planning Area, and would most likely be affected by management decisions within the CRVFO.) For this analysis, primarily Grand County and Jackson County are included in the model of economic contributions from BLM management. Approximately 449,400 acres of the Planning Area are in Larimer County (approximately 27 percent of the total County acreage); however, it is much more intensely influenced by economic factors along the Front Range (due to the extended influence of such relatively large cities as Fort Collins and Loveland). As a result, Larimer County is not included in this discussion; however, it is included in the modeling of economic contributions from BLM management. Within the Planning Area, socioeconomic resources in Grand and Jackson Counties are the most likely to be directly affected by BLM land management decisions. Figures for Summit County are included, however, since it is likely that workers who cannot afford to live in Summit County reside elsewhere within the Planning Area.

Within the Planning Area, 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 place of work has become an issue in many of the towns and counties within the Planning Area.

Population

Table 3-34, Planning Area Population Totals, shows current and historic populations. Within the Planning Area, Summit County had the largest population in 2005; however, of Jackson and Grand Counties (the 2 counties with the greatest acreage within the Planning Area, and with the most BLM-managed public lands), Grand County had the larger population: 13,906 (Colorado State Demography Office 2007a).

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. In 2005, net migration accounted for 51.0 percent of total population change within the Planning area (67.4 percent, excluding Summit County), whereas, it accounted for 42.6 percent of population change in the State (Colorado State Demography Office 2007b).

**Table 3-34
 Planning Area Population Totals (1980-2005)**

Location	1980	1990	1980-1990 Percent Change	2000	1990-2000 Percent Change	2005	2000-2005 Percent Change	1980-2005 Percent Change
State	2,889,735	3,294,473	14.0	4,301,261	30.6	4,722,755	9.8	63.4
Planning Area	18,186	22,452	23.5	37,567	67.3	42,944	14.3	136.1
Grand County	7,475	7,966	6.6	12,442	56.2	13,906	11.8	86.0
Jackson County	1,863	1,605	-13.8	1,577	-1.7	1,531	-2.9	-17.8
Summit County	8,848	12,881	45.6	23,548	82.8	27,507	16.8	210.9

Source: Colorado State Demography Office 2007a

Age Distribution

As shown in Table 3-35, the population of the Planning Area in 2005 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 21.3 percent, while Summit County had the lowest, at 19.5 percent. Summit County had the highest level of working age people and the lowest percentage of people 65 and older. Jackson County had the highest percentage of this group, higher than the state average (Colorado State Demography Office 2007c).

**Table 3-35
 Planning Area Regional Age Distribution (2005)**

Location	Percent Ages 0 to 17	Percent Ages 18 to 64	Percent Ages 65 and Older
State	25.1	65.2	9.7
Planning Area	20.7	70.2	9.2
Grand County	21.3	70.4	8.4
Jackson County	21.3	64.4	14.3
Summit County	19.5	75.7	4.8

Source: Colorado State Demography Office 2007c

Housing

Housing availability has been identified as an issue of concern in several counties within the Planning Area, specifically the availability of affordable housing. 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. The most current data available for the counties within the Planning Area is for 2000. Even though the data is 7 years old, it shows the beginning of the trend toward a low availability of affordable housing. Table 3-36 shows housing area housing affordability. A rating of 100 or higher under the Housing Affordability Index indicates that the median family can afford the median house.

Table 3-36 shows that housing in the Planning Area, in general, was affordable for the median household in 2000 in Jackson and Larimer Counties; but was not affordable in Grand and Summit Counties (Economic Profile System 2004).

Location	1990			2000		
	Housing Unit: Median Value	Percent of Median Income Necessary to Buy House	Housing Affordability Index	Housing Unit: Median Value	Percent of Median Income Necessary to Buy House	Housing Affordability Index
Grand County	\$111,462	21 percent	119	\$205,500	26 percent	95
Jackson County	\$64,427	18 percent	141	\$86,000	16 percent	154
Summit County	\$159,025	24 percent	102	\$317,500	34 percent	75
Planning Area	\$111,638	21 percent	121	\$203,000	25 percent	108
Colorado	\$108,564	19 percent	129	\$166,600	21 percent	119

Source: Economic Profile System 2004

At 57 percent, the 2005 vacancy rate within the Planning Area was higher than that for the State, at 13 percent (See Table 3-37 Planning Area Housing Estimates.) The Counties with high housing values, due to the presence of Resort communities, tended to have the highest vacancy rates, including Grand and Summit Counties, with 60 percent and 64 percent vacancy (Colorado State Demography Office 2007d). Jackson County's high vacancy rate is most likely due to out-migration, few jobs, and low income levels.

Location	Housing Units	Vacancy Rate	Persons per Household	Housing Units Percent Change 1990-2005
Grand County	14,266	60	2	42.9
Jackson County	1,218	47	2	-8.1
Summit County	30,514	64	2	78.5
Planning Area	45,998	57	2	62.0
Colorado	2,075,557	13	3	40.5

Source: Colorado State Demography Office 2007d
 * Percent of total housing units that are vacant

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 within the 5-County impact area (Eagle, Grand, Jackson, Larimer, and Summit counties). BLM-managed public lands within the Planning Area 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 2008). (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 to 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 in order 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 within the Planning 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 Planning 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 in order 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 Tables 3-38 and 3-39 below, direct, indirect, and induced contributions are included in the estimated BLM contributions.

Table 3-38 Average Annual Employment Contributions by Resource Program within the Planning Area (Full and Part-time Jobs)*	
Resource	KFO Employment Contributions
Recreation	157
Livestock Grazing	7
Forest Products	23
Mineral Resources	6
Externally Funded Ecosystem Restoration	0.01

Table 3-38 Average Annual Employment Contributions by Resource Program within the Planning Area (Full and Part-time Jobs)*	
Resource	KFO Employment Contributions
Revenue Sharing (County Payments)	8
BLM Expenditures and Employment	47
Total BLM Management	248

*Potential employment and labor income contributions are based upon estimated resource outputs from KFO specialists.

Table 3-39 Average Annual Labor Income by Resource Program within the Planning Area (Thousands of 2010 Dollars)	
Resource	Labor Income Contributions
Recreation	\$5,623.00
Livestock Grazing	\$77.00
Forest Products	\$828.00
Mineral Resources	\$528.00
Externally Funded Ecosystem Restoration	\$0.16
Revenue Sharing (County Payments)	\$380.00
BLM Expenditures and Employment	\$2,447.00
Total BLM Management	\$9,883.00

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 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; and from timber sales. By far the greatest revenues 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, 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 within the County, and off-sets for certain Federal payments to Counties (such as timber, mineral leasing, and grazing receipts) (BLM 2003a). Table 3-40 shows the amount of PILTs that each County within the Planning Area received for the 2007 fiscal year. Annually, as a result of revenue sharing from BLM activities, on average approximately 8 jobs and \$380,000 in labor income are contributed to the Planning Area economy.

Location	PILT Amount
Grand County	\$137,343
Jackson County	\$178,458
Summit County	\$2,240
Planning Area	\$318,041
Colorado	\$8,149,918

Source: DOI 2007b

Recreation

KFO Field Office staff estimate that, on average, there were 359,021 recreation visits to BLM-managed public lands within the Planning Area annually. 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 within the area. As a result, their spending would remain in the impact area. Of all resource programs, after separating the contributions made from local residents, recreation contributes the most employment and labor income to the area economy.

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 made up of oil and gas industry employment. There are mining claims for gold and uranium, and coal and coalbed methane resources are present within the Planning Area; however, 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 within the Planning Area include salable minerals (for which there is a small-to-moderate market for decorative stone and moss rock) and oil and gas (which is occurring mainly in Jackson County). As a result of the removal of this mineral material from BLM-managed public lands, on average approximately 6 jobs and \$528,000 in labor income are supported annually in the KFO impact area economy .

Livestock Grazing

Livestock grazing on public land continues to be important to local economies within Colorado, providing habitat and forage for domestic livestock, horses, and wildlife. Within the Planning Area, approximately 337,400 acres are allocated for grazing. In all Counties within the Planning Area, livestock sales made up more than 80 percent of the total market value of agricultural production (NASS 2007a). In 2007 cattle inventory was 106,568 heads within the Planning Area. The amount of forage required in order to support this inventory would be 639,408 AUMs. Between 2000 and 2009, the average annual use of BLM AUMs within the Planning Area was 16,000; this corresponds to roughly 2 percent of total forage required in order to support the

2007 inventory of livestock within the KFO impact area. As a result of this BLM forage, an average of approximately 7 jobs and \$77,000 in labor income are contributed annually to the KFO impact area economy.

Of the Counties with the greatest amount of BLM-managed public lands within the Planning Area, Jackson County generated the largest economic value of for grazing. Table 3-41 shows the private costs of replacing the AUMs within the Planning Area by paying grazing fees to private landowners, purchasing replacement pasture land, or purchasing replacement hay. In all cases, private costs far exceed the costs to ranchers to use BLM-managed public lands; therefore, changes in grazing policy could affect the costs of operations to ranchers and incomes from ranching.

AUM Replacement Method	Private Costs	Private Costs Per AUM	Amount above Costs on Public Lands	Amount above Costs on Public Lands Per AUM
Grazing fees	\$587,353	\$14.80	\$533,777	\$13.50
Pasture land	\$214,250,824	\$103,611.00	\$214,250,824	\$103,611.00
Replacement hay	\$2,361,317	\$59.50	\$2,307,741	\$58.20

Sources: NASS 2007a, 2007c; Bement and Davis, undated; Colorado Department of Agriculture 2007

BLM Expenditures and Employment

The Kremmling Field Office building 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 within the area, and by spending dollars on project related goods and services. BLM-managed public lands within the Planning Area are largely managed through 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, shuttling vehicles, and projects contribute directly to the area economy and social stability as well. On an average annual basis, KFO expenditures and employment support 47 jobs and \$2.5 million in labor income.

Externally Funded Ecosystem Restoration

A portion of the management actions performed on BLM-managed public lands are carried out with funds not provided by the BLM; therefore, 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 royalties from grazing payments. These treatments are labor intensive and use agricultural industries and associated businesses contained within the impact area economy. As a result of these treatments, less than 1 job and \$200 in labor income would be supported annually in the KFO impact area 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; however, 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; therefore, they can be characterized as non-market values.

Non-market values can be broken down into 2 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. Within 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 within 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). Within the Planning 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; however, evaluation is not always feasible during the planning process. This does not, however, preclude their consideration in the planning process.

Employment

Employment within the Planning Area is distributed among industry sectors, and is displayed below in Table 3-42 (IMPLAN 2008). Contributions from management within the KFO discussed above make up only a portion of employment and labor income within industry sectors displayed in Table 3-42, Current Employment and Labor Income by Industry Sector within the Planning Area. The largest industry is the government sector, which comprised 14 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 5-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 2008 data, the Planning Area can be characterized as most specialized with respect to the transportation and warehousing sector, followed by the accommodation and food services sector, and the arts, entertainment, and recreation sector.

Income

Total Personal Income (TPI) and Per Capita Personal Income (PCPI) are useful measures of economic well-being. In 2008, TPI in the 5-County Planning Area was \$15.9 billion. PCPI was \$41,103 within the Planning Area, and \$42,868 within the State of Colorado (U.S. Department of Commerce 2008a). PCPI is a useful measure of economic well being; however, it should be examined alongside changes in real earnings per job. PCPI includes income from 401(k) plans, as well as other non-labor income sources (such as transfer payments, dividends, and rent; therefore, it is possible for PCPI to be relatively high, while the average wage per job is low, relative to the State. In 2008, average earnings per job were \$40,290 in the KFO impact area and \$50,656 in the State (U.S. Department of Commerce 2008b).

Further examining personal income provides insight into the area economy and its connection to BLM-managed public lands. The 3 major sources of personal income within the Planning Area 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.

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

Labor earnings were the largest source of income within the Planning Area, accounting for 68 percent of all income in 2008. In Colorado, labor earnings made up 71 percent of total personal income. The government and construction sectors were the largest components of labor income

in 2008 for the 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 3-42)

Government Revenues and Expenditures

Table 3-43 shows the sources of revenues and expenditures for the Planning Area for 2000 and 2003. Taxes were the dominant source of revenue in 2003, most of which were property taxes.

Social Values

Recreational opportunities and scenic beauty were the most commonly cited reasons that people live in, or visit, the communities within the Planning Area. The quality of life and small-town character were also cited as reasons that residents live in the area. Popular recreational activities includes 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, within the Planning Area.

**Table 3-43
 Planning 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

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 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, as well as in providing open areas (BLM 2007k; Grand County 2000).

Social characteristics in Jackson County differ from those of many of the other counties within 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, and necessitated by the lack of diversity in economic opportunities (BLM 2007g). Recreation opportunities are available in Jackson County; however, they are not tourist-oriented, as they are in the other counties within the Planning Area.

This discussion, alongside information from public scoping comments and the North-Central Colorado Community Assessment Report, provides a comprehensive assessment of the concerns of communities within 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 3 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/or

-
- 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/or
 - 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

Within the Planning Area, as well as the State, the population has grown since 1980. Over the past 25 years, the population of the Planning Area has increased by 136.1 percent; and the population of the State has increased by 63.4 percent. Summit County experienced the greatest growth during this time. Jackson County was the only County within the Planning Area to experience a decline in population. The decade between 1990 and 2000 showed the highest growth (67.3 percent for the Planning Area, and 30.6 percent for the State) (Colorado State Demography Office 2007a).

Much of the growth within the Planning Area 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 within the Planning Area, especially in Eagle 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 within the Planning Area, with less than 1 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 within the Planning Area has fluctuated. Between 1991 and 2001, net migration was the dominant source of population change within the Planning 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 within the Planning Area. By 2005, slightly more than one-half of the population change within the Planning Area was attributable to net migration (Colorado State Demography Office 2007b).

Between 2005 and 2030, the population of the counties with the Planning Area is forecast to nearly double, increasing by 40,526 (94.4 percent), while the population of the State is expected to grow by 2,959,305 (62.7 percent). Summit County is projected to have the greatest absolute increase (24,365); however, Grand County is expected to grow by the highest percentage (113.8 percent). Jackson County is forecast to have both the smallest absolute population increase (337) and the smallest rate of growth, at 22.0 percent (Colorado State Demography Office 2007g).

Age Distribution

Since 1990, the overall aging of the population has affected, and is anticipated to continue to affect, the Planning Area and the State. As shown in Table 3-45, between 1990 and 2005 the population of children ages 0 to 17 declined within the Planning Area, while the working age population (ages 18 to 64) increased; and the percentage of people ages 65 and older increased steadily within the Planning 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; and the working age population is also forecast to decline steadily. The Planning Area average population of those 65 and older is projected to continue to increase after 2005; however, it is expected to remain lower than the State average through 2030 (Colorado State Demography Office 2007c).

**Table 3-44
 State and Planning Area Age Distribution**

Year	Ages 0 to 17		Ages 18 to 64		Ages 65 and older	
	Planning Area Percent	Colorado Percent	Planning Area Percent	Colorado Percent	Planning Area Percent	Colorado Percent
1990	22.6	26.2	72.7	63.8	4.7	8.5
2000	19.0	25.6	75.9	64.8	5.1	8.2
2005	20.1	25.1	73.6	65.2	6.3	8.6
2010	20.9	24.7	71.1	64.9	8.0	9.7
2015	21.1	24.7	68.4	63.2	10.5	11.5
2020	20.7	24.7	66.4	61.4	12.9	13.7
2025	20.3	24.6	64.7	59.9	15.0	15.5
2030	20.3	24.7	63.3	58.8	16.4	16.5

Source: Colorado State Demography Office 2007c

Housing

Between 1990 and 2000, housing affordability decreased within the Planning Area and the State; and a greater percentage of income was needed in order to purchase housing (Economic Profile System 2004). Between 1990 and 2005, the number of housing units within the Planning Area increased 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).

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. Assuming that this is the case for the Planning Area, tourists visiting the area would generate 938 jobs and \$18,780,000 in earnings by 2030 (under current management conditions) (Stynes and White 2006, Runyan Associates 2006; Colorado Division of Local Government 2005).

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 within the 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).

In June of 2007, the Kremmling Town Board approved an application for a pellet plant. 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 homes 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, will be 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.

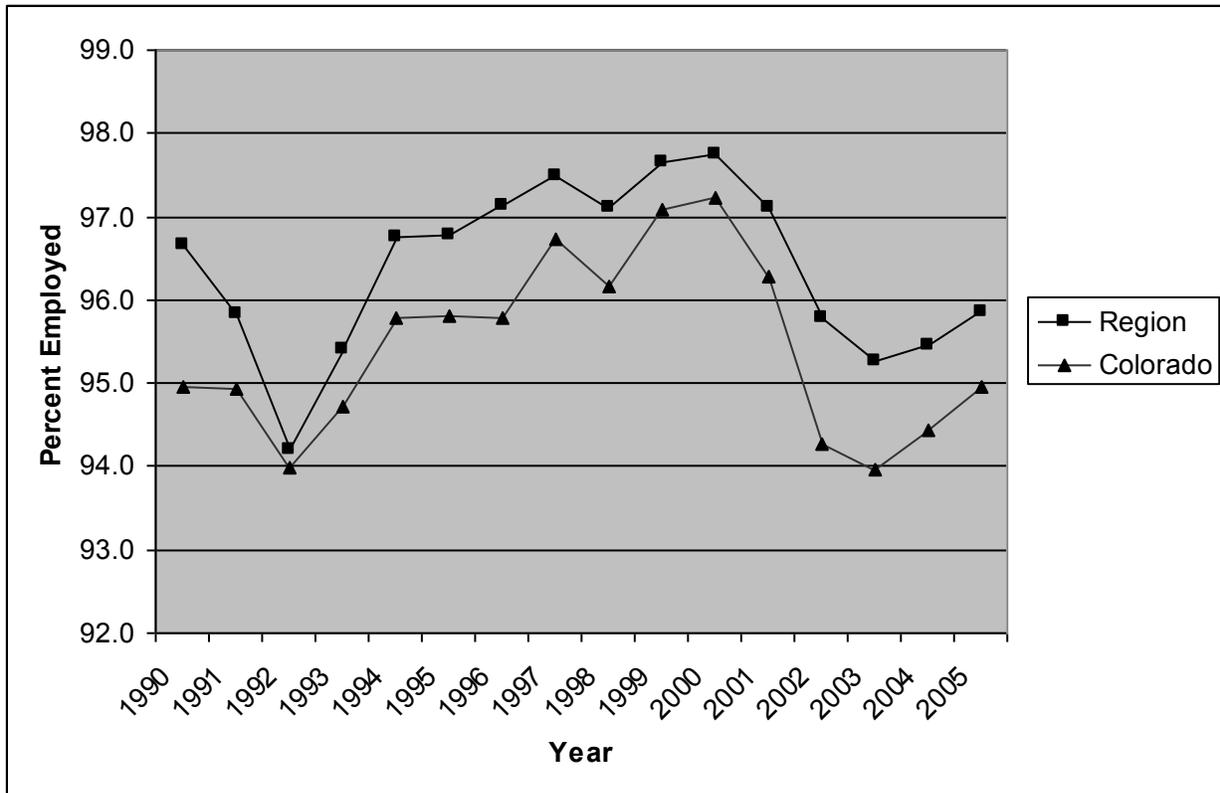
Together, the pellet plants could generate \$69 million in sales, assuming that 172,367,286 Btus would be used per home; that 30,000 homes would use the pellets produced by the Confluence Energy pellet plant in Kremmling; that the Rocky Mountain Pellet Company Plant in Walden sells all 150,000 tons of 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, adjusted to include the impact on local government (EIA 2004; Colorado Division of Local Government 2005).

Employment

Between 1990 and 2005, the total number of jobs in the Planning Area grew by 68.8 percent, while the labor force grew by 90.8 percent. The number of unemployed workers increased by 135.9 percent (Colorado State Demography Office 2007f). Figure 3-7 shows employment growth between 1990 and 2005 for the Planning Area and the State, demonstrating that employment levels within the Planning Area fluctuated in a pattern similar to that for the State. Throughout this period, Planning Area employment levels exceeded the State average (CSDO 2007f).

The surplus in the number of jobs (jobs minus labor force) increased by 1,227 between 1990 and 2005, from a surplus of 6,056 jobs to 7,283 jobs. This indicates that, even if all unemployed workers received jobs, there would still be a need for more employees. This job gap reached a maximum in the Planning Area and in the State in 2001 (CSDO 2007f).

Figure 3-7
State and Planning Area (Region) Percent Employed



Source: Colorado State Demography Office 2007f.

Within the Planning Area, between 1970 and 2000, total employment increased by 923.5 percent. The dominant source of employment in 1970 was the government sector; however, by 2000, the services sector employed the largest percentage of the population with the Planning Area (39.2 percent); and retail trade employed the second-largest percentage (at 26.0 percent). The largest services sectors were hotels and other lodging services and amusement and recreation services, with 48.8 percent and 23.0 percent of total services employment (CSDO 2008a). The same rankings prevailed in 2001 and 2005; however, in 2001 construction replaced government as the third-largest sector. By 2005, government sector employment exceeded construction employment. Between 2001 and 2005, jobs in management of companies and enterprises (81.2 percent), mining (50.8 percent), and education (37.7 percent) saw the greatest increases. Employment in the information field experienced the greatest decrease during this period (10.8 percent). Both agriculture and construction experienced a decrease in jobs between 2001 and 2005 (1.3 and 7.6 percent); however, the proportion of the population employed in each of these sectors increased slightly (CSDO 2008b).

During the past decade, job growth in Summit County has been outpacing population growth. Future projections show this trend continuing, with larger numbers of commuters and migrants coming into the County to fill jobs. Factors fueling job growth have been second-home construction, real estate sales, and the strengthening of industries that support new home development. As the economy diversifies away from being primarily ski industry driven, retail sales have evened out throughout the year, rather than showing a high level of disparity between the winter and the rest of the year (Summit County 2003).

Figure 3-15 shows the projected increase in jobs within the Planning Area from 2005 to 2030. Figure 3-16 shows the projected change in the number of jobs in selected sectors. Between 2005 and 2030, the total number of jobs in the Planning Area is forecast to increase by approximately 106.0 percent. The greatest increases are forecast in regional and national services (72.9 percent) and tourism (68.3 percent). The mining sector is projected to lose jobs. Jobs in agriculture are forecast to increase by 15.4 percent, but to decrease as a percentage of total jobs (CSDO 2007h).

Income

Between 1970 and 2008, annual TPI in the economic impact area increased by \$2.6 billion to \$15.9 billion; and annual PCPI increased from \$20,362 to \$44,560 (all measures adjusted for inflation to 2009 dollars). This translates to a TPI increase of 40 percent (roughly 1 percent annually) and a PCPI increase of 20 percent (roughly 0.5 percent annually) over this period (U.S. Department of Commerce 2008).

PCPI is a useful measure of economic well being; however, it should be examined alongside changes in real earnings per job. PCPI includes income from 401(k) plans and other non-labor income sources (such as transfer payments, dividends, and rent); therefore, it is possible for per capita income to rise, even if the average wage per job declines over time. PCPI rose between 1970 and 2005, and average earnings per job also increased (from \$34,671 to \$43,464) (values adjusted for inflation to 2009 dollars), indicating a possible decrease in area economic well being (U.S. Department of Commerce 2008).

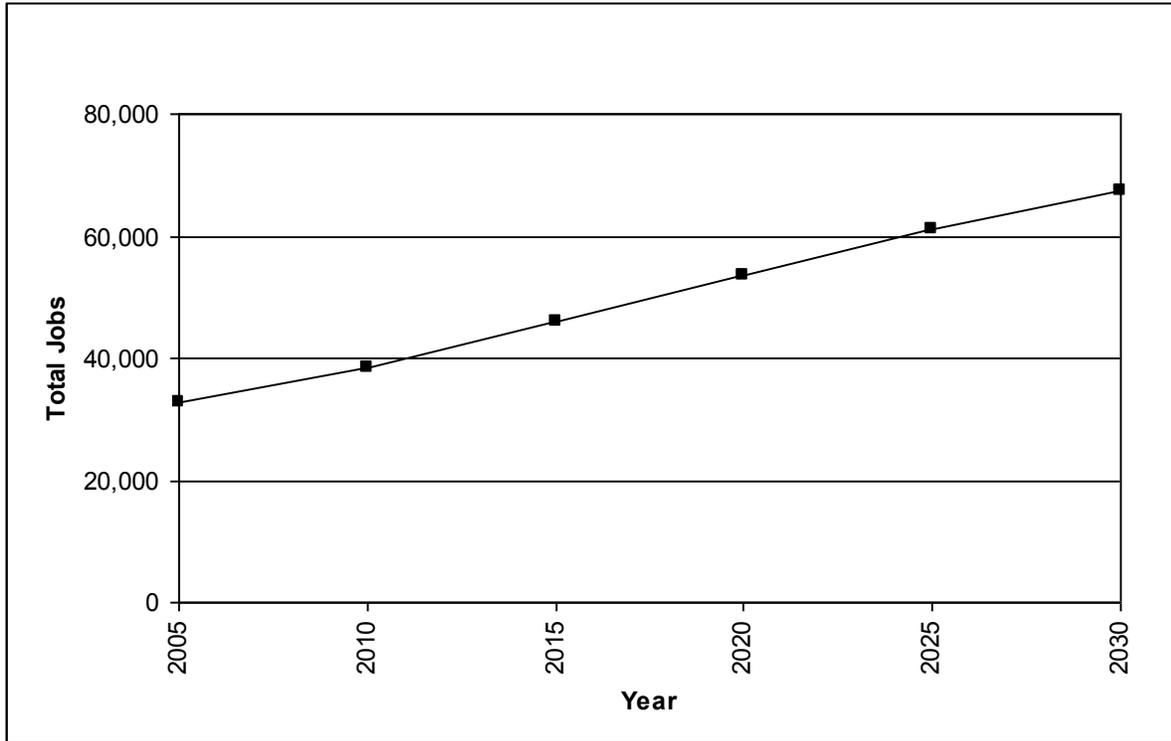
In 1970, non-labor income represented 27.7 percent of total personal income; by 2008, non-labor income had increased to 31.7 percent of TPI (U.S. Department of Commerce 2008). As the population of the area continues to age, the share of income from these non-labor sources should continue to rise, as 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; therefore, they indirectly contribute to area labor and non-labor income.

Government Revenues and Expenditures

As shown in Table 3-43, 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

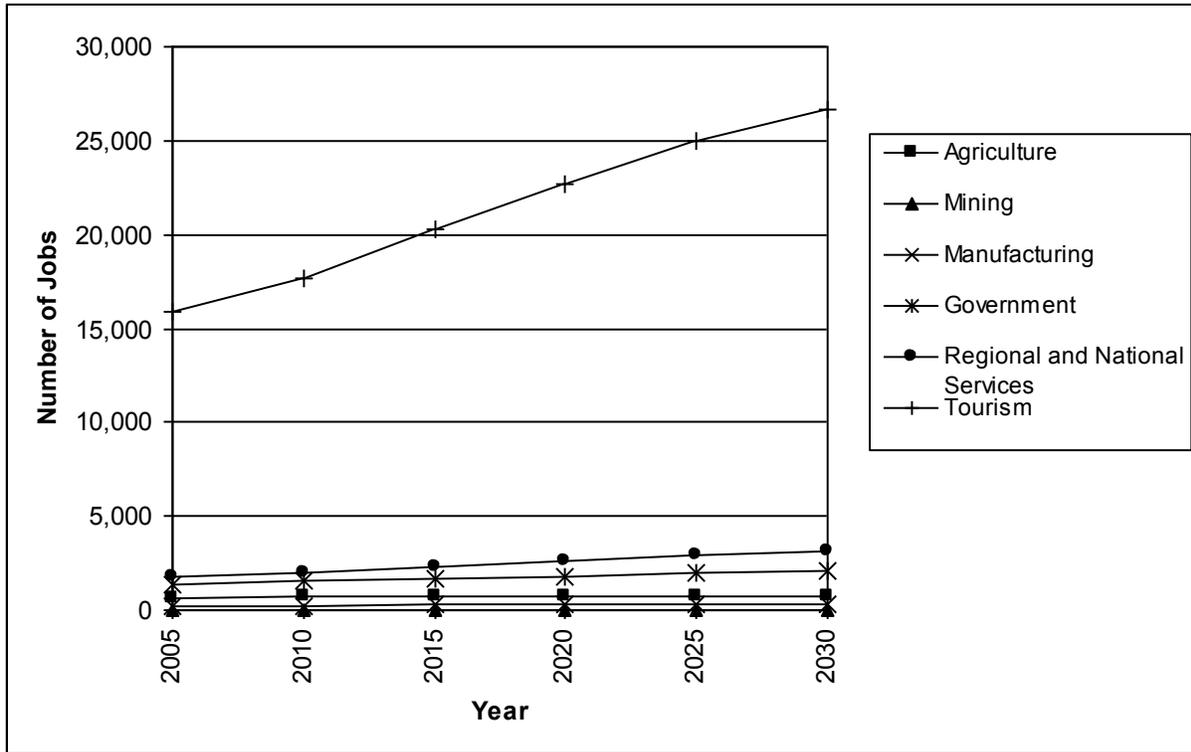
health increased by the highest percentages between 2000 and 2003. During this time, spending on capital outlays and social services decreased as a portion of total spending. Total expenditures increased by 15.8 percent (Colorado Division of Local Government 2007).

Figure 3-8
Planning Area Projected Total Jobs (2005—2030)



Source: CSDO 2007h

Figure 3-9
Planning Area Projected Jobs by Sector (2005—2030)



Source: CSDO 2007h

3.2.28 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 and/or low-income populations. Population growth can stimulate economic growth and provide economic diversification. However, development in support of the growing population 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.

In this Section, economic, racial, and demographic information generated in order to identify areas of low-income and high minority populations within, and around, the Planning Area is presented. The distribution of persons in poverty is used as an identifier for low-income populations. The presence, distribution, and percentage of environmental justice populations is 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 and/or high minority populations:

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 (for example, 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 and/or high minority populations, so that these populations would be especially limited in their ability to participate in activities on BLM-managed public lands within 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 3-45, State and Planning Area Race and Ethnic Origin (2005), the population of the Planning Area was predominantly White and non-Hispanic, and was more homogeneous than that of the State. The Black/African American group was the dominant minority in the State; however, based on population percentages, there are no real dominant minorities within the Planning Area. The percentage of the State population composed of Hispanic or Latino persons was greater than that of the Planning Area. Only Summit County had a higher percentage of Hispanic origin than did the State. Grand County had the lowest percentage of Hispanic origin of the counties within the Planning Area (CSDO 2007i).

Table 3-45 State and Planning Area Race and Ethnic Origin (2005)					
Race/Origin	Grand County Percent	Jackson County Percent	Summit County Percent	Planning Area Percent	Colorado Percent
Race					
White	97.5	98.8	97.1	97.8	90.2
Black/African American	0.6	0.3	0.9	0.6	4.1
American Indian and Alaska Native	0.6	0.8	0.4	0.6	1.1
Asian	0.8	0.1	0.9	0.6	2.6
Native Hawaiian and Other Pacific Islander	0.1	0	0	0.0	0.1
Two or More Races	0.5	0	0.7	0.4	1.8
Origin					
Non-Hispanic	95.0	91.9	86.9	91.3	80.7
Hispanic or Latino	5.0	8.1	13.1	8.7	19.3

Source: CSDO 2007i

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).

According to the U.S. Census Bureau, the poverty threshold in 2004 was \$9,973 for an individual, and \$19,971 for a family of 4. Table 3-46, Planning Area Poverty and Median Household Income, shows estimated median household income and poverty levels for the counties within the Planning Area. Summit County had the lowest poverty level in 2004, and Jackson County had the highest. The poverty rate in Jackson County exceeded the State average. Summit County's median household income was the highest within the Planning Area, and exceeded the State average, while Jackson County's was the lowest. Overall, the median household income within the Planning Area was below the State average, as a result of low income levels in Jackson and Grand Counties (U.S. Census Bureau 1998, 2003, and 2006).

Location	Percent in Poverty			Median Household Income 2004
	1989	2000	2004	
Grand County	6.8	7.3	7.2	\$49,907
Jackson County	18.4	14.5	12.0	\$33,476
Summit County	5.3	6.1	5.9	\$52,220
Planning Area	10.2	9.3	8.4	\$45,201
Colorado	11.7	8.9	10.2	\$50,105

Source: U.S. Census Bureau 1998, 2003, and 2006

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 and/or high minority populations.

Trends

Between 1990 and 2005, the percentage of minority population within the region decreased from 2.83 percent to 2.73 percent of the total population. Over this period, the minority population within the Planning Area decreased by 69.6 percent. Jackson County experienced the greatest decrease in the percentage of minorities within the Planning Area, from 7.79 percent in 1990 to 1.17 percent in 2005 (the lowest level within the Planning Area). The proportion of minorities in Grand and Summit Counties increased between 1990 and 2005; however, 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 within the Planning 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 within the Planning Area. [See Table 3-45, State and Planning Area Race and Ethnic Origin (2005).]

As shown in Table 3-46, Planning Area Poverty and Median Household Income, between 1989 and 2004 the poverty rate within the Planning Area and the State declined, with the poverty rate

within the Planning 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 Planning Area counties, except in Jackson County. Poverty has declined in Jackson County; however, it has consistently been the highest within the Planning Area, and well above the State average (U.S. Census Bureau 1998, 2003, and 2006).