# CHAPTER 3—AFFECTED ENVIRONMENT

## 3.1 INTRODUCTION

This chapter describes the existing conditions for Bureau of Land Management (BLM) resources, resource uses, special designations, and the socioeconomic environment within the Richfield Field Office (RFO) planning area. A variety of laws, regulations, policies, and other requirements direct management of resources and resource uses on public lands administered by the BLM. The affected environment is used as the baseline of existing conditions against which the impacts of the different alternatives are analyzed and compared in Chapter 4.

## 3.2 OVERVIEW OF THE PLANNING AREA

The planning area encompasses 5.4 million acres in Sanpete, Sevier, Piute, and Wayne counties, and portions of Garfield County. There are also 21,500 acres of Kane County within the planning area. These acres, however, lie entirely within Glen Canyon National Recreation Area (NRA) so no decisions within this RMP will affect those lands. Within this area, BLM manages 2.1 million acres of public land surface and mineral estate, and an additional 95,000 acres of split estate lands (federal minerals where the surface estate is in state or private ownership). The BLM also has administrative responsibility for 2,082,865 acres of mineral estate where the surface is managed by other federal agencies (U.S. Forest Service [USFS] and National Park Service [NPS]). Noted geographic features of the RFO include the Henry Mountains, Parker Mountain, Fremont River, Dirty Devil River, Gilbert Badlands, and Factory Butte. Acreage calculations used in this chapter and elsewhere in this document reflect current data in BLM's geographic information system (GIS) and may differ from acreages displayed in older documents that were calculated by other methods. In this document, the term "planning area" applies to all lands within the 5 county area regardless of surface ownership. The term "Richfield Field Office" (RFO) applies only to the BLM-administered public lands and resources within the planning area. All acres in text and tables represent surface acres unless otherwise noted.

### 3.2.1 Physiography

The planning area is located primarily in south-central Utah and lies almost entirely within the Colorado Plateau and the Colorado Plateau-Basin and Range Transition physiographic provinces (Hunt 1974, Stokes 1986) except for a small portion of northern Sanpete County, which is within the Middle Rocky Mountains province.

As shown on Map 3 of the *Mineral Potential Report* (BLM 2005b), the eastern part of the planning area is in the Colorado Plateau province. This area is characterized by relatively flat-lying sedimentary strata uplifted to elevations between 5,000 and 10,000 feet above sea level, and that are predominantly Paleozoic to Mesozoic in age. In places, the strata are deeply incised as canyons; in others, they are relatively broad bench lands. Strata in the eastern part of the planning area are intruded by igneous rocks that form the Henry Mountains.

The western part of the planning area is in the Colorado Plateau-Basin and Range Transition Zone. This province has similarities to the Colorado Plateau to the east and to the Basin and Range to the west. Similarly to the Colorado Plateau, the sedimentary strata in the Transition Zone are relatively flat lying. Similarly to the basin and range, the physiography of the Transition Zone includes fault-bounded, north-

trending ranges that are separated by valleys. In addition, the Sevier and Sanpete Valleys and adjacent ranges are part of one of the world's classic fold-and-thrust belts (DeCelles and Coogan 2006). Many of the ranges are capped by Tertiary volcanic rocks. One of the largest volcanic fields in the United States is the Marysvale Volcanic Field, which includes the Tushar Mountains and parts of adjacent plateaus.

The southern end of the Middle Rocky Mountains province extends into the northern highlands of Sanpete County along the drainage divide between the Spanish Fork and San Pitch rivers. Rocks in the area include Upper Cretaceous and Tertiary strata similar to those present in the Colorado Plateau to the east, along with Middle Tertiary volcanic deposits of the Moroni Formation.

## 3.2.2 Topography and Drainage

Overall, elevations across the planning area range from a high of 12,173 feet on Mount Delano, located on the crest of the Tushar Mountains in the Fishlake National Forest, to a low of around 3,700 feet on Lake Powell in Glen Canyon NRA. Mountain summits are typically 9,000 to 11,000 feet in elevation, with valley bottoms at 5,000 feet. The Green and Colorado rivers drain the eastern portion of the planning area, whereas areas to the west have internal drainage to either the Sevier or Utah Lake basin. The Sevier River, which drains most of the western portion of the planning area, discharges to Sevier Lake.

# 3.3 PHYSICAL, BIOLOGICAL, AND CULTURAL RESOURCES

## 3.3.1 Air Resources

This section describes the climate and existing air quality in the region potentially affected by alternatives described in Chapter 2. Air pollutants addressed in this Proposed RMP/Environmental Impact Statement (EIS) include criteria pollutants, hazardous air pollutants, and compounds that could cause visibility impairment or atmospheric deposition. Regional air quality is influenced by the interaction of several factors, including meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources, and the chemical properties of emitted air pollutants. Elements of air quality addressed in this analysis include ambient air quality concentrations, visibility, and atmospheric deposition. Chapter 3 of the *Management Situation Analysis* (MSA) contains detailed information concerning air quality (BLM 2004a).

### 3.3.1.1 Global Climate Change

Ongoing scientific research has identified potential impacts of climate changing pollutants on the global climate. These pollutants are commonly called "greenhouse gases" and include carbon dioxide ($CO_2$), methane, nitrous oxide, water vapor, and several trace gas emissions. Through complex interactions on a regional and global scale, these emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although climate changing pollutant levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused $CO_2$ concentrations to increase dramatically and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing $CO_2$ concentrations also lead to preferential fertilization and growth of specific plant species.

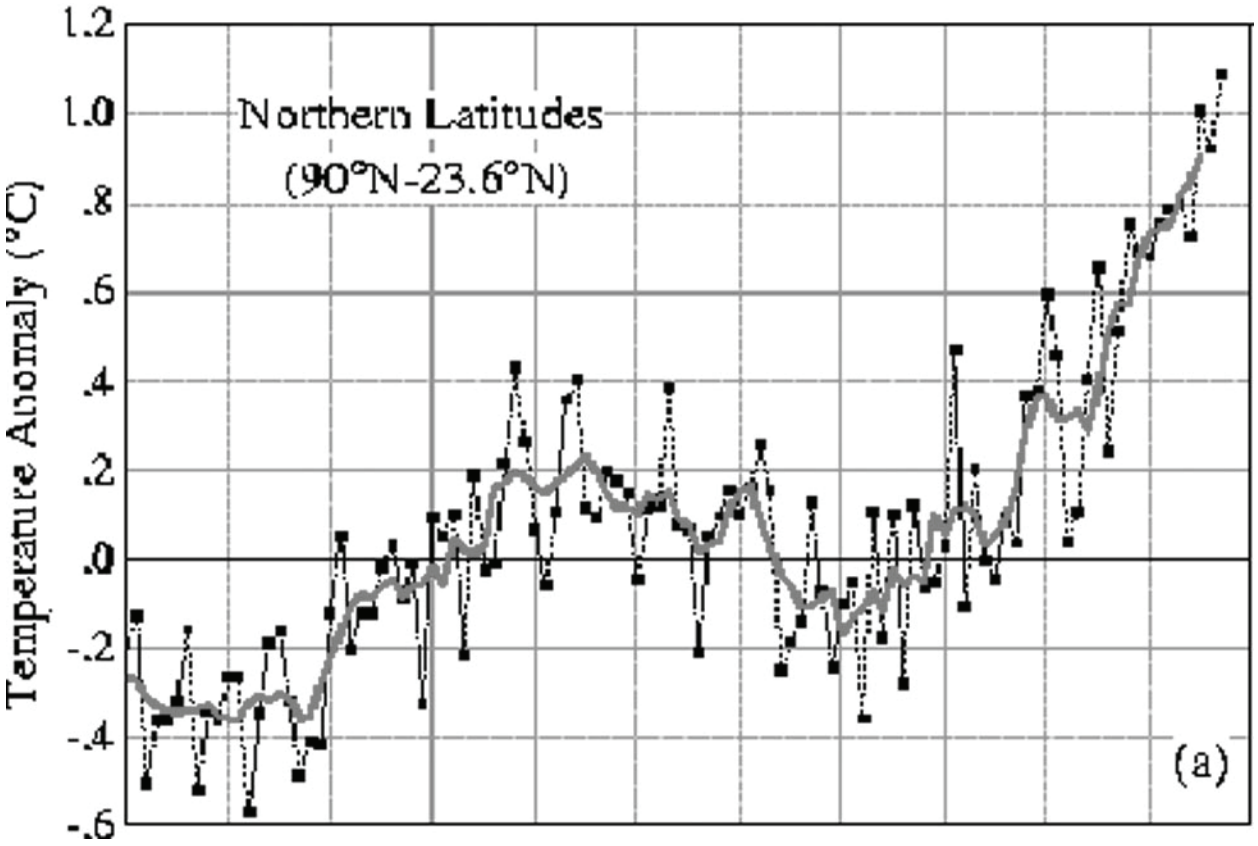
Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Figure 3-1 demonstrates that northern latitudes (above 24° N) have exhibited temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of these greenhouse gases are likely to accelerate the rate of climate change.

The Intergovernmental Panel on Climate Change (IPCC) has recently completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts, and options for adaptation and mitigation. At printing of this PRMP/FEIS, this assessment is available on the IPCC website at www.ipcc.ch/. According to this report, global climate change may ultimately contribute to a rise in sea level, destruction of estuaries and coastal wetlands, and changes in regional temperature and rainfall patterns, with major implications to agricultural and coastal communities. The IPCC has suggested that the average global surface temperature could rise 1 to 4.5 degrees Fahrenheit (°F) in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) confirmed these findings but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer models indicate that such increases in temperature will not be equally distributed globally but are likely to be accentuated at higher latitudes, such as in the Arctic, where the temperature increase may be more than double the global average (BLM 2007a). Also, warming during the winter months is expected to be greater than during the summer, and increases in daily minimum

temperatures are more likely than increases in daily maximum temperatures. Vulnerabilities to climate change depend considerably on specific geographic and social contexts.

BLM recognizes the importance of climate change and the potential effects it may have on the natural environment. Several activities occur within the planning area that may generate emissions of climate changing pollutants. For example, oil and gas development, large fires, and recreation using combustion engines can potentially generate $CO_2$ and methane. Wind erosion from disturbed areas and fugitive dust from roads along with entrained atmospheric dust have the potential to darken glacial surfaces and snow packs, resulting in faster snowmelt. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as "carbon sinks."

**Figure 3-1. Annual Mean Temperature Change for Northern Latitudes (24 - 90° N)**




Source: Goddard Institute for Space Studies (2007)

### 3.3.1.2 Climate

Indicators of climate include temperature, precipitation, wind, barometric pressure, humidity, sunshine and cloudiness. Issues of concern with respect to climate include climate variability (how changes in climate may affect resources) and climate change (how human activities and other factors may affect climate). Climate change indicators reported in this RMP include monitored (measured by an instrument) values.

An area's climate is determined mainly by latitude, distance from the ocean and elevation. The world's eco-regions are characterized by typical climate and are classified by domain, division and province. Domains include polar, humid temperate, humid tropical and dry. The west coast and the eastern half of the United States are classified as humid temperate, the southern tip of Florida and Hawaii are classified as humid tropical, most of Alaska is classified as polar, with southern Alaska classified as humid temperate, and most of the western United States is classified as dry. Dry climates are the most extensive climate group, occurring on more than one quarter of the earth's surface. Eco-region divisions of the dry domain include desert (temperate, temperate mountainous and tropical/sub-tropical) and steppe (temperate, temperate mountainous, tropical/sub-tropical, and tropical/sub-tropical mountainous). Steppes are typically grasslands of short grasses, with shrubs and trees. The eco-region of most of the Richfield planning area is classified as temperate, dry (semidesert), intermountain and mountain area. (http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html).

### 3.3.1.3 Ambient Air Quality Standards

The Clean Air Act (CAA) Amendment of August 7, 1977 (Section 160) identifies the following air quality areas:

- Class I—the most restrictive class applies to areas in which practically any change in air quality would be considered significant.
- Class II—this class applies to areas in which deterioration normally accompanying moderate, well-controlled growth would be considered insignificant.
- Class III—this class applies to areas in which deterioration to ambient standards is allowed.

Most of the RFO and all of the lands managed by the BLM are generally classified as a Class II air quality area (40 Code of Federal Regulations [CFR] Part 81.345). Five Class I areas are in close proximity or within the boundaries of the planning area: Capitol Reef National Park and a portion of Canyonlands National Park are within the planning area boundary; and Arches National Park, Bryce Canyon National Park, Zion National Park, and the remainder of Canyonlands National Park are located adjacent to or near the planning area (Map 3-2). Protection of air quality in these Class I areas may require additional mitigation or protection measures to avoid potential impacts from BLM authorized activities.

Overall air quality in the RFO is good. Based on the region's remoteness, low population, limited industrial development and a lack of major urban communities, counties in the planning area are designated as "attainment" or "unclassifiable" with respect to National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. As of May 2006, the air quality in the planning area had not been designated as "non-attainment" for any criteria pollutant. In addition, based on the *2006 Division of Air Quality Annual Report,* the area is likely to be in attainment with respect to the new particulate matter (PM) 2.5 standards enacted in September 2006, although the final determination has not yet been made (Utah Department of Air Quality [UDAQ] 2007).

The air pollutant of most concern on public lands that could affect the Class I areas is particulate matter, which may originate from fire, fugitive dust, or vehicle use. Air resources are affected predominantly by existing concentrations of various pollutants and the climatic and meteorological conditions. Map 3-2 shows the Class I air quality areas within and adjacent to the planning area.

### 3.3.1.4 Air Pollutant Concentrations

Air pollutant concentration usually refers to the mass of pollutants present in a volume of air and can be reported in units of micrograms per cubic meter ($\mu g/m^3$). Concentration can also be reported on a volume basis as parts per billion (ppb) and parts per million (ppm).

Air pollutant concentration monitoring networks in Utah include the **S**tate & **L**ocal **A**ir **M**onitoring **S**ystem (SLAMS), Tribal monitoring networks and the **C**lean **A**ir **S**tatus & **T**rends **Net**work (CASTNet). SLAMS stations are located in urban areas and measure "criteria pollutants". The Utah Department of Environmental Quality operates the SLAMS network to establish compliance with regulatory concentration standards. CASTNet stations are located in remote areas and measure concentrations of compounds that are of interest to ecosystem health.

#### Criteria Air Pollutants

Criteria air pollutants are those for which national concentration standards have been established. Measured pollutant concentrations greater than these standards represent a risk to human health or welfare. Criteria air pollutants include carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), ozone ($O_3$), particulate matter ($PM_{10}$, $PM_{2.5}$) and lead (Pb). Criteria air pollutant concentrations are compared to National Ambient Air Quality Standards (NAAQS).

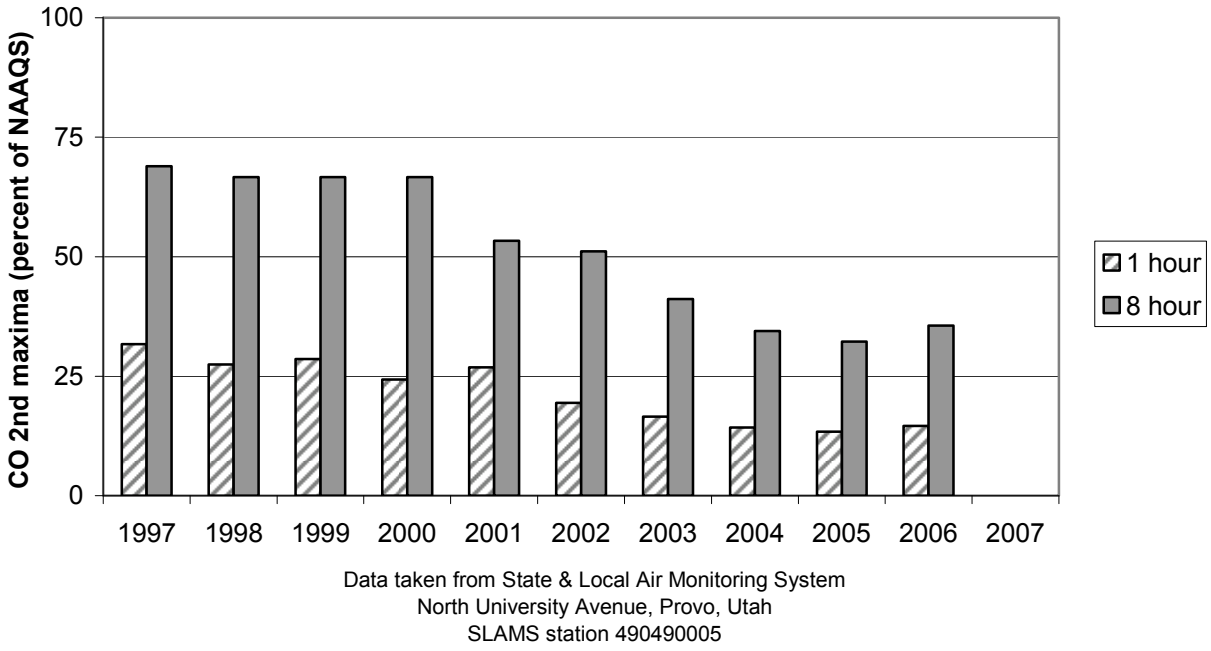
Some criteria air pollutant modeled concentrations are compared to the Prevention of Significant Deterioration (PSD) increments. The goal of the PSD program is to protect public health and welfare from air pollution effects, notwithstanding attainment and maintenance of the NAAQS, and "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores and other areas of special national or regional natural, recreation, scenic or historic value." PSD increments have been established for $NO_2$, $SO_2$ and $PM_{10}$.

Specific monitoring protocols, known as reference (or equivalent) methods, must be followed to determine compliance with UAAQS and NAAQS. The UDEQ performs regulatory monitoring throughout the State of Utah for CO, $NO_2$, $O_3$, $PM_{10}$ and $PM_{2.5}$.

#### Carbon Monoxide

CO is an odorless, colorless gas formed during combustion of any carbon-based fuel, such as operation of engines, fireplaces, furnaces, etc. High concentrations of CO affect the oxygen-carrying capacity of the blood and can lead to unconsciousness and asphyxiation. Forest fires are natural sources of CO. No CO monitoring has been performed in the Richfield area. However, CO data has been collected at Provo, Utah since 1997. Figure 3-2 shows the results. CO levels have been decreasing and no violations of the ambient air quality standards are noted. (Since CO levels are directly related to automobile traffic, these data should be considered high for Richfield.)

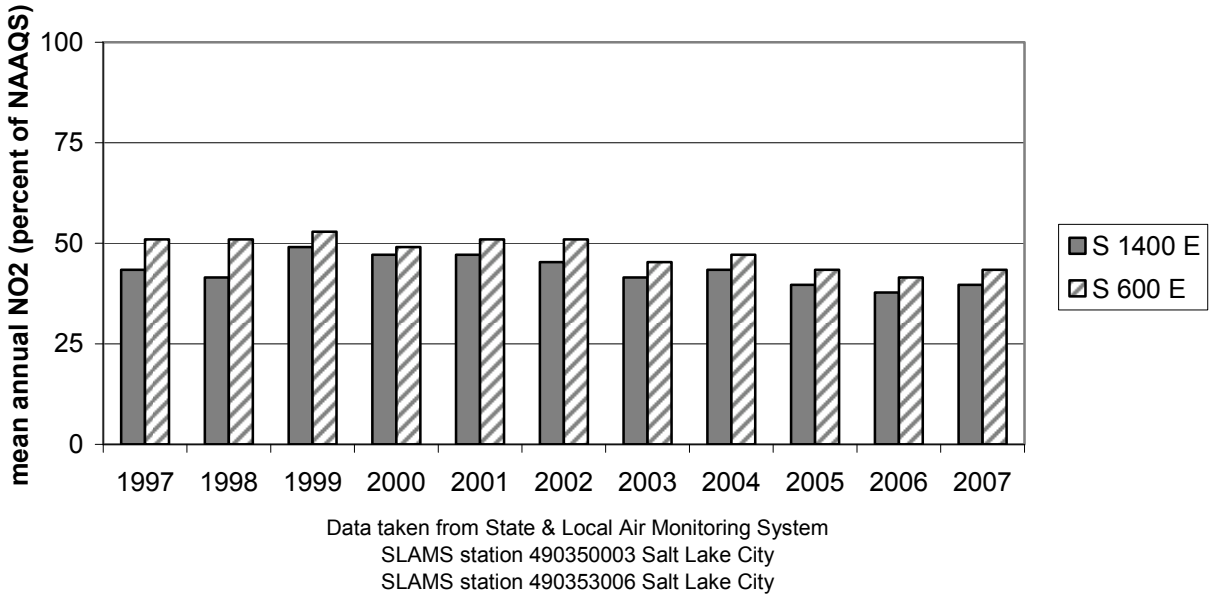
**Figure 3-2. Carbon Monoxide Concentrations Near the Richfield Planning Area**




## Nitrogen Dioxide

$NO_2$ is a highly reactive compound formed at high temperatures during operation of fossil fuel combustion, At high concentrations, it can form a red-brown gas. At concentrations in excess of the EPA air quality standard, it is a respiratory irritant, however, all areas of the United States are in compliance with this air quality standard. During fossil fuel combustion, NO is released into the air which reacts in the atmosphere to form $NO_2$. NO plus $NO_2$ is a mixture of nitrogen gases, collectively called nitrogen oxides ($NO_x$). $NO_x$ emissions can convert to ammonium nitrate particles and nitric acid which can cause visibility impairment Bacterial action in soil can be a natural source of nitrogen compounds. No $NO_2$ monitoring has been performed in the Richfield area. However, $NO_2$ data has been collected at Salt Lake City, Utah since 1997. Figure 3-3 shows the results. $NO_2$ levels have been decreasing and no violations of the ambient air quality standards are noted. (Since $NO_2$ levels are related to automobile traffic and industrial emissions, these data should be considered high for Richfield.)

**Figure 3-3. Mean Annual Nitrogen Dioxide Concentrations Near the Richfield Planning Area**

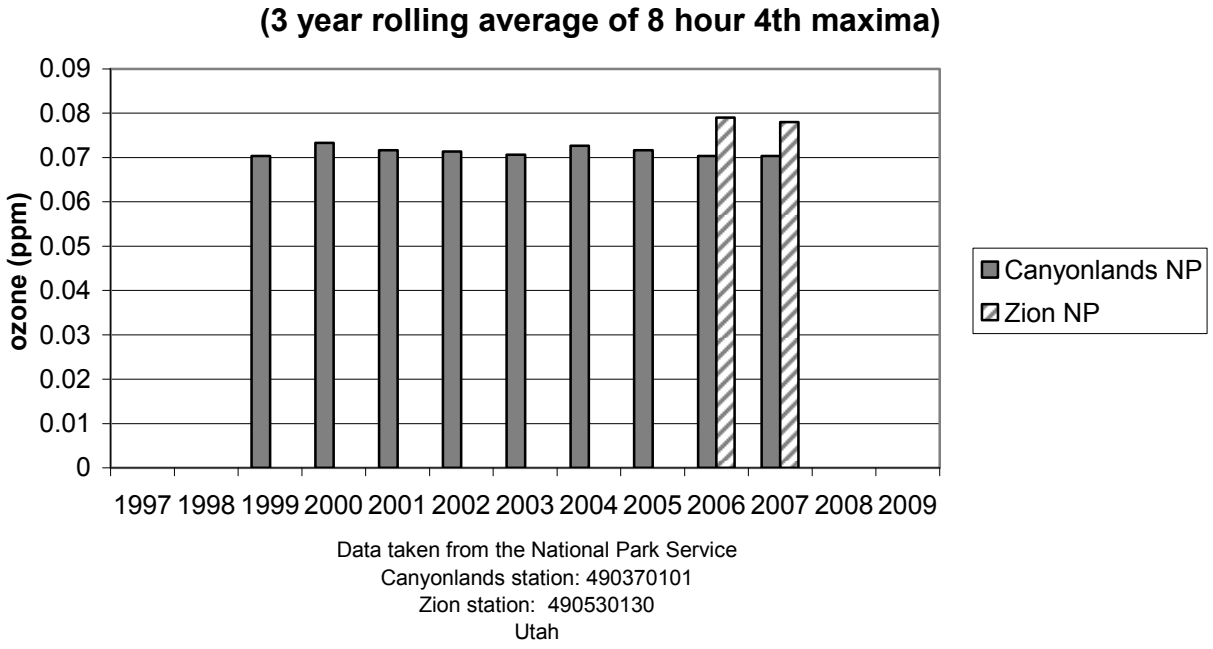



## Ozone

$O_3$ is a faint blue gas that is generally not emitted directly into the atmosphere, but is formed from $NO_x$ and volatile organic compounds (VOC) emissions. Internal combustion engines are the main source of $NO_x$. Sources of VOC include paint, varnish and some types of vegetation (i.e., sage brush and conifers). $O_3$ is a strong oxidizing chemical that can burn lung and eyes, and damage plants.

Ozone data has been collected at Zion National Park since 1999 and Canyonlands national Park since 2006. Figure 3-4 shows the results. It is noted that ozone levels could exceed the newly proposed ambient air quality standard. The current 8-hour NAAQS for ozone is 0.075 ppm.

**Figure 3-4. Ozone Concentrations Near the Richfield Planning Area**




## Particulate Matter

Particulate matter (i.e., soil particles, hair, pollen, etc.) is essentially the small particles suspended in the air which settle to the ground slowly and may be re-suspended if disturbed. Separate allowable concentration levels for particulate matter are based on the relative size of the particle:

- Particulate Matter ($PM_{10}$), particles with diameters less than 10 micrometers, are small enough to be inhaled and can cause adverse health effects.
- Fine Particulate Matter ($PM_{2.5}$), particles with diameters less than 2.5 micrometers, are so small that they can be drawn deeply into the lungs and cause serious health problems. These particles are also the main cause of visibility impairment.

PM concentrations for monitoring sites near the Richfield area are shown in Figure 3-5 through Figure 3-8. The measured concentrations show compliance with ambient air quality standards, except with the new 24 hour average $PM_{2.5}$ standard. The current 24-hour NAAQS for $PM_{2.5}$ is 35 micrograms/$m^3$ and the annual arithmetic mean is 15.0 micrograms/$m^3$.

**Figure 3-5. Twenty Four Hour $PM_{2.5}$ Concentrations Near the Richfield Planning Area**

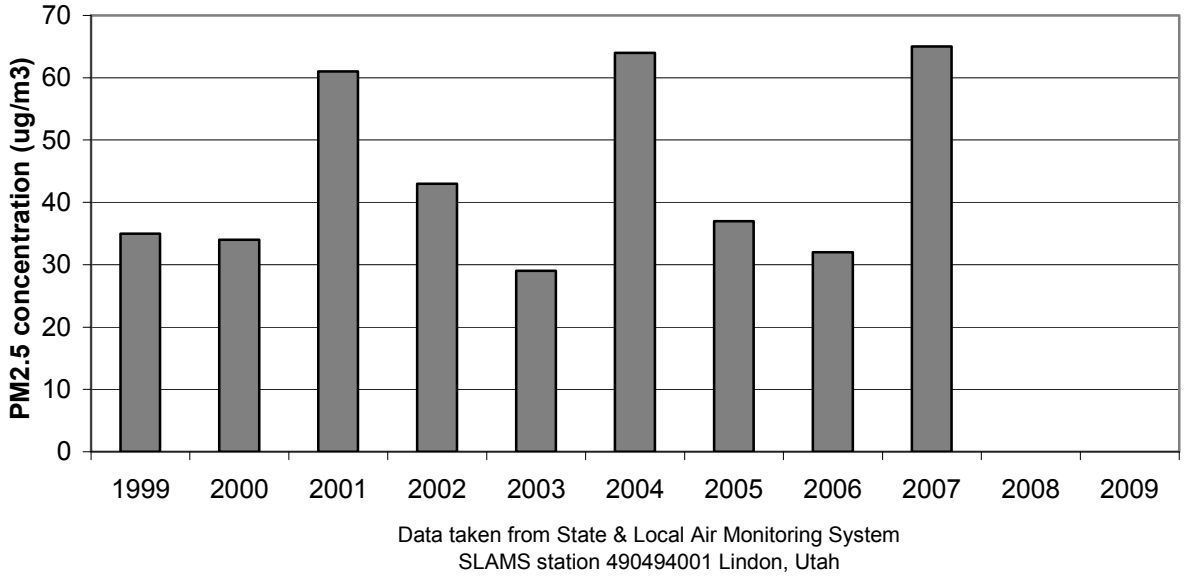



**Figure 3-6. Mean Annual $PM_{2.5}$ Concentrations Near the Richfield Planning Area**

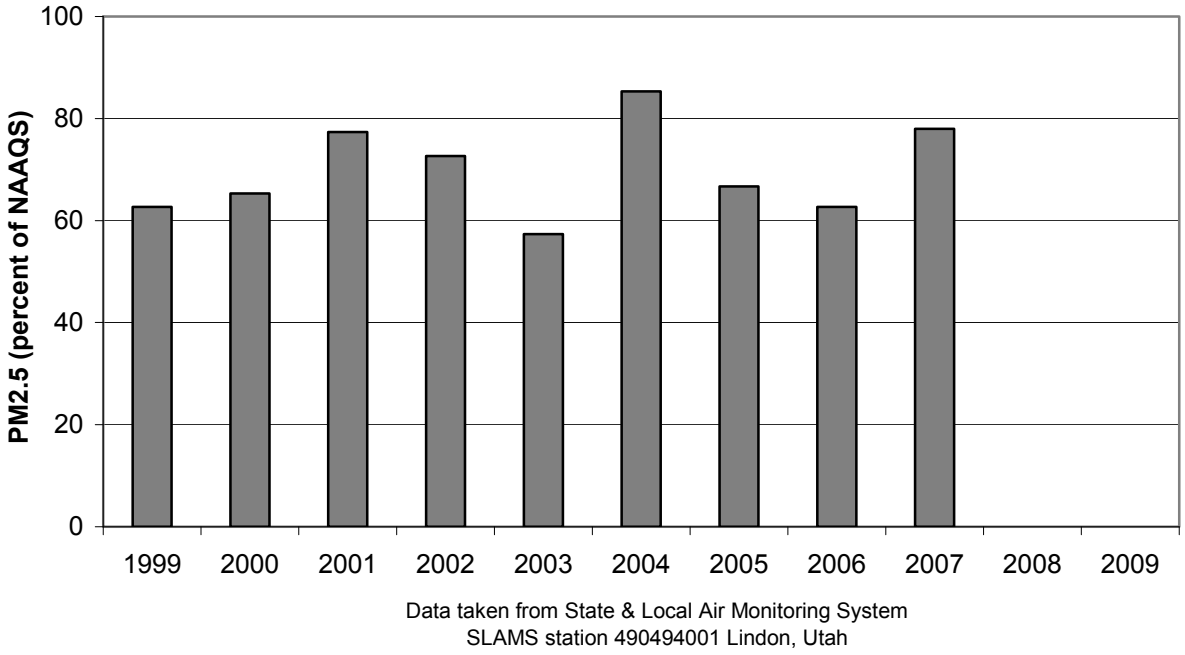


**Figure 3-7. Twenty Four Hour $PM_{10}$ Concentrations Near the Richfield Planning Area**

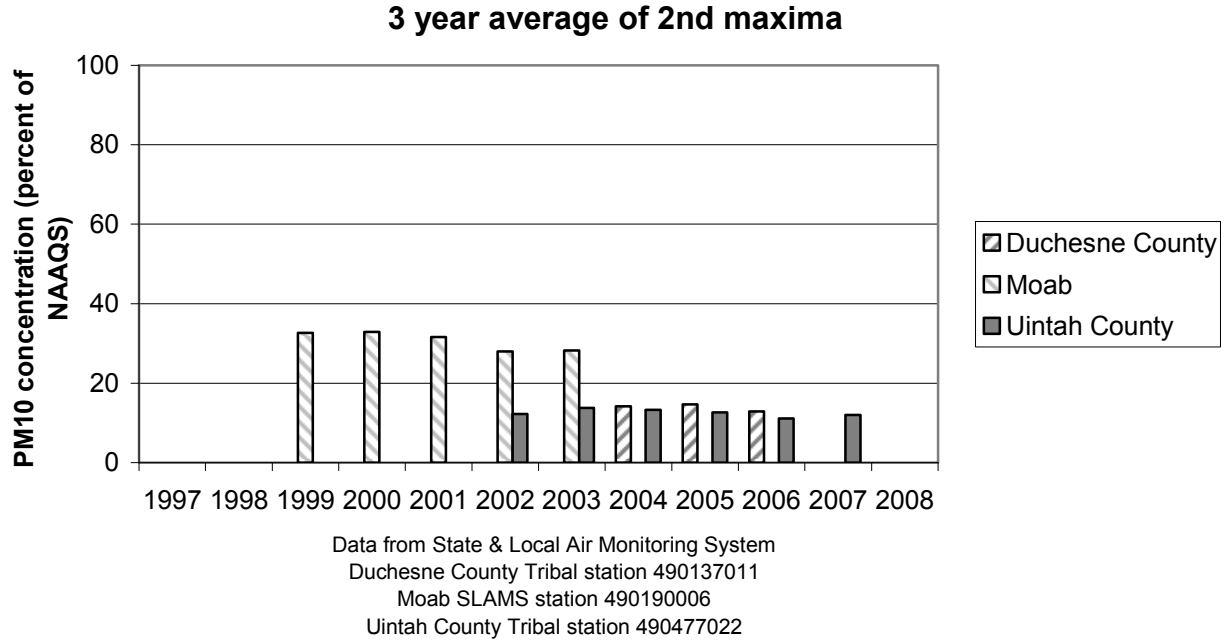
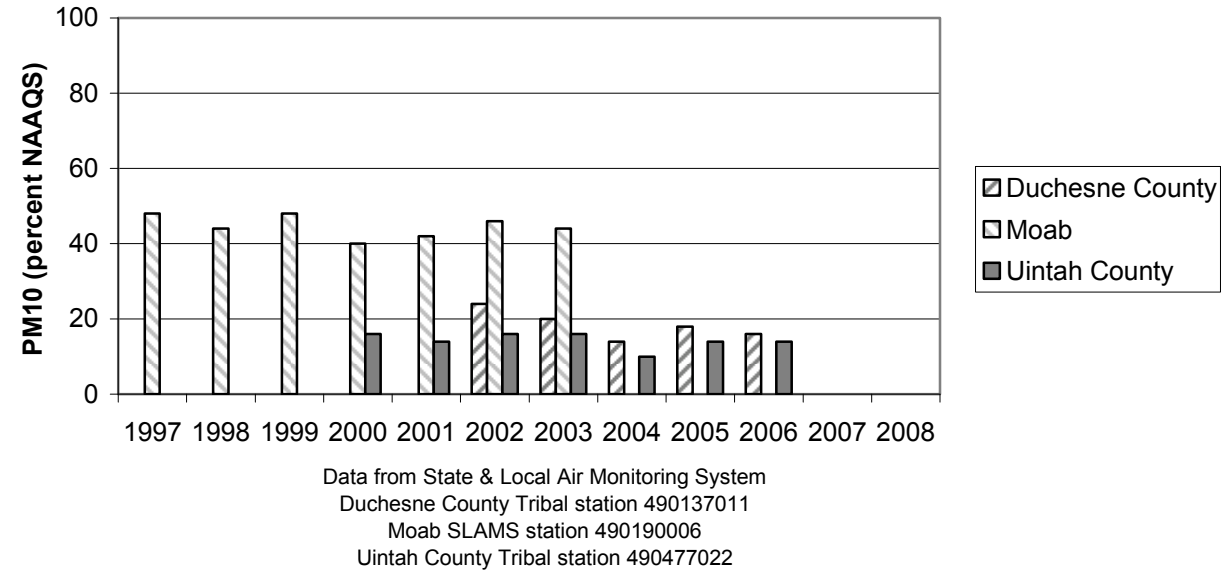



**Figure 3-8. Mean Annual $PM_{10}$ Concentrations Near the Richfield Planning Area**

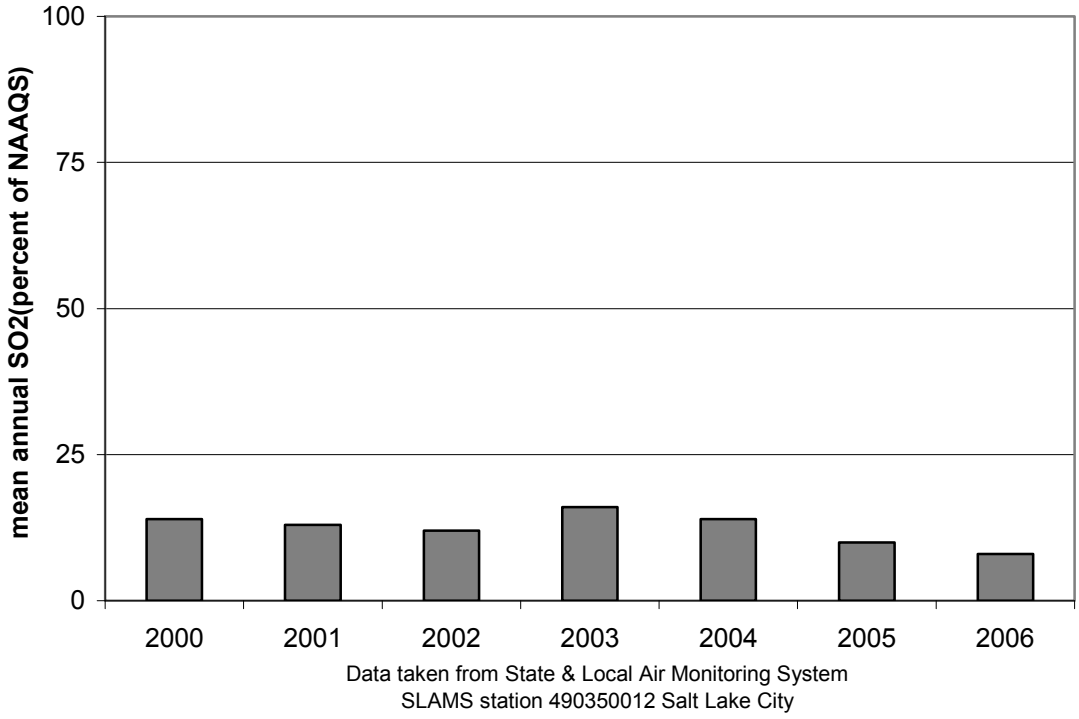



## Sulfur Dioxide

$SO_2$ forms during combustion from trace levels of sulfur in coal or diesel fuel, and can convert to ammonium sulfate ($SO_4^{--}$) and sulfuric acid ($H_2SO_4$) which can cause visibility impairment and acid rain. Volcanoes are natural sources of $SO_2$.

$SO_2$ monitoring has been performed at by the State of Utah in and around Salt Lake City. Figure 3-9 shows the annual results at Salta Lake City. $SO_2$ levels have been slightly decreasing and no violations of the ambient air quality standards are noted.

**Figure 3-9. Mean Annual Sulfur Dioxide Concentrations Near the Richfield Planning Area**




## Nitrogen and Sulfur Compounds

Other air pollutants of interest include nitrogen compounds such as particulate nitrate ($NO_3$), nitric acid ($HNO_3$) and ammonium ($NH_4$), and sulfur compounds such as particulate sulfate ($SO_4$) and sulfur dioxide ($SO_2$). Although monitoring of these air pollutants typically does not adhere to reference methods, these concentration data contribute to our understanding of air quality.

The **C**lean **A**ir **S**tatus and **T**rends **Net**work (CASTNet) has measured concentrations of nitric acid, nitrate and ammonium, as well as ozone, sulfur dioxide and sulfate, in the United States since the late 1980's. There is one CASTNet stations in Utah at Canyonlands NP. Figure 3-10 shows mean annual concentrations of nitrogen compounds in Canyonlands National Park from 1995. These data are representative of the area potentially affected by BLM actions within the Richfield Planning area and are less than those typical for remote areas.

**Figure 3-10. Mean Annual Nitrogen Compounds Concentrations Near the Richfield Planning Area**

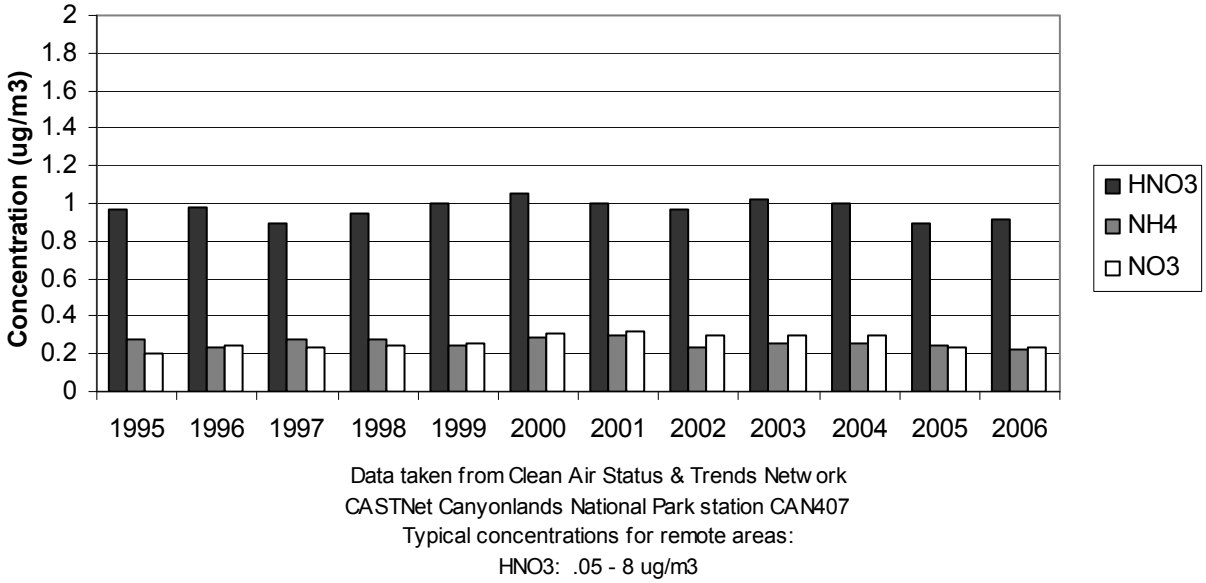
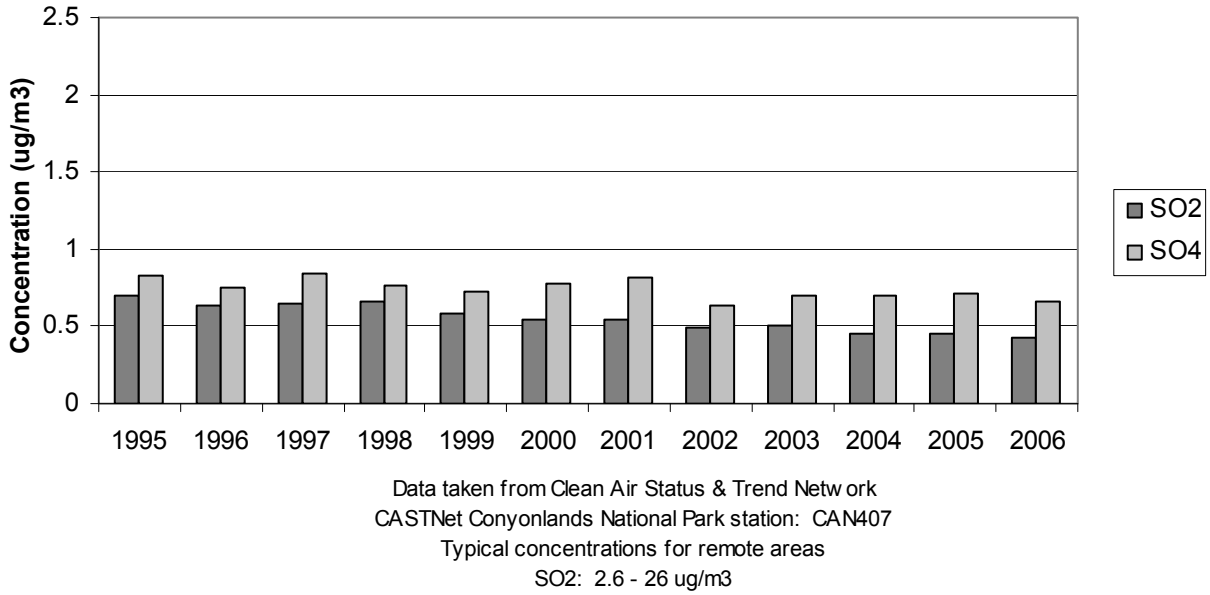



Figure 3-11 shows mean annual concentrations of sulfur compounds in Canyonlands National Park from 1995. These data are representative of the area potentially affected by BLM actions within the Richfield Planning area and are less than those typical for remote areas.

**Figure 3-11. Mean Annual Sulfur Compounds Concentrations Near the Richfield Planning Area**



### Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are those pollutants that are known or suspected to cause cancer or other serious health problems, such as chronic respiratory disease, reproductive disorders or birth defects. The EPA has classified 189 air pollutants as HAPs, including formaldehyde ($CH_20$), benzene, toluene, ethylbenzene, xylene, and n-hexane.

Potential concentrations of HAPs are compared to inhalation reference concentrations to estimate the risk of health effects.

## 3.3.1.5 Visibility

Visibility can be defined as the ability to see color, texture and contrast at a distance and can be reported as visual range, in units of distance such as miles.

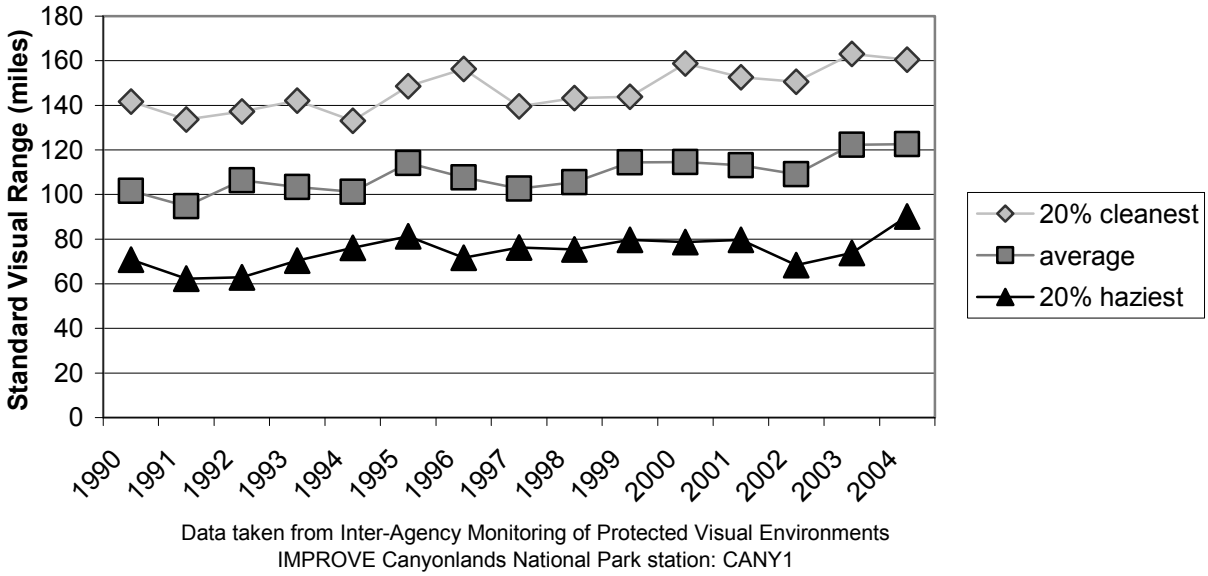
Visibility can be expressed in terms of deciview (dv), a measure for describing perceived changes in visibility. One dv is defined as a change in visibility that is just perceptible to an average person.

Visibility data are calculated for each day, ranked from cleanest to haziest, and reported into three categories:

- 20% cleanest: mean visibility for the 20% of days with the best visibility
- average: the annual mean visibility
- 20% haziest: mean visibility for the 20% of days with the poorest visibility

The IMPROVE network has measured visibility in Class I areas throughout the US. There are 7 IMPROVE stations in Utah: Arches, Bryce Canyon, Canyonlands, Capitol Reef, Lone Pine, Zion and Zion Canyon National Parks. Visibility data have been measured in Canyonlands National Park from 1988 through the present. Mean annual visual range varies from 130 to 162 miles on clear days, 93 to 121miles on average days and 61 to 90 miles on hazy days (Figure 3-12). These data are representative of the area potentially affected by BLM actions within the Richfield planning area.

**Figure 3-12. Annual Visibility Near the Richfield Planning Area**




Data taken from Inter-Agency Monitoring of Protected Visual Environments
IMPROVE Canyonlands National Park station: CANY1

### 3.3.1.6 Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems, and is reported as the mass of material deposited on an area (kilogram per hectare - year). dry deposition (gravitational settling of particles and adherence of gaseous pollutants to soil, water and vegetation).

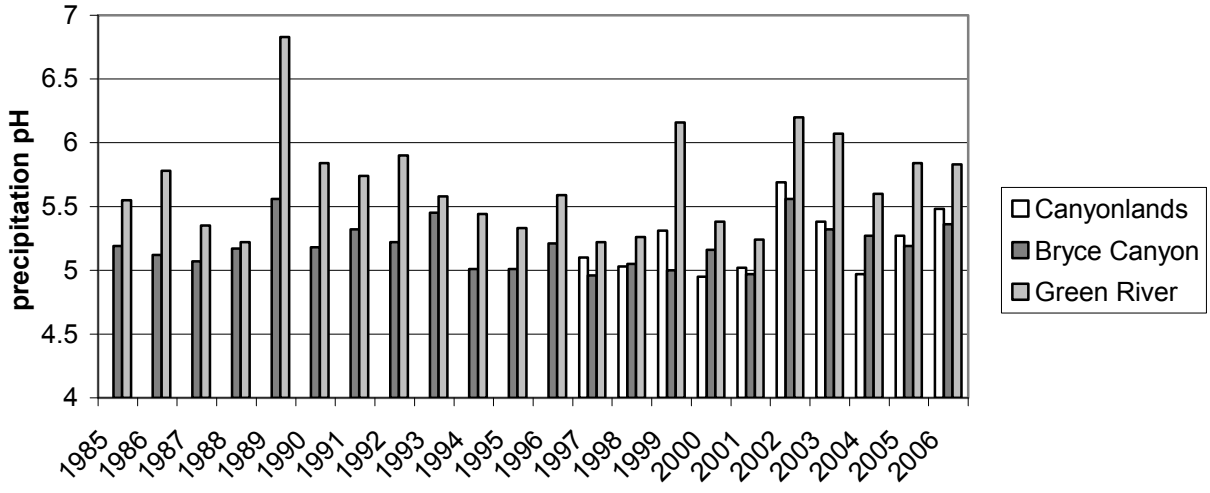
Atmospheric deposition can cause acidification of lakes and streams. One expression of lake acidification is change in acid neutralizing capacity (ANC), the lake's capacity to resist acidification from atmospheric deposition. Acid neutralizing capacity is expressed in units of micro-equivalents per liter (μeq/l).

#### Wet Deposition

Wet deposition refers to air pollutants deposited by precipitation, such as rain and snow. One expression of wet deposition is precipitation pH, a measure of the acidity or alkalinity of the precipitation.

There are 5 NADP stations in Utah: Logan, Murphy Ridge, Green River, Bryce Canyon NP and Canyonlands NP. The NADP stations in Bryce Canyon NP and Canyonlands NP have assessed precipitation chemistry from 1985 and 1997 through to the present. Figure 3-13 shows precipitation pH has ranged from 4.9 to 6.8.

**Figure 3-13. Mean Annual Precipitation pH Near the Richfield Planning Area**




Data taken from National Atmospheric Deposition Program
NADP Canyonlands station: UT09
NADP Bryce Canyon station: UT99
NADP Green River station: UT98
Normal range of precipitation pH:

## Dry Deposition

Dry deposition refers to the transfer of airborne gaseous and particulate material from the atmosphere to the Earth's surface.

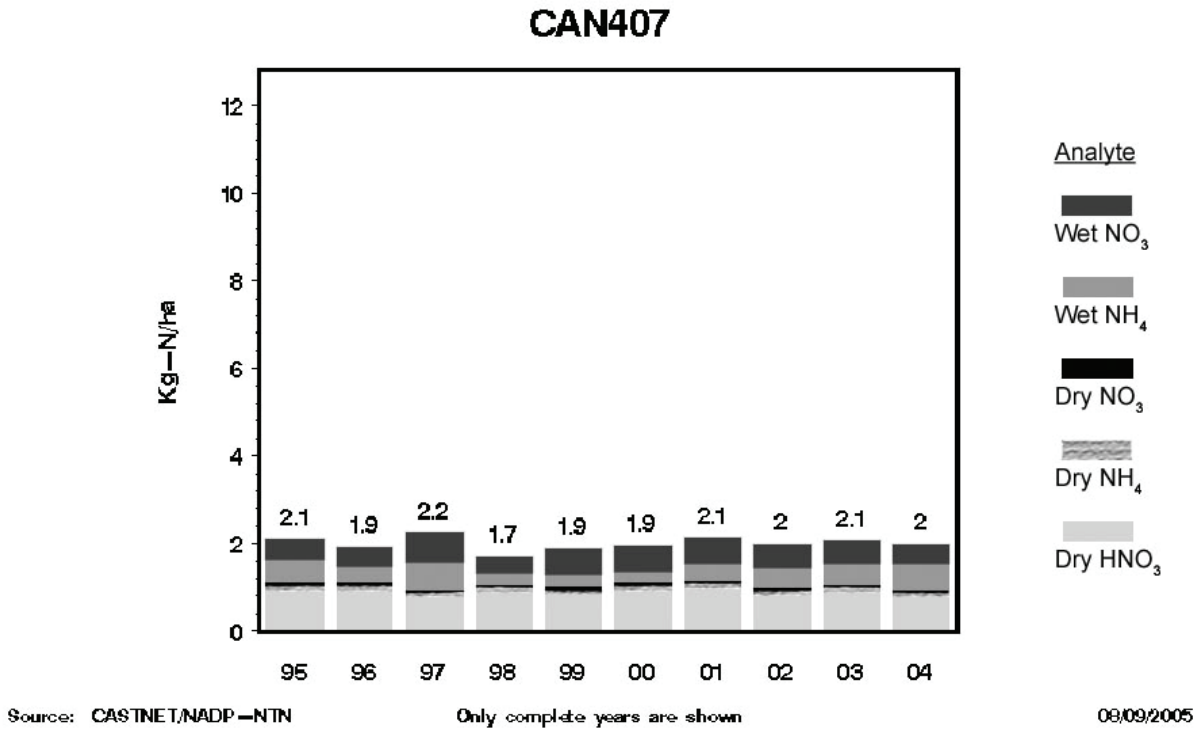
The **C**lean **A**ir **S**tatus and **T**rends network (CASTNet) has measured dry deposition of ozone ($O_3$), sulfur dioxide ($SO_2$), nitric acid ($HNO_3$), sulfate ($SO_4^{--}$), nitrate ($NO_3^-$), and ammonium ($NH_4^{++}$), in the United States since the late 1980's. There is one CASTNet stations in Utah at Canyonlands NP.

## Total Deposition

Total deposition refers to the sum of airborne material transferred to the Earth's surface by both wet and dry deposition. Total nitrogen deposition is calculated by summing the nitrogen portion of wet and dry deposition of nitrogen compounds, and total sulfur deposition is calculated by summing the sulfur portion of wet and dry deposition of sulfur compounds.

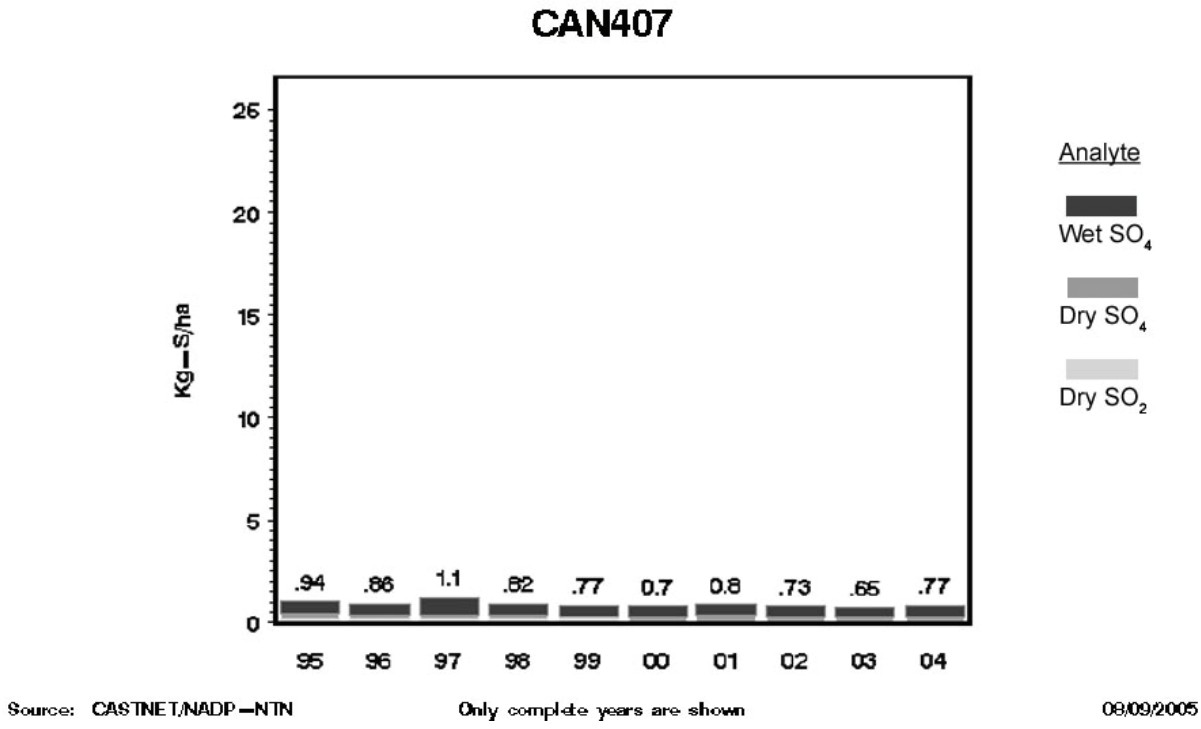
Total deposition has been measured at Canyonlands National Park from 1995 through the present. Total nitrogen deposition has ranged from 1.7 to 2.2 kg/hectare-year since 1995 (Figure 3-14).

**Figure 3-14. Total Nitrogen Deposition at Canyonlands National Park**




Total sulfur deposition has ranged from 0.7 to 1.1 kg/hectare-year since 1995 (Figure 3-15).

**Figure 3-15. Total Sulfur Deposition at Canyonlands National Park**



## Lake Chemistry

Atmospheric deposition can cause acidification of lakes and streams. One expression of lake acidification is change in acid neutralizing capacity (ANC), the lake's capacity to resist acidification from atmospheric deposition. Acid neutralizing capacity is expressed in units of micro-equivalents per liter (μeq/l). Lakes with ANC values of from 25 to 100 μeq/l are considered to be sensitive to atmospheric deposition, lakes with ANC values of from 10 to 25 μeq/l are considered to be very sensitive, and lakes with ANC value of less than 10 are considered to be extremely sensitive. Lakes within the Uinta Mountains have ANC values 10-150 μeq/l.

## 3.3.2 Soil Resources

Soil data and associated ecological site descriptions are used in evaluating the site's potential productivity and are critical to evaluating rangeland health as well as determining impacts of various management activities. Soil erosion is one indicator of rangeland health. Soil surveys have been completed for about three-quarters of the planning area, although some surveys are more than 20 years old. Published surveys include Fairfield-Nephi Area (1984), Millard County, East (2003), Sanpete Valley (1981), and the Henry Mountains Area (1990). The National Resources Conservation Service (NRCS) is currently revising the survey for Sevier County. Piute County and the western portion of Wayne County lack soil surveys and ecological site inventories.

### 3.3.2.1 Soil Resource Condition

Soil composition is one factor that determines vegetation growth and wildlife habitats. Soil types also influence water quality, salinity, and erosion throughout the planning area. BLM considers impacts of various management decisions on soils and related impacts to salinity control, water quality, and erosion. A comprehensive inventory of the condition of soil resources has not been conducted across the planning area, although rangeland health assessments and other site-specific project monitoring reports may contain some of this kind of information. This section provides an overview of the general soil resource concerns in the RFO.

Soil management problems may arise in the lands managed by the RFO depending on a combination of factors, including soil type, climate, geologic setting, vegetative cover, and how the resources are affected by multiple uses (e.g., recreation, mineral development, grazing). Vegetation is sparse in some of the planning area because of high salinity, a short growing season, and distribution of effective moisture in some soils. Erosion and compaction are two important factors of concern in the planning area. Several areas in the planning area contain soils that are considered to be highly susceptible to wind and water erosion.

Vehicle traffic, herbivore trampling, foot traffic, or any activity that repeatedly causes an impact on the soil surface can cause a compaction layer (Chanasyk and Naeth 1995, Cole 1985, and Thurow *et al.* 1988). Compaction becomes a problem when it begins to limit plant growth, water infiltration, or nutrient cycling processes (Wallace 1987, Willat and Pullar 1983, Thurow *et al.* 1988, Hassink *et al.* 1993). Moist soil is more easily compacted than dry or saturated soil (Hillel 1998).

Soils developed on marine formations are high in gypsum and other salts. High concentrations of these salts at or near the soil surface limit the types and amounts of vegetation present. Badland and gypsum land, which are natural sources of large amounts of salt and sediment, often lack significant vegetation cover but frequently have a thin protective layer, such as rock fragments and/or soil crusts (physical and/or cryptobiotic) that provide some stability. Surface disturbance in these areas may increase the potential for erosion.

Biological soil crusts can be an important ecological component of the stability of certain soil and plant communities. Areas in the eastern portion of the RFO on the Colorado Plateau contain biological soil crusts as a component of the community. There are no inventories of the spatial extent or the condition of the soil crusts within the RFO. The standards and guidelines portion of the Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration (43 CFR Subpart 4180) and Utah's *Standards for Rangeland Health and Guidelines for Management* (BLM 1997) compare current soil crust cover to that identified in the ecological site descriptions to determine if current management strategies are meeting standards.

Salt and sediment yield is of major concern in the Colorado River Basin, and erosion from public lands is an important source of sediment and associated salts in the area. Some of this yield is natural or results from relatively stable conditions in an arid or semiarid climate with periodic high-intensity storms and active erosion. The actual contribution of salt and sediment yield to the total Colorado River Basin from drainages in the planning area is unknown. The Colorado River Salinity Control Act guides actions in watersheds of the Colorado River Basin.

## 3.3.3 Water Resources

The United States is divided and subdivided into successively smaller hydrologic units classified into 4 levels: regions, subregions, accounting units, and cataloging units. In general terms, a hydrologic unit can be defined as any geographic area containing water that naturally drains to a specific outlet. The hydrologic units are arranged within each other from the smallest (cataloging units) to the largest (regions).

The first level of classification divides the nation into major geographic areas, or regions. These geographic areas contain either the drainage area of a major river, such as the Upper Colorado River region, or the combined drainage areas of a series of rivers, such as the Texas-Gulf region, which includes a number of rivers draining into the Gulf of Mexico. The second level of classification divides the regions into subregions. A subregion includes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area. The third level of classification subdivides many of the subregions into accounting units, and the fourth level of classification is the cataloging unit, which is the smallest element in the hierarchy of hydrologic units. A cataloging unit, which is roughly equivalent to a local watershed, is a geographic area representing part or all of a surface drainage basin, a combination of basins, or a distinct hydrologic feature (U.S. Geological Survey [USGS] no date).

The planning area lies within portions of 11 separate watersheds located in the Upper Colorado Hydrologic Region and the Great Basin Hydrologic Region. The RFO is located within both the Colorado River Hydrologic Basin and the Great Basin Hydrologic Region. The Henry Mountains portion of the RFO is located in the Upper Colorado River Sub-basin of the Colorado River Basin, whereas most of the Mountain Valley portion of the RFO is located in the Sevier River Sub-basin of the Great Basin Hydrologic Region. The northernmost portions of the RFO are contained in the Jordan River/Utah Lake Sub-basin of the Great Basin, and the easternmost extent of the Mountain Valley area is located in the Upper Colorado River Sub-basin. The RFO encompasses 120 perennial streams (Table 3-1) and a larger number of intermittent streams.

**Table 3-1. Perennial Stream Segments—Richfield Field Office**

| | | |
|---|---|---|
| Antimony Creek | Ax Handle Canyon Creek | Beaver Creek |
| Benson Creek | Big Hollow Creek | Birch Creek |
| Box Creek | Brimhall Springs Creek | Brine Creek |
| Browns Creek | Bullberry Creek | Bull Creek |
| Bullfrog Creek | Bullfrog Creek North Fork | Burr Creek |
| Burro Creek | California Gulch Creek | Carcass Creek |
| Cass Creek | Cedar Creek | Coal Mine Wash |
| Coaly Wash Stream | Copper Creek | Copper Springs Creek |
| Cottonwood Creek | Cottonwood Wash | Cow Creek |
| Crescent Creek | Dark Canyon Creek | Daves Fork |
| Deep Creek | Deer Creek (Mitchell Creek) | Dirty Devil River |
| Divide Canyon Creek | Dry Canyon Creek | Dry Creek |
| Dugout Creek | Fish Creek | Fremont River |
| Government Creek | Granite Creek | Greenwich Creek |

| | | |
|---|---|---|
| Halls Creek | Hansen Creek | Happy Canyon |
| Hells Kitchen Canyon Creek | Hogg Canyon Creek | Holt Draw |
| Hoodle Creek | Ivie Creek | Larrys Fork |
| Left Hand Fork Ax Handle Creek | Little Table Creek | Lost Creek |
| Maidenwater Creek | Manning Creek | Maple Canyon Creek |
| Maple Creek | Milk Creek | Mill Creek |
| Mt. Ellen North Fork Creek | Mt. Ellen South Fork | Mud Creek |
| Muddy Creek | Muley Creek | North Wash |
| North Wash South Fork | Oak Creek | Oak Spring Creek |
| Otter Creek | Pennell Creek | Peterson Creek |
| Petes Canyon Creek | Pine Creek | Pistol Creek North Fork |
| Pistol Creek South Fork | Pleasant Creek | Poison Creek |
| Poison Spring | Pole Canyon Creek | Praetor Canyon Creek |
| Quaking Aspen Creek | Quitchupah Creek | Quitchupah Creek North Fork |
| Raggy Canyon Creek | Reese Creek | Riley Canyon Creek |
| Road Creek | Robber's Roost Canyon | Saleratus Creek |
| Salt Wash | Sand Creek | Sandy Creek |
| San Pitch River | Sevier River | Sevier River East Fork |
| Skumtumpah Creek | Slate Creek | South Creek |
| South Willow Creek | Speck Creek | Spring Branch |
| Spring Creek North Fork | Starr Creek | Straight Creek |
| Sulphur Creek | Sulphur Creek Tr. Pleasant | Sweetwater Creek |
| Swett Creek | Swift Spring Creek | Tenmile Creek |
| Thompson Creek | Threemile Creek | Ticaboo Creek |
| Timber Canyon Creek | Trachyte Creek | Twin Corral Box Canyon |
| Water Creek | Water Hollow Creek | Wild Horse Creek |
| Willow Patch Creek | Willow Spring Creek (Forest Creek) | Yogo Creek |

The majority of the streams in the RFO, whether perennial or intermittent, originate at higher elevations on National Forest or BLM lands and flow through private and BLM-administered lands. Many of these streams are characterized by steep streambed gradients and are subject to flooding during rapid snowmelt or high-intensity thunderstorms. As the perennial streams run through public lands, they provide water for livestock, wildlife, fisheries, and downstream irrigation.

Some intermittent and ephemeral streams in the area yield water during periods of spring snowmelt or intense thunderstorm activity. However, much of the water in most of these streams is used for irrigation and does not reach the major rivers.

The Sevier River and its tributaries are regulated by storage reservoirs. Because of this, the Utah State Engineer must approve changes to any water regime. A considerable amount of water from the snowmelt period is stored and then released from July to September. Lakes and reservoir storage facilities are an

important part of the water resource scheme. Major reservoirs in the area include Otter Creek, Koosharem, Piute, Willow Creek, Gunnison, and Sevier Bridge Reservoirs.

Springs, seeps, and wells in the area provide high-quality water for domestic and livestock use.

### 3.3.3.1 Water Quality

Baseline surface water quality within the planning area is influenced by the geology and soil with which the water has been in contact. Water quality also varies depending on flow conditions. Human-induced impacts in the planning area, such as changes in thermal and turbidity conditions in water bodies and impacts from increased salinity, heavy metals, and nutrients from irrigation or other discharges also affect baseline water quality. Surface water quality impacts within the planning area may be associated with agricultural runoff, road maintenance, removing riparian vegetation, channel modification, stream bank destabilization, atmospheric deposition, resource extraction, oil and gas activities, urban runoff, and grazing activities.

Table 3-2 lists the impaired stream and river segments located within the RFO, listed on Utah's 2006 303(d) list of impaired waters (Appendix 4). Table 3-3 lists the lakes and reservoirs located within the planning area needing total maximum daily load (TMDL) analysis. TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. The State sets water quality standards. The State identifies the uses for each water body, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources. The calculation must include a margin of safety to ensure that the water body can be used for the purposes that the State has designated. The calculation must also account for seasonal variation in water quality. The Clean Water Act (CWA), Section 303, establishes the water quality standards and TMDL programs.

**Table 3-2. Utah's 2004 303(d) List of Impaired Stream and River Segments Requiring a TMDL Analysis**

| Water Body Name | Water Body Description | Causes |
|---|---|---|
| East Fork Sevier River | East Fork Sevier River and tributaries from confluence with Sevier River upstream to Antimony Creek confluence, excluding Otter Creek and tributaries | Temperature<br>Total phosphorus |
| Lost Creek | Lost Creek and tributaries from confluence with Sevier River upstream about 6 miles | Total Dissolved Solids (TDS) |
| Sevier River | Sevier River from Clear Creek confluence to HUC unit boundary | Temperature |
| Peterson Creek | Peterson Creek and tributaries from confluence with Sevier River to USFS boundary | TDS |
| Lower Ivie Creek | Ivie Creek and tributaries from confluence with Muddy Creek to U-10 highway | TDS |
| San Pitch River | San Pitch River and tributaries from beneficial U132 to Pleasant Creek confluence excluding Cedar Creek, Oak Creek, Pleasant Creek, and Cottonwood Creek | Temperature |
| Lower Muddy Creek | Muddy Creek from confluence with Fremont River to Ivie Creek confluence | Selenium |

**Table 3-3. Lakes and Reservoirs within Planning Area Identified as Needing TMDL Analysis**

| Water Body Name | Water Body ID | Pollutant |
|---|---|---|
| Piute Reservoir | UT-L-16030001-011 | Total phosphorus |
| Nine Mile Reservoir | UT-L-16030004-001 | Total phosphorus<br>Dissolved oxygen |
| Otter Creek Reservoir | UT-L-16030002-004 | Total phosphorus |
| Koosharem Reservoir | UT-L-16030002-011 | Total phosphorus |

Source: UDEQ 2006

As surface water quality decreases, the ability of aquatic animals and plants to maintain themselves diminishes. Stressors associated with increasing temperatures, lower dissolved oxygen levels, changing pH, and smothering from sediments adversely affect the aquatic ecosystem and diminish the ability of surface waters to sustain baseline conditions.

### 3.3.3.2 Drinking Water

Several municipal water sources and associated watersheds originate on public lands. BLM coordinates with local communities to protect and allow appropriate development of municipal water resources. Table 3-4 lists the culinary water sources located on public lands within the planning area.

**Table 3-4. Culinary Water Sources on Public Lands**

| Name of Water User | Location and Source |
|---|---|
| William Murray | T. 27 S., R. 3 W., Section 7—Spring |
| Town of Kingston | T. 30 S., R. 3 W., Section 24—Spring |
| Utah Division of Water Resources (Town of Greenwich) | T. 27 S., R. 1 W., Section 35—Spring |
| Town of Annabella | T. 24 S., R. 2 W., Section 19—Spring |
| Utah Division of Water Resources (Town of Lyman) | T. 27 S., R. 3 E., Section 35—Spring<br>T. 28 S., R. 3 E., Sections 3 and 4—Spring |
| Town of Bicknell | T. 28 S., R. 3 E., Section 25—Spring<br>T. 29 S., R. 3 E., Section 3—Spring |
| Town of Loa | T. 28 S., R. 2 E., Section 3—Spring and Well |
| Town of Sigurd | T. 23 S., R. 1 W., Section 6, 21, and 28—Springs |
| Kings Meadow Ranches | T. 23 S., R. 1 W., Section 28—Spring |
| City of Aurora | T. 22 S., R. 2 W., Sections 1 and 6—Springs |
| Caineville Special Service District | T. 28 S., R. 8 E., Section 33—Well |
| Town of Koosharem | T. 26 S., R. 1 E., Section 30—Spring |
| Town of Hanksville | T. 29 S., R. 11 E., Section 1—Well |
| Town of Antimony | T. 31 S., R. 2 W., Section 19—Spring |
| Utah Department of Transportation (UDOT)<br>U-24 Rest Stop | T. 26 S., R. 1 E., Section 29—Spring |

### 3.3.3.3 Groundwater

Groundwater recharge primarily originates as precipitation in the mountain areas surrounding the planning area where geologic formations outcrop or where water resources were deposited during past geologic periods. Groundwater quality is highly variable and dependent on the formations where the aquifers are located. Groundwater contamination is a concern. Fresh water in the Navajo Formation is contaminated with high levels of TDS adjacent to Muddy Creek.

## 3.3.4 Vegetation

Vegetation communities provide the foundation for many resources and resource uses on public lands. Plant communities provide habitat for wildlife, provide forage for livestock, influence recreation use, and are components of scenic quality. Healthy vegetation communities stabilize soils, increase infiltration of precipitation, slow runoff, reduce erosion, and enhance visual quality.

Soil, climate, topography, and disturbance influence patterns of vegetation structure and species composition. Disturbances (such as fire) influence the structure and species composition of vegetation communities. Increases in the interval between fire disturbances in nearly all vegetation communities have resulted in increased vegetation density and change in vegetation structure and species composition.

The vegetation community and association descriptions that follow refer to the combination of plants forming natural vegetation in an area. These descriptions combine Utah Land Cover Geographical Analysis Program (GAP) data into 3 broad categories: desert shrub, sagebrush steppe, or forest and woodlands (USGS 2004). Each category contains one or more vegetation community or association, as illustrated in Map 3-3, Vegetation Cover Types. The vegetation associations are defined by the dominant plant species of either the tree or shrub vegetation layer (Jennings *et al.* 2004). The primary vegetation associations within the lands managed by the RFO are desert shrub, pinyon-juniper woodlands, sagebrush steppe, ponderosa pine, mixed-conifer, oak, mountain shrub, aspen, and nonvegetated. Table 3-5 lists the acreage and percentage of each vegetation association in the RFO.

**Table 3-5. Vegetation Communities and Associations**

| Vegetation Community and Association | Richfield Field Office | |
|---|---|---|
| | Acres | Percentage |
| Desert shrub | 1,051,000 | 49% |
| Pinyon-juniper woodlands | 552,000 | 26% |
| Sagebrush steppe | 337,000 | 16% |
| Ponderosa pine | 43,000 | 2% |
| Mixed-conifer | 29,000 | 1% |
| Oak | 20,000 | 1% |
| Mountain shrub | 16,000 | 1% |
| Aspen | 12,000 | <1% |
| Nonvegetated | 67,000 | 3% |
| **Total** | **2,127,000** | **100%** |

Source: USGS 2004

### 3.3.4.1 Desert Shrub

Desert shrub includes the salt shrubs: shadscale, greasewood, blackbrush, and desert grassland vegetation cover types (see Table 3-6). Desert shrub vegetation comprises nearly half of the RFO (1,051,000 acres), including much of the lower elevation public land mostly east of Capitol Reef National Park. This is the largest vegetation community in the RFO. Located primarily on the valley floors, this vegetation community is most common on well-drained, sandy to rocky soils. It can, however, tolerate saline and alkaline soils. Plants within this community are adapted to a wide temperature range, and many are

capable of photosynthesis at temperatures as low as 11°F (Simonin 2001). Precipitation in these areas ranges from 6 to 14 inches annually but is mostly from 8 to 12 inches per year. Table 3-6 lists species prevalent in this vegetation community.

Wildlife and livestock use of desert shrub vegetation varies depending on the species present. Fourwing saltbush is very palatable and provides high-quality forage for wildlife and livestock even during drought conditions (Kindschy 1996). Black greasewood is a valuable browse for livestock and wildlife, particularly during fall and winter; however, when consumed in large quantities, the soluble oxalates that black greasewood contains are poisonous to livestock (Anderson 2004). The forage value for blackbrush is principally as browse for bighorn sheep. Domestic sheep and goats, and to a lesser extent cattle, also browse blackbrush. During the winter in southwestern Utah, blackbrush provides fair forage for domestic sheep and cattle (Anderson 2001). Desert shrub areas provide browse and shelter for small mammals, and fourwing saltbush provides a source of water for black-tailed jackrabbits.

**Table 3-6. Typical Desert Shrub Plant Species**

| Life form | Common Name | Scientific Name |
|---|---|---|
| Shrubs | Shadscale | Artiplex confertifolia |
| | Winterfat | Krascheninnikovia lanata |
| | Saltcedar | Tamarix chinensis |
| | Rabbitbrush species | Chrysothamnus spp. |
| | Hopsage | Grayia spinosa |
| | Mormon Tea | Ephedra spp. |
| | Blackbrush | Coleogyne ramosissima |
| | Black Greasewood | Sarcobatus vermiculatus |
| | Fourwing Saltbush | Artiplex canescens |
| Grasses | Indian Ricegrass | Achnatherum hymenoides |
| | Galleta | Hilaria jamesii |
| | Alkali Sacaton | Sporobolus airoides |
| | Saltgrass | Distichlis spicata |
| | Purple Threeawn | Aristida purpurea |
| | Blue Grama | Bouteloua gracilis |
| | Sand Dropseed | Sporobolus cryptandrus |
| | Cheatgrass | Bromus tectorum |
| Forbs | Broom Groundsel | Senecio spartioides |
| | Hairy Daisy | Erigeron incertus |
| | Longleaf Phlox | Phlox longifolia |
| | Scarlet Globemallow | Sphaeralcea coccinea |

Source: USFS 2004 and Welsh et al. 2003.

### 3.3.4.2 Sagebrush Steppe

Widely distributed in the Colorado River Basin and Great Basin, the sagebrush-steppe vegetation community is primarily found in the western portion of the RFO. Sixteen percent (337,000 acres) of the RFO is considered sagebrush steppe. Sagebrush steppe communities generally occur on the drier portions of pinyon-juniper woodlands and mesic portions of the desert shrub community. Precipitation in these areas averages 8–15 inches per year, and soils are dry, with a thin organic horizon. Forbs with shallow root systems are favored in wetter years, whereas deeply rooted shrubs have the competitive advantage during droughts and survive by tapping deeply infiltrated moisture (West 2000). Sagebrush species include big sagebrush, Wyoming big sagebrush, and basin sagebrush. Table 3-7 lists species in the sagebrush steppe vegetation community. Sagebrush steppe communities in Utah have declined because of drought, changes in disturbance regimes, and the invasion of cheatgrass and other invasive plant species. A recent sagebrush die-off in Utah affected approximately 600,000 acres of sagebrush habitat below 7,000 feet, primarily on public lands. The die-off was attributed to stress on the plants caused by an extended drought. In addition, most of the sagebrush in the RFO are mature plants, with little new growth being found.

About 100 bird species and 70 mammal species are found in sagebrush steppe communities. These species can be grouped into sagebrush obligates (e.g., sage-grouse, sage thrasher, sage sparrow, Brewer's sparrow, pygmy rabbit, sagebrush vole, sagebrush lizard, and pronghorn); shrubland species (e.g., green-tailed towhee, black-throated sparrow, and lark sparrow); and shrubland-grassland species (e.g., Swainson's hawk, ferruginous hawk, prairie falcon, sharp-tailed grouse, and loggerhead shrike).

**Table 3-7. Typical Sagebrush Steppe Plant Species**

| Life form | Common Name | Scientific Name |
|---|---|---|
| Shrubs | Rabbitbrush species | Chrysothamnus spp. |
| | Broom Snakeweed | Gutierrezia sarothrae |
| | Shadscale | Artiplex confertifolia |
| | Antelope Bitterbrush | Purshia tridentata |
| | Fringed Sagebrush | Artemisia frigida |
| | Wyoming Sagebrush | Artemisia tridentata wyomingensis |
| | Basin Big Sagebrush | Artemisia tridentata vaseyana |
| | Fourwing Saltbush | Artiplex canescens |
| Grass | Indian Ricegrass | Achnatherum hymenoides |
| | Bluebunch Wheatgrass | Pseudoroegneria spicata |
| | Crested Wheatgrass (non-native) | Agropyron cristatum) |
| | Desert Needlegrass | Achnatherum speciosum |
| | Basin Wildrye | Leymus cinereus |
| | Poa species | Poa spp. |
| | Salina Wildrye | Leymus salinus |
| | Slender Wheatgrass | Elymus trachycaulus |
| | Cheatgrass | Bromus tectorum |
| Forbs | Yarrow | Achillea millefolium |

| Life form | Common Name | Scientific Name |
|---|---|---|
| | Arrowleaf Balsamroot | Balsamorhiza sagittata |
| | Scarlet Globemallow | Sphaeralcea coccinea |
| | Desert Phlox | Phlox tenuifolia |
| | Pricklypear Cactus | Opuntia spp. |
| | Fleabane species | Erigeron spp. |
| Mosses and Lichens | Awnless Spikemoss | Selaginella mutica |

Source: USFS 2004 and Welsh et al. 2003.

### 3.3.4.3 Forests and Woodlands

Forest and woodland vegetation is generally restricted to areas where soil moisture is adequate to establish seedlings or where the disturbance regime has changed. Adequate soil moisture is usually found at higher elevations and in riparian areas. Forest species usually dominate areas above 7,000 feet. Pinyon-juniper woodlands dominate lower elevations with adequate soil moisture. Typical forest and woodland types found within the RFO are ponderosa pine (*Pinus ponderosa*), aspen (*Populus spp.*), mixed-conifer, and pinyon-juniper woodlands. Forested areas above 10,000 feet elevation are usually a mix of several conifer species. At the lower elevations, forest types vary from pure juniper to a mix of woodland species and ponderosa pine. Table 3-8 lists species commonly found in forest and woodland areas.

**Table 3-8. Typical Forest and Woodland Species**

| Life form | Common Name | Scientific Name |
|---|---|---|
| Trees | Utah Juniper | Juniperus osteosperma |
| | Rocky Mountain Juniper | Juniperus scopulorum |
| | Pinyon Pine | Pinus edulis |
| | Singleleaf Pinyon | Pinus monophylla |
| | Ponderosa Pine | Pinus ponderosa |
| | Bristlecone Pine | Pinus longaeva |
| | Engelmann Spruce | Picea engelmannii |
| | Subalpine Fir | Abies lasiocarpa |
| | White Fir | Abies concolor |
| | Douglas Fir | Psuedotsuga menziesii |
| | Aspen | Populus tremuloides |
| | Curleaf Mountain-Mahogany | Cercocarpus ledifolius |
| Shrubs | Greenleaf Manzanita | Arctostaphylos patula |
| | Black Sagebrush | Artemisia nova |
| | Gambel Oak | Quercus gambelii |
| | Mountain Snowberry | Symphoricarpus oreophilus |
| | Serviceberry species | Amelanchier spp. |
| | Chokecherry | Prunus virginiana |

| Life form | Common Name | Scientific Name |
|---|---|---|
| | Oregon Grape | Berberis repens |
| | Wood's Rose | Rosa woodsii |
| | Myrtle Pachistima | Pachistima myrsinites |
| | Redberry Elder | Sambucus racemosa |
| | Gooseberry species | Ribes spp. |
| | Mountain Muhly | Muhlenbergia montana |
| Grasses | Idaho Fescue | Festuca idahoensis |
| | Sheep Fescue | Festuca ovina |
| | Mutton Grass | Poa fendleriana |
| | Blue Grama | Bouteloua gracilis |
| Forbs | Littleleaf Pussytoes | Antennaria parviflora |
| | Heartleaf Arnica | Arnica cordifolia |
| | Indian Paintbrush species | Castilleja spp. |
| | Lupine species | Lupinus spp. |

Source: USFS 2004 and Welsh et al. 2003.

## Pinyon-Juniper

Pinyon-juniper woodlands occupy the driest woodland sites in Utah and provide important resources for people, wildlife, and plants. Pinyon-juniper woodland communities cover 552,000 acres—about one-quarter of the RFO. Pinyon-juniper stands grow on foothills, low mountains, mesas, and plateaus ranging from 3,000 to 8,000 feet in elevation, depending on precipitation and soil conditions. The upper limits of the pinyon-juniper woodland community in Utah are 6,500 feet on north-facing slopes and 8,400 feet on south-facing slopes. Plant species present in these areas vary widely (Evans 1988). Typically, juniper dominates at lower elevations and pinyon dominates at higher elevations (Anderson 2002, Zlatnik 1999). Pinyon-juniper woodlands provide little forage for livestock and big game.

Pinyon-juniper woodlands are increasing in the western United States as they replace other vegetation communities. Juniper is expanding into open meadows, grasslands, sagebrush steppe communities, quaking aspen groves, riparian communities, and forest lands. Increases in canopy cover results in significant amounts of bare ground, litter, and desert pavement at the soil surface (USGS 2004). On lower edges of the woodland zone, Utah juniper is frequently the only tree species. Utah juniper is more adapted to dry conditions than pinyon, with junipers often serving as nurse trees for pinyons in well-developed forests. The undergrowth is variable and dependent upon canopy closure, soil texture, elevation, and aspect (Welsh *et al.* 2003). In healthy pinyon and juniper communities, height ranges from 15 to 30 feet. Health and relative density of pinyon and juniper vary widely within the RFO; however, canopy densities over 50 percent occur over large areas. Pinyon pine and Utah juniper vigorously compete with other plants for available soil water. They crowd out grasses and shrubs that usually are present as understory vegetation. The lack of protective vegetative cover in pinyon and juniper stands leaves the soil surface particularly susceptible to erosion.

The replacement of shrub steppe communities with juniper woodland is attributed to the reduced role of fire caused by the reduction of the fine fuels through livestock grazing (Miller and Rose 1995). A combination of climatic changes, fire suppression, and the removal of understory vegetation has facilitated this expansion of pinyon-juniper woodlands.

### Ponderosa Pine

Ponderosa pine forest types within the RFO (Map 3-3) are found primarily in the Henry Mountains and bordering USFS lands in the western portion of the RFO. Ponderosa pine can be either a climax or a seral species. It is a climax species at the lower limits of the coniferous forests and a seral species in higher elevation mixed-conifer forests. Ponderosa pine is considered shade intolerant and tends to grow in even-aged stands; however, in the drier limits of its range, such as the Henry Mountains, uneven-aged stands appear common. In reality, these apparently uneven-aged ponderosa pine stands are a mosaic of small even-aged groups. Ponderosa pines lose vigor in dense stands (Burns and Honkala 1990).

Fires have had a profound effect on the distribution of ponderosa pine. Although the seedlings are readily killed by fire, larger trees possess thick bark that offers effective protection from fire damage. Competing tree species, such as Douglas fir, are considerably less fire tolerant, especially in the sapling and pole size classes. Because of successful fire control during the past 50 years, many of these stands have developed understories of Douglas fir and true firs. Type conversion has been accelerated by harvest of the ponderosa pine, leaving residual stands composed of true fir, Douglas fir, or lodgepole pine (Burns and Honkala 1990).

### Quaking Aspen

Quaking aspen is found on relatively moist sites between 7,500 and 10,500 feet in mountainous areas within the planning area. It also grows at lower elevations in riparian communities and at other sites with deep soil and adequate soil moisture. In very high exposed places, aspen becomes stunted, with the stem bent or almost prostrate from snow and wind. At its lower elevation limit, it is a scrubby tree growing along creeks (Burns and Honkala 1990). Aspen trees grow together in clones or in groups of stems that share the same root system and genetic makeup. Quaking aspen seedlings at 1 year of age are capable of reproducing by root sprouts (suckers), and mature stands reproduce vigorously by this means. Root collar sprouts and stump sprouts are produced only occasionally by mature trees, but saplings commonly produce them (Burns and Honkala 1990). Aspen clones may regenerate readily after clearcutting or burning by producing numerous root sprouts. Root damage during logging can reduce sprouting. Clearcutting of a mixed aspen-conifer stand may lead to replacement with pure aspen stands, depending on location. This forest type is very important for landscape diversity, aesthetics, and wildlife habitat.

The fast-growing quaking aspen tree is short–lived, and pure stands are gradually replaced by slower growing species. Areas once dominated by aspen in the State of Utah have decreased by 60 percent since the late 1800s (Shepperd *et al.* 2001). The diversity and abundance of understory plants in an aspen stand can be 10 times that found in coniferous forest types. In addition, aspen forests yield more water than conifer types in similar environments.

### Spruce-Fir

Spruce-fir forest types within the planning area occur at the highest elevations, usually above 10,000 feet. These forest types include Douglas fir, subalpine fir, and Englemann spruce. Spruce-fir forests can be very complex in structure and age distribution. Their species are shade tolerant and generally not considered resistant to fire. Fires are infrequent but important in dry years, and windthrow is a prime disturbance factor.

## 3.3.4.4 Riparian Resources

The BLM's 1987 policy statement on riparian area management defines a riparian area as "an area of land that is directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation

dependent upon free water in the soil." A riparian area identified as lentic is usually a meadow/spring riparian area whereas a riparian area identified as lotic has running water such as a creek or river.

Riparian areas cover less than 1 percent of the planning area. The most extensive areas of riparian vegetation on public land are those found along the Dirty Devil River and the Fremont River east of Capitol Reef National Park. The ecological significance of riparian areas far exceeds their limited physical area. They are located along streams and rivers or lands with a water table that is capable of influencing soils and vegetation. They are major contributors to ecosystem productivity and structural and biological diversity, and they provide important habitat for fish, birds, and other wildlife species. Riparian areas affect the quantity and quality of water onsite and downstream, and help store floodwaters, recharge groundwater, reduce the risk of flash floods, and filter sediments.

The objective of the Utah BLM Riparian Policy is to improve or maintain riparian areas in proper functioning condition (PFC). Regardless of the type of riparian or wetland ecosystem, functioning condition is assessed for each stream or varying segments. Functioning condition is rated by category to reflect ecosystem health as affected by management practices. Riparian areas are classified as in PFC when there is adequate vegetation and landform structure present to dissipate stream energy from high flows. This results in a reduction in erosion, improvement in water quality, filtration of sediment, capturing of bedload, and an aid in floodplain development. Properly functioning riparian areas also improve flood water retention and ground water recharge, promote development of root masses that stabilize stream banks against cutting action, promote development of diverse ponding and channel characteristics necessary for fish production and other uses, and support greater biodiversity.

"Functioning at Risk" riparian areas are in functional condition, but at least one soil, water, or vegetation attribute makes them susceptible to degradation following high flow events. Management practices that can make them "At Risk" include livestock grazing, the presence of roads, off-highway vehicle (OHV) activities, and commercial recreation and development.

"Non-Functioning" riparian areas are clearly not providing adequate vegetation, landform, or large wood debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, etc.

BLM has inventoried riparian areas throughout the RFO. About 455 miles of lotic riparian habitat and 1,423 acres of lentic riparian habitat have been inventoried on public lands in the RFO. The BLM has completed a condition assessment of all inventoried riparian areas in allotments. All riparian areas in allotments were inventoried in the early 1990s. More recently, under the *Utah Standards and Guidelines for Rangeland Health,* the BLM expanded the definition for riparian areas to include seeps and springs. To date, approximately 59 percent of riparian areas under the more comprehensive definition have been inventoried. Estimates of functional conditions of these riparian areas are displayed in Table 3-9. It should be noted that this does not represent a comprehensive total of riparian habitats within the RFO because not all have been surveyed. Utah's *Standards for Rangeland Health* (BLM 1997) establish PFC as the minimum standard for BLM management of riparian areas.

**Table 3-9. Riparian Conditions Inventory**

| | | Proper Functioning Condition | Functioning-At-Risk | | | | Non-Functional | Total |
|---|---|---|---|---|---|---|---|---|
| | | | Trend Up | Trend Not Apparent | Trend Down | Total | | |
| Lotic Riparian | Miles | 305 mi | 30 mi | 61 mi | 11 mi | 102 mi | 48 mi | 455 mi |

| | | Proper Functioning Condition | Functioning-At-Risk | | | | Non-Functional | Total |
|---|---|---|---|---|---|---|---|---|
| | | | Trend Up | Trend Not Apparent | Trend Down | Total | | |
| | % surveyed | 67% | 7% | 13% | 2% | 22% | 11% | |
| Lentic Riparian | Acres | 1,236 ac | 16 ac | 137 ac | 10 ac | 163 ac | 24 ac | 1,423 ac |
| | % surveyed | 87% | 1% | 10% | 1% | 11% | 2% | |

*Source: Riparian Inventories, Richfield Field Office, 2008

Riparian areas are dynamic and, compared with upland habitats, extremely responsive to changes. Variations in seasonal water flows influence the productivity and density of riparian vegetation and channel development. Flooding is an essential part of system development and stability. Minor changes are normal and are part of the resilience of the riparian ecosystem. A system's ability to withstand major disturbances depends on the integrity and balance of stream bank, hydrology, and vegetation components. Degraded conditions in any of those components can result in impacts that may be beyond the riparian area's capacity to withstand or repair following disturbance. The combined effects of small-scale, repeated degradation without recovery cause incremental declines in functional condition and increase vulnerability to further degradation. It is BLM policy to maintain, restore, or improve riparian ecosystems to achieve a healthy and properly functioning condition that ensures biological diversity, productivity, and sustainability.

Riparian areas depend on a balanced combination of physical (stream bank, channel, and soil characteristics), hydrologic (regular occurrence of surface water), and vegetation (hydrophytic communities) components. When any of these 3 components—soils, water, or vegetation—are adversely affected, the functional capacity of a riparian habitat may degrade. Riparian-wetland areas are properly functioning when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows and flooding, thereby reducing erosion and improving water quality. Deep soil-binding root masses stabilize stream banks against erosion.

### 3.3.4.5 Invasive, Non-native Species

The BLM defines a weed as "a plant that interferes with management objectives for a given area of land at a given point in time" (BLM 2007b). Noxious weeds are 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. Noxious weeds are defined in Utah's *Standards for Rangeland Health and Guidelines for Livestock Grazing* (BLM 1997) as non-native plants that are especially undesirable because they have no forage value and are sometimes toxic, or are capable of invading plant communities and displacing native species. The BLM recognizes noxious weed invasions as one of the greatest threats to the health of rangelands nationwide.

Invasive species include plants able to establish on a site where they were not present in the original plant composition. Invasive species aggressively out-compete native species within a community and often alter the physical and biotic components enough to affect the entire ecological community. Invasive species are of particular concern following a disturbance. They are often exotic species that do not have naturally occurring, local predators.

Although the invasive weed species occur throughout the RFO, most infestations are small and sparsely scattered through Sevier, Piute, Garfield, and Wayne counties. The areas with the highest noxious weed

concentration occur in the Sanpete County portion of the planning area. Due to weed treatments over the past 25 years, infestations are small and localized; and they are treated as soon as they are identified. Cheatgrass is located throughout the planning area and is generally most prevalent below 8,000 feet. There are several small areas of cheatgrass monoculture throughout the planning area, generally in areas post wildfire, or post grasshopper invasion. Additionally, some areas have higher concentrations of cheatgrass due to historic vegetative disturbance.

The Utah Noxious Weed Act defines a noxious weed as any plant that is determined by the Commissioner of Agriculture to be especially injurious to public health, crops, livestock, land, or other property. There are 19 species which have been designated as state noxious weeds, and 15 have been additionally classified as new and invading weeds that have the potential to become noxious weeds. The state noxious weed list is presented in Table 3-10.

**Table 3-10. Utah Noxious Weeds**

| Common Name | Scientific Name |
|---|---|
| Bermudagrass | Cynodon dactylon |
| Bindweed (Wild Morning Glory) * | Convolvulus arvensis |
| Canada Thistle * | Cirsium arvense |
| Diffuse Knapweed * | Centaurea diffusa |
| Dyers Woad | Isatis tinctoria |
| Perennial Sorghum species including Johnsongrass (Perennial sorghum) * | Sorghum almum<br>Sorghum halepense |
| Leafy Spurge | Euphorbia esula |
| Medusahead | Taeniatherum caput-medusae |
| Musk Thistle * | Carduus nutans |
| Perennial Peppergrass * | Lepidium latifolium |
| Purple Loosestrife | Lythrum salicaria |
| Quackgrass * | Agropyron repens |
| Russian Knapweed * | Centaurea repens |
| Scotch Thistle * | Onopordum acanthium |
| Spotted Knapweed | Centaurea maculosa |
| Squarrose Knapweed * | Centaurea squarrosa |
| Whitetop * | Cardaria draba |
| Yellow Star Thistle | Centaurea solstitialis |

Note: Species marked with an asterisk (*) occur within the RFO. The remaining species have been identified on adjacent private, state, or USFS lands.
Source: Utah Department of Agriculture and Food 2003b.

In addition to the list generated by the State of Utah, each county weed control board has the authority to develop its own list. Table 3-11 lists weeds designated as noxious in any of the 5 counties within the planning area.

**Table 3-11. County Noxious Weeds 2003**

| Common Name | Scientific Name | County Listed |
|---|---|---|
| Black Henbane | Hyoscyamus niger | Sanpete |
| Houndstongue | Cynoglossum officinale | Sanpete |
| Velvet Leaf | Abutilon theophrasti | Sanpete |
| Russian Olive | Elaeagnus angustifolia | Sevier, Wayne |

Source: Utah Department of Agriculture and Food 2003b.

Utah BLM has designated several other invasive plants as new and invading weeds. These plants, although not listed by the State or any of the 5 counties, are identified based on their potential to invade and possibly alter plant communities in the RFO. Table 3-12 identifies these species.

**Table 3-12. Utah BLM New and Invading Weeds**

| Common Name | Scientific Name |
|---|---|
| Black Henbane | Hyoscyamus niger |
| Camel Thorn | Alhagi camelorum |
| Dalmatian Toadflax | Linaria dalmatica |
| Goatsrue | Galega officinalis |
| Jointed Goatgrass | Aegilops cylindrica |
| Poison Hemlock | Conium maculatum |
| Purple Starthistle | Centaurea calcitrapa |
| Silverleaf Nightshade | Solanum elaeagnifolium |
| St. John's Wort | Hypericum perforatum |
| Velvetleaf | Abutilon theophrasti |
| Water Hemlock | Cicuta douglasii (C. maculata) |
| Wild Proso Millet | Panicum miliaceum |
| Yellow Nutsedge | Cyperus esculentus |
| Yellow Toadflax | Linaria vulgaris |

Source: BLM 2004b.

Finally, the RFO has identified 4 invasive species in addition to the state, county, and Utah BLM plants. These additional species, which are known to cause problems within the local plant communities in the RFO, are:

- Puncture vine, which is also known as Goat's head (*Tribulus terristris*)
- Salt cedar, which is commonly referred to as tamarisk (*Tamarix chinensis* or *T. ramosissima*)
- Small flowered tamarisk (*Tamarix parviflora*)
- Buffalobur (Solanum rostratum).

Russian knapweed (*Centarea repens*), salt-cedar (*Tamarix chinensis*), and Russian olive (*Elaeagnus angustifolia*) are all problematic species occurring in riparian areas of the RFO. Salt-cedar channelizes rivers with its deep roots and chokes out other vegetation.

The foregoing lists are changed as new plant species become problems. It should be noted that a species' absence from the lists does not mean that the species is not considered in management decisions. For example, although large areas of uplands and rangelands are being converted to invasive annual species, including cheatgrass (*Bromus tectorum*) and Russian thistle (*Salsola tragus*), neither species is included in any of the above lists. Once cheatgrass has established on a site and gone through a couple of cycles of seed production and dispersal, the seed bank can contain 2 or 3 times as many viable cheatgrass seeds as there are established plants in the community (Zouhar 2003). Cheatgrass invasion may be accelerated by disturbance, but disturbance is not required for its establishment. Cheatgrass can also thrive in areas that have little or no history of cultivation or grazing by domestic livestock. It may establish in these relatively undisturbed areas when seed disperses from nearby patches and establishes on sites of small natural disturbances, such as where rodents or predators dig in the soil (Zouhar 2003). It has changed plant species composition in all 3 vegetation communities.

## 3.3.5 Cultural Resources

Overviews of known cultural resources in the RFO show a wide range of and potential for cultural resources. Cultural resource inventories have been conducted in the lands managed by the RFO for more than 30 years at varying levels using a variety of methods. Most of the inventories were conducted in accordance with Section 106 of the National Historic Preservation Act (NHPA) as part of impact mitigation from surface disturbing activities, although academic institutions have performed some research excavations. Inventories have identified several thousand cultural properties throughout the RFO, representing a wide variety of site types and chronological periods. Overall, less than 5 percent of the RFO has been inventoried.

Compared with other areas in the Southwest, site densities in inventoried areas are low throughout the RFO. Site densities increase near Capitol Reef National Park and in some of the canyons in eastern Wayne and Garfield counties. Site densities are much lower in Sevier County, with the lowest densities being found in Sanpete and Piute counties. Known cultural resources include various site types ranging in age from about 10,000 years ago through the present. The site types are listed and described below.

### 3.3.5.1 Site Types

Cultural resources in the RFO have been classified according to one or more site types. Site types are groupings of sites with similar physical or cultural characteristics. During original recordation, sufficient information may not have been readily available to determine the functional or cultural site type. Consequently, some sites may be recategorized after further research. Sites fitting into more than one category are usually more complex and have more information potential than do single-category sites. At the broadest level, cultural resources sites are categorized as either prehistoric or historic types.

#### Prehistoric Site Types

Prehistoric sites can be associated with one or more of 4 broad thematic periods: Paleo-Indian, Archaic, Formative (Fremont or Anasazi), and Late Prehistoric. There are sites within the RFO from each period, with an especially large representation of Formative sites. Some of the site types in the RFO are as follows:

- **Rock Art.** Rock art can be of two types, petroglyphs and pictographs. Petroglyphs are designs pecked or incised into the surface of the rock; pictographs are painted on the rock surface with various shades of pigment. At some sites, designs have been pecked into the rock and then painted; at other sites, images were painted, then features were created by pecking away the paint and the rock surface. Rock art has not been attributed to specific human groups with any degree of assurance, but it is believed that rock art within the RFO represents groups living from before 9000 B.C. to the present.
- **Rockshelter.** A rockshelter consists of a rock outcrop or large boulder that provides shelter from wind, sun, rain, and other elements. Rockshelters were used by both prehistoric and historic people.
- **Lithic Scatter.** A lithic scatter is any group of stone artifacts or artifact fragments. Lithic scatters are usually composed of flaked stone tools or debitage. Ground stone tools and tool fragments also fit into this category. This type ranges from sites with only a single tool present to sites with thousands of artifacts, diverse in type and function.
- **Ceramic Scatter.** A ceramic scatter is any group of ceramic artifacts or artifact fragments and can result from either prehistoric or historic activity. Most prehistoric ceramics represent the Fremont Indian culture or tradeware from the Anasazi culture to the south, but a small amount of Numic (e.g., Ute or Paiute) pottery has been recorded.

- **Cairn.** A cairn is an intentionally created pile of stones. Most cairns in the RFO are from the historic period (e.g., sheepherders' monuments, mining claim markers, etc.). However, some may be prehistoric.
- **Hearth.** A hearth is the remains of a feature where humans purposely used fire. This includes clay- or rock-lined fire pits, ash pits, ash stains, and fire-cracked rock concentrations or scatters.
- **Rock Alignment.** A rock alignment is any human arrangement of rock not usually recognized as part of a structure.
- **Cist.** Cists are small structures usually built for storage. They are slab-lined or coursed masonry, generally about 1 meter in diameter. They are usually semi-subterranean but can occur on the surface, freestanding, or attached to a cliff face or ledge.
- **Burial.** Burial sites contain human physical remains below the surface or exposed, whether marked or not.
- **Structural.** These sites are constructed from a wide range of material types and include various features within the structure. They consist of structures of brush and trees, mud and sticks, coursed masonry, and slab-lined, boulder-lined, or unlined pits occurring in open or naturally protected areas.
- **Midden.** Middens are concentrations of all or several of the following: ash, charcoal, bone, sherds, lithic fragments, human excrement, and general garbage.

## Historic Site Types

Historic sites are cultural resources with a period of significance ranging from 1700 A.D. to the present. Because features such as ditches, fences, and houses cannot be understood or interpreted outside the functional complex of which they are a part, historic resources are grouped into several themes. Some of these themes are organized chronologically, although most are functionally organized.

- **Anglo Exploration:** The pre-settlement category includes historic features from the period before the settlement of the 5 counties in the planning area. Limited features of this period have been identified. There are several records of individuals and groups passing through this area along what became known as the Old Spanish Trail. Remains of their activities may possibly be found. The Old Spanish Trail was designated a National Historic Trail in late 2002.
- **Ranching:** The ranching category includes features resulting from the raising of domestic livestock, such as fences, water developments, cabins, corrals, camps, and sheepherders' monuments. There is a long history of ranching in the RFO, and the features remaining from these developments are useful historic resources.
- **Farming:** The farming category includes features resulting from raising crops; digging or drilling wells; building barns, sheds, and cisterns; using farm implements; and constructing canals, ditches, and residences.
- **Mining:** The mining category includes features resulting from exploration and extraction of mineral resources, such as shafts and adits, drill sites, prospect holes, tailing dumps and waste rock piles, ore bins, loading chutes, kilns, tramways, residences, and other buildings.
- **Transportation:** The transportation category includes features resulting from attempts to transport people or goods across the RFO, such as abandoned rail lines, railroad grades, construction camps, bridges, roads, trails, and possible remains of river navigation.
- **Government Management:** The government management category includes features resulting from government attempts to manage the land and its resources. Many of these features are the result of Civilian Conservation Corps (CCC) activities through the 1930s. They include dams, fences, land treatments or manipulations, spring developments, roads, and bridges.

### 3.3.5.2 National Register of Historic Places

There are 3 sites within the lands managed by the RFO which have been formally listed on the National Register of Historic Places (NRHP). They are:

- **Cowboy Caves.** This site consists of two adjacent caves: Cowboy Cave and Walters Cave. Together they make up one of the richest archaic sites on the Colorado Plateau and outline almost 5,000 years of intermittent human habitation in the area.
- **Bull Creek Archaeological District.** This area of roughly 1,900 acres contains 104 identified significant archaeological sites, including habitations, storage structures, camps, and quarries. These sites represent a 400-year occupation (A.D. 800–A.D. 1200) of the area by peoples from the Formative period.
- **Starr Ranch.** The stone cabin here is a remnant of a 1890s stock-raising boom, when large cattle herds were introduced in the Henry Mountains. Starr Ranch is situated on the south slopes of Mount Hillers, and its stone buildings are still standing.

Many other sites throughout the RFO meet the eligibility criteria for NHRP listing. Current laws protect sites that are listed on the NHRP and those that are eligible for such a listing.

### 3.3.5.3 Cultural History Overview

Cultural resources in the RFO are categorized into two major time periods separated by the presence of European influence in the region. Prehistoric sites can be associated with one or more of 4 broad cultural periods that are distinguished based on differences in material culture traits or artifacts and subsistence patterns. Prehistoric sites can be associated with one or more of 4 broad thematic periods: Paleo-Indian (before 5500 B.C.), Archaic (5500 B.C. to 700 A.D.), Formative (700 A.D. to 1300 A.D.), and Late Prehistoric (1300 A.D. to ca. 1776 A.D.).

#### Paleo-Indian (Before 5500 B.C.)

There is no firm date for the earliest human use of the lands managed by the RFO; however, there is evidence of human use about 12,000 years ago. Chronologically, Paleo-Indians were contemporaries with extinct megafauna, and evidence outside the planning area shows the early human dependency on these animals (Spangler 2001). No sites that can definitely be assigned to this period have been found in the planning area, although many Paleo-Indian projectile points have been found throughout the Henry Mountains. Based on the period artifacts found throughout the area, it is safe to assume that Paleo-Indians did use the Henry Mountains; therefore, a potential for future discovery remains. Because of the rare nature of these resources, any discovery of Paleo-Indian sites would be significant.

#### Archaic (5500 B.C. to A.D. 700)

The Archaic tradition may be defined as a generalized hunter-gatherer adaptive strategy, with peoples employing “common adaptive strategies to exploit a variety of desert environments” (Spangler 2001). The warmer, dryer environment following the Paleo-Indian period resulted in a change from the big-game subsistence pattern of the Paleo-Indian to a small game hunting, seed, and nut-gathering subsistence pattern. It is thought that Archaic peoples “followed an annual round in response to changing resource availability, living in small, kin-related groups throughout most of the year” (Tipps 1988). These highly adaptive groups could easily move from where resources were depleted to where resources were abundant, roving from location to location, with their diet focusing on a new staple food source at each different location. Toward the end of the Archaic period, the hunter-gatherer tradition was gradually incorporated into supplemental agricultural subsistence. Evidence of agriculture exists in southern and southeastern Utah, dated to early Anasazi cultures around 1000 B.C. (Craig Harmon, BLM RFO, Personal

communication 2003). Archaic sites are common in the RFO. A few places in the area that were inhospitable to later Formative occupation seemed to favor earlier Archaic use.

Because these Archaic sociopolitical groups were small, the few seasonal cave and overhang dwellings thus far discovered are estimated to represent only a portion of the sites used. Potential for further Archaic site discoveries remains throughout the RFO.

### Formative (A.D. 700 to A.D. 1300)

The Formative Period saw the continued growth of the Anasazi or ancestral Puebloan cultures in addition to the Fremont culture. Evidence of the Anasazi is limited to areas east of Capitol Reef National Park, and it does not extend much farther north than the Henry Mountains area. Archaeological evidence of the Fremont people is generally found north of the Puebloan areas throughout much of central and eastern Utah (Craig Harmon, BLM RFO, Personal communication 2003). Archaeological evidence from north of the Henry Mountains area contains evidence of the Fremont and Puebloan cultures.

Formative cultures led a more sedentary life than did their Archaic predecessors. Consequently, Formative cultures resulted in more permanent settlements. The Formative Fremont are "archaeologically characterized by the use of ceramics and the bow and arrow, habitation of deep pithouses in small riverine settlements, and a metate with a shelf, termed the Utah metate" (Miller 2002). Much of the rock art in the RFO is attributed to Formative cultures, although rock art from Archaic and Numic cultures also has been noted. Most sites in the RFO identified as belonging to a specific cultural group are either wholly from or contain components of Formative cultures.

### Late Prehistoric (A.D. 1300 to ca. 1776)

Following the seemingly abrupt decline and disappearance of the Fremont culture around A.D. 1300, archaeological evidence suggests that Numic-speaking tribes (Paiute, Shoshone, Goshute) and the Navajo entered the area (Craig Harmon, BLM RFO, Personal communication 2003). According to the idea of Numic Expansion, suggested earlier in the 20th century, Late Prehistoric peoples used the bow and arrow and had pottery which significantly altered their hunting, food gathering, and food consumption practices from Archaic traditions. However, most records and diaries kept by the early settlers in Utah contain references to the many small farming communities that they encountered in the mid-19th century along the Virgin and Santa Clara rivers in southwestern Utah. This evidence seems to contradict the Numic Expansion theory. More research on this topic is necessary.

Sites from this period begin to be located in the planning area. They have probably been observed many times before but were ascribed to and recorded as Fremont.

### Historic (After ca. 1776)

The first documented Europeans in Utah arrived in 1776–1777, led by the Spanish Catholic Fathers Dominguez and Escalante. Trappers, explorers, and emigrants passing through to the Pacific coast followed them. Between the early 1830s and the late 1840s, users of what is now known as the Old Spanish Trail navigated numerous routes, many of which cross portions of the RFO (NPS 2001). European settlement of the planning area ranged from 1848 in Sanpete County to the 1880s in Wayne County (Powell 1994) and was predominantly accomplished by Mormon pioneers. These early communities focused on farming and ranching for subsistence.

A gold and silver boom in the Tushar Mountains in the 1890s and early 20th century spawned several small towns in Piute County. When the mines were no longer productive, the population boom reversed itself. Later, lead, zinc, alunite, and uranium were mined (Powell 1994). Over the years, ranching has continued as a use of public lands. Although most historic period cultural resources in the 5 county area are not located on public land, there are exceptions, such as the Wolverton Historic Mill and Starr Ranch.

### 3.3.5.4 Cultural Relationships

Several tribes maintain active interests in use and management of the lands managed by the RFO. Continuing consultation efforts with these groups have identified a few areas of tribal religious significance and/or traditional use within the RFO. Tribes have also expressed concerns about the preservation and protection of specific archaeological sites and impacts to prehistoric sites from disturbance.

### 3.3.5.5 Cultural Resource Condition and Trend

The condition and trend of cultural resources in the RFO vary considerably as a result of the diversity of terrain, geomorphology, access and visibility, and past and current land use patterns. Because recorded sites are manifested by discovery of exposed artifacts, features, and/or structures, they are easily disturbed by natural elements such as wind and water erosion, natural deterioration and decay, as well as animal and human intrusion and development and maintenance activities. On the basis of limited site monitoring, the trend of site conditions in the RFO is considered to be downward. Indications of active vandalism or collecting (unauthorized digging and "pothunting") have been observed in limited instances. Archaeological and historic sites are known to be deteriorating from a variety of causes. Many sites are deteriorating from natural causes and many others from the illegal activities of artifact collectors. Inadvertent damage from construction projects also affects resources. Collectively, these agents have adversely affected and continue to adversely affect many known cultural resources.

### 3.3.5.6 Consultation

Section 106 of the National Historic Preservation Act of 1966 requires the BLM and other federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP. The BLM first determines whether it has an undertaking that is defined in the regulations as a type of activity that could affect historic properties. Historic properties are properties that are included in the NRHP or that meet the criteria for the NRHP. If so, BLM must consult with the State Historic Preservation Officer (SHPO). If BLM determines that it has no undertaking, or that its undertaking is a type of activity that has no potential to affect historic properties, the agency has no further Section 106 obligations.

In most of Utah, the BLM operates under the State Protocol Agreement with the Utah SHPO that defines the manner in which the BLM will meet its responsibilities under the NHPA as well as the National Programmatic Agreement among the BLM, the ACHP, and the National Conference of State Historic Preservation Officers. The agreement established certain review thresholds under which the BLM will request the review of the Utah SHPO and the ACHP in certain situations. These include:

- Non-routine interstate and/or interagency projects or programs
- Undertakings that directly and adversely affect National Historic Landmarks or National Register eligible properties of national significance
- Highly controversial undertakings, when council review is requested by the BLM, SHPO, a Native America tribe, a local government, or an applicant for a BLM authorization
- Undertakings affecting National Register eligible or listed properties
- Land exchanges, land sales, Recreation and Public Purposes Act (R&PP) leases, and transfers
- When BLM professional staff lack the appropriate regional experience or professional expertise, and until performance is mutually acceptable to the BLM Deputy Preservation Officer and SHPO
- When BLM's professional cultural resources staff wishes to bring a particular project to the attention of the SHPO.

The Protocol Agreement allows the BLM to streamline the review process significantly on projects that do not affect historic properties. The following steps would be followed in determining that there would be "no potential to affect": (1) identify the area of potential effect (APE); (2) conduct a Class I (literature) search and/or review other relevant records for historic properties/eligible historic properties within the APE; (3) notify the tribes or other entities that would have consulting party status of the proposed action and provide them with the opportunity to identify traditional cultural and religious properties and/or other historic and potentially eligible properties; (4) communicate/consult with tribes and other entities that would have consulting party status through letter and phone calls which, if properly documented, should demonstrate a "good faith" effort on the BLM's part; and (5) carefully and thoroughly document the BLM's findings and communications/consultation. The BLM will not request the review of the SHPO in the following situations:

- No Potential to Affect determinations by qualified BLM staff
- No Historic Properties Affected; no sites present, determined by qualified BLM staff
- No Historic Properties Affected; no eligible sites present, determined by qualified BLM staff
- No Historic Properties Affected; eligible sites present, but not affected as defined by 36 CFR 800.4.

During the life of this plan a number of actions—such as vegetation treatments, land disposals, range improvements, or energy development—may occur. Before any of the activities are implemented, the field office will take into account the effects these actions will have on cultural resources. This process is accomplished through the regulations of National Historic Preservation Act contained in Title 36 of the Code of Federal Regulations, Part 800, and agreements between BLM and the Utah State Historic Preservation Officer. Native American tribes having an interest in the area are also consulted prior to any federal undertaking.

### 3.3.5.7 Native American Religious Concerns

The area encompassed by the planning area boundary has seen considerable prehistoric and historic Native American use. Several federally recognized Native American tribes identified to date have either a history of traditional use in or ancestral ties to this area (although there may be other tribes interested in the area). These tribes are:

- Paiute Indian Tribe of Utah (headquartered in Cedar City, Utah)
- Uintah and Ouray Ute (headquartered in Ft. Duchesne, Utah)
- Hopi Tribe (headquartered in Kykotsmovi, Arizona)
- Navajo Nation (headquartered in Window Rock, Arizona)
- Southern Ute Tribe (headquartered in Ignacio, Colorado)
- Ute Mountain Ute Tribe (headquartered in Towaoc, Colorado)
- Kaibab Paiute Tribe (headquartered in Pipe Springs, Arizona)
- San Juan Southern Paiute Tribe (headquartered in Tuba City, Arizona)
- Moapa Paiute Band (headquartered in Moapa, Nevada)
- White Mesa Ute Band (headquartered in White Mesa, Utah).

In addition to these tribes, the BLM also includes the Navajo Utah Commission in Montezuma Creek, Utah, and the Utah Division of Indian Affairs in Salt Lake City, Utah, in discussions related to BLM actions (including land use planning).

The BLM is the present custodian of the public land in the planning area, but this was not always the case. Innumerable Native American groups were present in this area for thousands of years prior to Euro-American contact and occupation that began a few hundred years ago. Spiritual, emotional, and physical

ties between these Native Americans and their traditional homelands have existed for a long time and will no doubt continue to exist.

Native Americans practice their religions in many places on federal lands. Many of the lawful activities that are permitted or authorized on federal lands can compromise the integrity of sacred places and the privacy of religious practices. With this in mind, Executive Order (EO) 13007 on Indian Sacred Sites was signed "to protect and preserve Indian religious practices." The order obligates federal land managers to work with Native American tribes to help protect their basic rights and the practice of their religions. When planning and implementing land uses, BLM generally has the ability to accommodate tribal access to sacred sites and to prevent physical damage or intrusions that might impede their use—if the existence of the sites is known.

### 3.3.5.8 Tribal Interest

The Paiutes claim both traditional use of and ancestral ties to the area managed by the RFO. Their interest includes specific claims relating to important and sacred areas as well as to certain other site locations. Some of these claims have recently been documented and supported in an ethnographic study conducted by Dr. Richard Stoffle of the University of Arizona (September 2004).

The Hopi claim ancestral ties to the prehistoric groups represented here and believe that they can trace Hopi clan migrations through symbols present in area rock art. The Utes have ancestral ties to central Utah. Both the Uintah and Ouray Ute and the Hopi Tribe have been willing to enter into consultation with BLM and comment on proposals in the RFO that have the potential to affect tribal interests.

The Navajo interest in this area is confined to that part of the planning area east of Capitol Reef National Park and stems from the 1850s, when Kit Carson and the U.S. Army attempted to round up the Navajos and move them from their ancestral homeland into New Mexico. During this "Long Walk" or "Big Roundup" time, many Navajo people escaped north into the Henry Mountains and remained there for some time. As a result, the Navajo Nation claims this area as a traditional cultural property, although no formal nomination as such has been made to date. The Navajo interest also extends to the Dirty Devil River corridor and the Horseshoe Canyon drainage.

Meetings to discuss the RMP have been held with all the tribes mentioned above. A more detailed discussion of consultation with Native American tribes can be found in Chapter 5 of this Proposed RMP/Final EIS.

## 3.3.6 Paleontological Resources

Paleontological resources are integrally associated with the rock formations in which they are located. The geographic extent of the lands managed by the RFO contains approximately 40 sedimentary geologic formations at the surface, most containing paleontological resources.

Sedimentary formations are formed through depositional processes that lead to characteristic traits and varying potential for certain types of fossils. If extensive excavation of a certain formation in one geographic area results in substantial fossil resources, a potential exists that similar fossils will be found elsewhere in the formation, although such consistency is not a guarantee. A comprehensive paleontological resource inventory has not been completed within the RFO; however, a review of paleontological research on formations contained within the RFO has identified the types of fossil resources known to be present. Table 3-13 identifies the geologic formations within the RFO, their predominant depositional environments, and the types of fossils present. The geologic map of the planning area (Map 6 of the *Mineral Potential Report* [BLM 2005b]) displays these formations in relation to the planning area boundaries.

**Table 3-13. Geologic Formations Present in the Planning Area**

| Formation Age | Formation Name | West[1] | East[1] | Depositional Environment | Fossils Present |
|---|---|---|---|---|---|
| Quaternary | Surficial Alluvium and Colluvium | X | X | Several | Vertebrate |
| | Surficial Older Alluvium and Colluvium | X | X | Several | Vertebrate |
| Tertiary | Sevier River Formation | X | | Fluvial, Lacustrine | Vertebrate; Invertebrate |
| | Volcanic Rocks, Undivided | X | | Volcanic with some Fluvial | Invertebrate |
| | Dipping Vat Formation (not noted on map) | X | | Fluvial | Plant |
| | Grey Gulch Formation (also Bald Knoll and Aurora) | X | | Lacustrine | Invertebrate; Plant |
| | Claron Formation (not noted on map) | X | | Fluvial/Lacustrine | Invertebrate; Plant |
| | Green River Formation | X | | Freshwater Lacustrine and Fluvial | Vertebrate; Invertebrate; Plant |
| | Colton Formation (not noted on map) | X | | Primarily Alluvial with Marginal Lacustrine and Deltaic Facies | Vertebrate; Invertebrate |
| | Flagstaff Formation | X | | Lacustrine/Marine | Vertebrate; Invertebrate; Plant; Trace |
| Cretaceous-Tertiary | North Horn Formation | X | | Lacustrine/Fluvial | Vertebrate; Invertebrate; Plant; Trace |

| Formation Age | Formation Name | West[1] | East[1] | Depositional Environment | Fossils Present |
|---|---|---|---|---|---|
| Cretaceous | Price River Formation (Mesa Verde Group) | X | | Fluvial and Floodplain | Plant |
| | Blackhawk Formation (Mesa Verde Group) | X | | Deltaic and Interdeltaic | Trace vertebrate; Plant |
| | Star Point Sandstone (Mesa Verde Group) | X | | Beach Sand and Intermediate Marine Shale | Plant; Trace |
| | Indianola Group (Sixmile Canyon Fm; Funk Valley Fm; Allen Valley Shale; Sanpete Fm) | X | | Fluvial | Invertebrate |
| | Straight Cliffs Formation | X | | Coastal Plain Interfingering with Marine | Vertebrate; Trace vertebrate; Invertebrate; Plant |
| | Mancos Shale (including Tununk and Wahweap Members) | X | X | Marine | Vertebrate; Trace vertebrate; Invertebrate; Trace invertebrate; Plant |
| | Dakota Sandstone | X | X | Beach to Marginal Marine (Deltaic) | Vertebrate; Invertebrate; Plant; Trace |
| | Cedar Mountain Formation | | X | Fluvial | Vertebrate; Trace vertebrate; Plant |
| Jurassic | Morrison Formation (Brushy Basin and Salt Wash Members) | X | X | Fluvial | Vertebrate; Trace vertebrate; Invertebrate; Plant |
| | Summerville Formation | | X | Tidal Flat | Trace vertebrate |
| | Curtis Formation (not noted on map) | | X | Marine | Invertebrate |
| | Twist Gulch Formation (not noted on map) | X | | Marginal Fluvial, Nearshore | Invertebrate |
| | Entrada Sandstone | | X | Nearshore Eolian | Trace vertebrate; Plant |
| | Carmel Formation | | X | Shallow Marine | Trace vertebrate; Invertebrate, Plant |
| | Arapien Shale | X | | Supratidal, Marginal Nearshore Fluvial | Invertebrate; Plant |
| Triassic-Jurassic | Navajo Sandstone | X | X | Eolian | Trace vertebrate; Plant |
| Triassic | Kayenta Formation | X | X | Fluvial | Trace vertebrate; Plant |
| | Wingate SS (not noted on map) | X | X | Eolian | Trace vertebrate |
| | Chinle Formation | X | X | Fluvial | Vertebrate; Trace vertebrate; Invertebrate; Plant (wood) |

| Formation Age | Formation Name | West[1] | East[1] | Depositional Environment | Fossils Present |
|---|---|---|---|---|---|
| | Moenkopi Formation | X | X | Marine/Tidal Flat | Vertebrate; Trace vertebrate; Invertebrate; Trace invertebrate; Plant |
| Permian | Kaibab Limestone/Toroweap Formation | X | X | Marine | Invertebrate |
| | Cutler Group | | X | Eolian, Fluvial, and Shallow Marine | Vertebrate; Invertebrate; Plant; Trace vertebrate; Trace Plant |
| Pennsylvanian | Hermosa Group | | X | Marine | Invertebrate |

Note
1—East and West refers to the eastern and western portions of the planning area, with Capitol Reef National Park forming the dividing line between the two sides.
Sources: Condon 1997; Doelling 2004; Graffam and Bourdon 1999; M. Hayden, Utah Geological Survey, Personal communication, 2004; Hintze *et al*. 2003; Rowley *et al*. 2002; Rowley, *et. al*. 2004; Steven *et al*. 1990; Stokes 1986.

More than half of the sedimentary formations (23 of 40) in the planning area are known to contain vertebrate or trace vertebrate fossils. However, some formations have a higher potential than others to contain significant numbers of vertebrate fossils. The Morrison and Cedar Mountain formations are noted for vertebrate fossils. Several complete fossil skeletons have been scientifically excavated from several specific localities in the planning area.

In addition to the potential for containing paleontological resources, paleontological localities identify areas where the presence of fossils is known. Roughly 587 paleontological localities are in the 5 counties composing the planning area. The BLM is responsible for managing about one-third of these localities.

## 3.3.7 Visual Resources

The planning area contains a broad range of visual settings, ranging from mountain landscapes and steep canyons, to agricultural settings, to desert. The purpose of visual resource management (VRM) is to manage the quality of the visual environment and reduce the visual impact of development activities while maintaining the viability of all resource programs. VRM involves applying methods for evaluating landscapes and determining appropriate techniques and strategies for maintaining visual quality and reducing adverse impacts.

### 3.3.7.1 Visual Resource Inventory

Before the current land use plans (LUP) were completed, visual resource inventories were conducted for most of the area now encompassed by the RFO. In those inventories, each acre of land was evaluated and assigned a scenic quality rating: A, B or C, with "A" representing the most scenic lands and "C" the least scenic. Criteria for determining the ratings are included in BLM Manual H-8410-1, *Visual Resource Inventory*. The BLM relied on these existing scenic quality evaluations for the purposes of this RMP revision. The earlier inventories excluded a small portion of public land in Garfield County between the Dixie National Forest and the Wayne County border. In July 2003, the BLM inventoried this area for this RMP revision.

### 3.3.7.2 Visual Resource Management

The BLM's VRM methodology begins with the inventory process. Landscapes are evaluated based on scenic quality, visual sensitivity, and distance zones (the distance from the existing network of travel routes). VRM class recommendations are based on the inventory process, and final class determinations are established by the RMP. The VRM Class objectives are:

- **Class I—**Preserve the existing character of the landscape. Management activity should be very limited. Change to scenery: very low and must not attract attention.
- **Class II—**Retain the existing character of the landscape. Management activities may be seen. Change to scenery should be low and not attract the attention of the casual observer.
- **Class III—**Partially retain the existing character of the landscape. Management activities may be seen and may attract the attention of the casual observer but should not dominate the view.
- **Class IV**—Allow major modifications of the existing character of the landscape. Management activities may dominate the view and be the major focus of viewer attention.

Current VRM classes for the RFO are shown below in Table 3-14 and on Map 2-1.

**Table 3-14. Visual Resource Management Classes**

| VRM Class | Acres (BLM-Administered Surface) |
|---|---|
| Class I | 0 |
| Class II | 529,500 |
| Class III | 569,000 |
| Class IV | 1,029,500 |

Source: BLM LUPs

It should be noted that although current LUPs for the RFO did not inventory or classify any lands as VRM Class I, the BLM's visual resource management direction for lands within wilderness study areas is guided by BLM Instruction Memorandum (IM) 2000-96. This memorandum requires that all Wilderness Study Areas (WSA) be managed according to VRM Class I management objectives until such time as the Congress decides to designate the area as wilderness or release it for other uses. The RFO contains 11 WSAs (446,900 acres) that are managed as VRM Class I.

The RFO encompasses many areas with a high degree of scenic quality and a high level of visual sensitivity. In general, high scenic quality within the RFO occurs where the area has varied topography, unique geology, and striking vistas. Areas with high visual sensitivity are the result of a high degree of visitor interest in and public concern for a particular area's visual resources, an area's high degree of public visibility, the level of use of an area by the public, and the type of visitor use that an area receives. These visual resources are appreciated by the local population and by the visiting public.

The area's scenic qualities attract visitors. The main locations in the RFO with outstanding scenic quality and/or high visual sensitivity include, but are not limited to:

- Class A scenery (VRM Class II)
- Eleven WSAs (VRM Class I)
- Scenery in the foreground, middle distance, and background zones of major paved recreation highways (U-12, U-24, U-95, U-276)
- Scenery in the foreground and middle distance zones of unpaved roads designated as Scenic Byways (Fishlake Scenic Byway and Bull Creek Pass Backcountry Byway)
- Scenery in the foreground and middle distance zones of unpaved roads designated as Utah Scenic Byways (Kimberly/Big John Road, Cove Mountain Road, Cathedral Valley Road; Thousand Lake Mountains Road, Gooseberry/Fremont Road, Notom Road, and Posey Lake Road)
- Areas along the public land/urban interface such as the Red Gates in Wayne County and the low hills surrounding the communities of Glenwood and Annabella in Sevier County.

## 3.3.8 Special Status Species

Special status species (SSS) are plants, fish, and animals that require particular management attention as a result of population or habitat concerns. There are 5 categories—

- Federally Listed Threatened and Endangered (T&E) Species and Designated Critical Habitats
- Federally Proposed Species and Proposed Critical Habitats
- Federal Candidate Species
- BLM Sensitive Species
- State Listed Species.

Federally listed species can have habitat designated as critical to species viability. Only the Mexican spotted owl has designated critical habitat within the planning area (Map 3-4). In the case of species that are listed and do not have critical habitat designated, BLM cooperates with the U.S. Fish and Wildlife Service (USFWS) to determine and manage habitats of importance. BLM is working with local working groups in developing management plans for several SSS.

USFWS has responsibility under a number of federal laws, treaties, EOs, and memoranda of agreement (MOA) for the conservation and management of many fish, wildlife, and plant species, and habitat. USFWS provides recommendations for protective measures for T&E species in accordance with the Endangered Species Act (ESA), as amended. Protective measures for migratory birds are provided in accordance with the Migratory Bird Treaty Act of 1918 (MBTA) and Bald Eagle Protection Act of 1940. Wetlands are afforded protection under EOs 11990 (wetland protection) and 11988 (floodplain management) and Section 404 of the CWA. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act.

BLM has entered into an MOA with USFWS and the USFS to improve the efficiency and effectiveness of plan-level Section 7 consultation processes under the ESA. Through this MOA, BLM agrees to promote the conservation of candidate, proposed, and listed species and to informally and formally consult on listed and proposed species and designated and proposed critical habitat during planning to protect and improve the condition of species and their habitats to a point where their special status recognition is no longer necessary.

### 3.3.8.1 Species Listed Under the Endangered Species Act

Table 3-15 identifies the federally listed species in the planning area. The Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS) included Jones cycladenia (*Cycladenia jonesii*) as a threatened species. However, further review and surveys did not find the species within the RFO; therefore, it is not included in Table 3-15.

**Table 3-15. Federally Listed Species**

| Common Name | Scientific Name | Status |
|---|---|---|
| ***Birds*** | | |
| California Condor | *Gymnogyps californianus* | Experimental |
| Mexican Spotted Owl | *Strix occidentalis* | Threatened |
| Southwestern Willow Flycatcher | *Empidonax traillii extimus* | Endangered |
| Western Yellow-billed Cuckoo | *Coccyzus americanus* | Candidate |

| Common Name | Scientific Name | Status |
|---|---|---|
| ***Mammals*** | | |
| Utah Prairie Dog | *Cynomys parvidens* | Threatened |
| ***Fish*** | | |
| Bonytail Chub | *Gila elegans* | Endangered |
| Colorado Pikeminnow | *Ptychocheilus lucius* | Endangered |
| Humpback Chub | *Gila cypha* | Endangered |
| Razorback Sucker | *Xyrauchen texanus* | Endangered |
| ***Plants*** | | |
| Wright Fishhook Cactus | *Sclerocactus wrightiae* | Endangered |
| Barneby Reed-Mustard | *Schoencrambe barnebyi* | Endangered |
| San Rafael Cactus | *Pediocactus despainii* | Endangered |
| Winkler Cactus | *Pediocactus winkleri* | Threatened |
| Last Chance Townsendia | *Townsendia aprica* | Threatened |
| Ute Ladies'-tresses | *Spiranthes diluvialis* | Threatened |
| Maguire Daisy | *Erigeron maguirei* | Threatened |

*Source: USFWS 2004.*

## California Condor

The California condor was listed as endangered on March 11, 1967, and noted to occur only in California. USFWS has reintroduced California condors into northern Arizona and southern Utah, and designated these birds as nonessential experimental populations under the ESA. The purpose of the reintroduction was to achieve a primary recovery goal: the establishment of a second noncaptive population, spatially disjunct from the noncaptive population in southern California.

California condors are among the largest flying birds in the world, with adults weighing up to 22 pounds. Condors are opportunistic scavengers, feeding only on carcasses. Since European settlement of California, condor populations have steadily declined. Poisoning, shooting, egg and specimen collecting, collisions with artificial structures, and loss of habitat contributed to the decline of the species. By 1987, the last wild condor was captured and taken to the San Diego Wild Animal Park. Beginning with the first successful breeding of California condors in 1988, the population (in 1996) was 121 individuals, including 104 in the captive flock and 17 in the wild. The condor experimental reintroduction imposes two requirements on federal agencies: (1) that they use their authority to conserve the condors, and (2) that they informally confer with USFWS on actions likely to jeopardize the condor (50 CFR Part 17).

Birds from northern Arizona frequently forage and roost in Utah and are likely to nest in southern Utah (Utah Division of Wildlife Resources [UDWR] 2005c). To date there are no known California condor nesting or roosting sites in the RFO. Threats to the condors include inadequate protection of suitable nesting sites and foraging areas near nesting sites (UDWR 2005c).

The planning area includes habitat that contains both the experimental population (Areas South of I-70) and habitat that could be occupied by California condors in non-experimental areas (North of I-70). Therefore, one analysis in the Biological Assessment (BA) includes the endangered California condor that may migrate north of I-70 and another analysis is made to determine effects on the experimental population south of I-70.

## Mexican Spotted Owl

The Mexican spotted owl was listed as a threatened species on March 16, 1993. The range of the Mexican spotted owl extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in central and southern Utah, southward through Arizona and New Mexico. Mexican spotted owls primarily forage at night. Their diet consists of a variety of mammals, birds, reptiles, and insects, with mammals constituting the bulk of the diet throughout the owl's range. Wood rats, voles, and gophers are the primary mammal food base. Steep slopes and canyons with rocky cliffs characterize much of the owl's habitat in the planning area.

A recovery plan was completed for the Mexican spotted owl in 1995. Mexican spotted owls in the RFO are located within the Colorado Plateau Recovery Unit. Threats to Mexican spotted owls include habitat loss associated with human disturbance and past and current timber harvest activity.

Designated critical habitat was established for the Mexican spotted owl in 2001 and revised in 2004. This designated habitat contains important nesting and foraging habitat for the owl. The critical habitat designation clarified that areas within critical habitat boundaries are considered critical habitat only when they contain or have the potential to contain habitat characteristics essential to the conservation of the species. For canyon habitats, the primary constituent elements include one or more of the following attributes: (1) cooler and often more humid conditions than the surrounding area; (2) clumps or stringers of trees and/or canyon walls with crevices, ledges, or caves; (3) a high percentage of ground litter and woody debris; and (4) riparian or woody vegetation. The primary constituent elements related to forest structure include the following: (1) a range of tree species; (2) a shade canopy created by the tree branches, covering 40 percent or more of the ground; and (3) large, dead trees with a trunk diameter of at least 12 inches (measured at 4.5 feet above ground surface).

## Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as an endangered species on February 27, 1995. It breeds primarily in the southwestern United States and winters in Central America and southern Mexico. The southwestern willow flycatcher is found in the southern and eastern parts of the State of Utah, along riparian zones of the Colorado Plateau. Current population status and trends for the southwestern willow flycatcher are unknown in Utah. Critical habitat for the southwestern willow flycatcher has been designated along the Virgin River in the southwestern part of Utah near St. George. Habitat for this species exists in Wayne County (UDWR 2005a, NatureServe 2004), and there has been a sighting of the species in the Fremont Valley gateway area (Suzanne Grayson, BLM RFO, Personal communication 2004). The southwestern willow flycatcher is rare in southern Utah during the summer and is found most frequently in riparian habitats, especially in areas of dense willows associated with rivers and wetlands. The major factor in the decline of the flycatcher is the alteration/loss of the riparian habitat necessary for the species (UDWR 2005a).

## Western Yellow-billed Cuckoo

This species is considered a riparian obligate and is usually found in large tracts of dense cottonwood/willow habitats (below 33 feet in height). Population status and trends within the planning area are unknown; however, a pair of yellow-billed cuckoos was heard during breeding season before 1983. More recent breeding has been recorded outside the planning area. Yellow-billed cuckoo nesting behavior may be closely tied to food abundance. The species is one of the latest migrants to arrive and breed in Utah. The yellow-billed cuckoos arrive in late May or early June and breed in late June through July. Nesting habitat is classified as dense lowland riparian characterized by a dense subcanopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 333 feet of water. Threats to the species include the alteration of riparian corridors from invasive species, livestock use, and development (UDWR 2005a, NatureServe 2004).

## Utah Prairie Dog

The Utah prairie dog was listed as an endangered species on June 4, 1973. On May 29, 1984, the prairie dog was downlisted to threatened. Historically, the Utah prairie dog was found in southwestern and central Utah. The habitat of a prairie dog consists of continuous grassland and other vegetation on flat plains. The prairie dog is found at elevations from 5,400 feet in Iron County to 9,500 feet in Wayne County, and lives both above ground and underground. The most obvious feature of a prairie dog colony is the abundance of mounds and holes. Utah prairie dog habitat is commonly divided into 3 recovery areas: the West Desert, the Paunsaugunt Plateau, and the Awapa Plateau. Portions of the Awapa Plateau and Paunsaugunt recovery areas are in the RFO.

Major threats to the Utah prairie dog include habitat loss (through development and drought), poisoning, and the plague. Prairie dogs are susceptible to several diseases. These factors lead to rapid decline and even disappearance of entire colonies.

A recovery plan was completed for the Utah prairie dog in 1991. A Utah Prairie Dog Interim Conservation Strategy was completed in 1997 (IM-UT 2002-040). A current management practice for the prairie dog is a translocation program. Translocation of prairie dogs is authorized by USFWS under authority of the ESA, as amended. It is anticipated that translocations will be a major part of the management of the Utah prairie dog in the future. No critical habitat has been designated for the Utah prairie dog.

## Colorado River Fish

There are 4 species of fish endemic to the Colorado River Basin listed as endangered under the ESA. None of these species or their designated critical habitat occurs within the public lands administered by the RFO. Some historic habitat was found on the Dirty Devil River; however, due to fluctuations in flows, this river is not current habitat. However, because these species and their designated critical habitat are located downstream from the RFO and because some streams that traverse the RFO are tributaries to the Colorado River Basin, they are briefly discussed here.

### Bonytail Chub

The bonytail chub was listed by USFWS as an endangered species in 1980. The bonytail is found in larger channels of the Colorado River system. They are endemic to the large rivers (Colorado, Green, and San Juan) of the Colorado River Basin. In April 1994, USFWS designated 1,980 miles of critical habitat for all 4 Colorado River fish in portions of Colorado, Utah, New Mexico, Arizona, Nevada, and California (50 CFR Part 17). UDWR has documented populations of bonytail chub within eastern Emery, Wayne, and Garfield counties (UDWR 2005a). Bonytail prefer eddies, pools, and backwaters near swift current in large rivers. Because the historic and occupied range of the bonytail is restricted to the mainstem of the Green River, it does not substantially extend into any tributaries, such as the Dirty Devil River, originating from the planning area (USFWS 1990a).

The historical distribution of bonytail is poorly documented, but on the basis of former collections, the optimum habitat of bonytail chubs appears to be the open river areas of relatively uniform depth and current velocity. Adults are found mainly in pools and eddies with silt, sand, or boulder substrates. Young occur in still water or shallow pools with silt or gravel (Bosworth 2003).

Threats of extinction stem from habitat loss (including alterations to natural flows and changes to temperature and sediment regimes), proliferation of non-native introduced fish, and other artificial disturbances (USFWS 1994b). Goals for management and conservation of bonytail are described in *Bonytail* (*Gila elegans*) *Recovery Goals*: *Amendment and Supplement to the Bonytail Chub Recovery*

*Plan* (USFWS 2002a), and incorporated in Appendix 14 of this Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS).

### Colorado Pikeminnow

The Colorado pikeminnow (formerly known as the Colorado squawfish) is a large minnow native to the Colorado River system of the western United States and Mexico. USFWS designated this species as endangered in 1967, and the species is also included in the UDWR Sensitive Species List (2003). The species is distributed within Wayne and Garfield counties in large mainstem rivers (Green River and Colorado River) and in the lower reaches of major tributaries. In the Green River drainage, the mainstem is occupied from the confluence with the Colorado River upstream through Dinosaur National Monument. Because the historic and occupied range of the pikeminnow is restricted to the mainstem of the Green River, it does not substantially extend into any tributaries, such as the Dirty Devil River, originating from the planning area (USFWS 1991).

Changes in sediment deposition patterns, flow, and temperature caused by dams have resulted in loss and alteration of aquatic habitats and have favored non-native competitors and predators (Bosworth 2003). Threats of extinction stem from habitat loss (including alterations to natural flows and changes to temperature and sediment regimes), proliferation of non-native introduced fish, and other artificial disturbances (USFWS 1994b). Recovery goals have been formulated to guide management and conservation efforts and are described in *Colorado Pikeminnow* (*Ptychocheilus lucius*) *Recovery Goals: Amendment and Supplement to the Colorado Squawfish Recovery Plan* (USFWS 2002b), and are incorporated as conservation measures in Appendix 14 of this PRMP/FEIS.

### Humpback Chub

The humpback chub is a rare minnow native to the upper Colorado River system. Because of the severe declines in humpback chub numbers and distribution, the species was listed as endangered in 1967 and is also included in the UDWR Sensitive Species List (2003). USFWS designated critical habitat in April 1994, as described under *bonytail chub*, above.

Humpback chub originally thrived in the fast, deep whitewater areas of the Colorado River and its major tributaries; but flow alterations, which have changed the turbidity, volume, current speed, and temperature of the water in those rivers, have had significantly adverse impacts on the species. Humpback chub in Utah are now confined to a few whitewater areas in the Colorado, Green, and White rivers (Bosworth 2003). Because the historic and occupied range of the humpback chub is restricted to the mainstem of the Green River, it does not substantially extend into any tributaries, such as the Dirty Devil River, originating from the planning area (USFWS 1990b).

Threats of extinction stem from habitat loss (including alterations to natural flows and changes to temperature and sediment regimes), proliferation of non-native introduced fish, and other artificial disturbances (USFWS 1994b). Recovery goals to guide management and conservation of the species are documented in *Humpback Chub Recovery Goals: Amendment and Supplement to the Humpback Chub Recovery Plan* (USFWS 2002c), and incorporated as conservation measures in Appendix 14.

### Razorback Sucker

The razorback sucker was listed as endangered in 1991 and is also included in the UDWR Sensitive Species List (UDWR 2003). The species is believed to have historically occupied much of the Green, Colorado, and San Juan rivers, as well as the lower portions of large tributaries such as the White and Duchesne rivers. Razorback sucker occur in water of desert and submontane elevations. Habitat may vary seasonally and includes pools, slow runs, backwaters, and flooded off-channel areas (Bosworth 2003). Current distribution patterns are difficult to interpret, primarily because the species is rarely encountered.

USFWS designated critical habitat in April 1994, as described under *bonytail chub*. A subpopulation of approximately 100 adults was found in the 1990s occupying the middle Green River, and UDWR has noted population distribution within Wayne County (Bosworth 2003, UDWR 2005a). Because the historic and occupied range of the razorback sucker is restricted to the mainstem of the Green River, it does not substantially extend into any tributaries, such as the Dirty Devil River, originating from the planning area (USFWS 1998).

The razorback sucker eats mainly algae, zooplankton, and other aquatic invertebrates. Successful reproduction has not been documented in the last 25 years. Spawning occurs during a 6-week period in April and May when water temperatures reach 53°F–64°F.

Threats of extinction stem from habitat loss (including alterations to natural flows and changes to temperature and sediment regimes), proliferation of non-native introduced fish, and other artificial disturbances (USFWS 1994b). The USFWS has developed recovery goals to guide management and conservation efforts (USFWS 2002d).

### Wright Fishhook Cactus

Wright fishhook cactus is a federally listed endangered plant that occurs in Emery, Sevier, and Wayne counties. The species is found in soils that range from clays to sandy silts to fine sands, typically in areas with well-developed biological soil crusts (Clark and Clark 1999). Wright fishhook cactus grows in salt desert shrub and widely scattered pinyon-juniper woodlands at elevations ranging from 4,280 to 6,440 feet (Utah Native Plant Society 2004). The species and its habitat are vulnerable to disturbance from domestic livestock grazing, mineral resource development, and OHV use (USFWS 1979).

### Barneby Reed-Mustard

Barneby reed-mustard is a federally listed endangered plant found only in Emery and Wayne counties. The species grows on red clay soils rich in selenium and gypsum, overlain with sandstone talus derived from the Moenkopi and Chinle geologic formations (USFWS 1994a). Barneby reed-mustard grows in sparsely vegetated sites in mixed desert shrub and pinyon-juniper woodlands, at elevations ranging from 4,788 to 6,510 feet (Clark and Clark 1999). Potential threats to the population of Barneby reed-mustard include mining, trampling by hikers, and road or recreation development (USFWS 1994a).

### San Rafael Cactus

San Rafael cactus is a federally listed endangered plant that grows in Emery and Wayne counties. It is found in fine-textured soils rich in calcium derived from the Carmel Formation and the Sinbad Member of the Moenkopi Formation. The species grows on benches, hilltops, and gentle slopes in pinyon-juniper woodlands and mixed desert shrub-grassland communities, at elevations ranging from 4,756 to 6,822 feet (Utah Native Plant Society 2004; USFWS 1995c). The habitat of San Rafael cactus is vulnerable to surface disturbance from OHV use, trampling by humans and livestock, and mineral resource exploration and development (Clark and Clark 1999).

### Winkler Cactus

Winkler cactus is a federally listed threatened plant that occurs in Emery and Wayne counties. The species is a small, nearly round cactus with solitary or clumped stems. The crown of the stem is at or very near ground level (Utah Rare Plant Society 2004). Winkler cactus is found in fine-textured soils derived from the Dakota Formation and the Brushy Basin Member of the Morrison Formation (Utah Native Plant Society 2004). It occurs on benches, hilltops, and gentle slopes on barren, open sites in salt desert shrub communities, at elevations ranging from 4,888 to 6,592 feet (USFWS 1995c). The habitat of the species is vulnerable to surface disturbance from OHV use, trampling by humans and livestock, and mineral resource exploration and development (Clark and Clark 1999).

### Last Chance Townsendia

Last Chance townsendia is a federally listed threatened plant that occurs in Emery, Sevier, and Wayne counties. The species is found in clay, clay-silt, or gravelly clay soils derived from the Mancos Formation. These soils are often densely covered with biological soil crusts. Last Chance townsendia grows in salt desert shrub and pinyon-juniper woodlands at elevations ranging from 5,531 to 8,396 feet (USFWS 1985). Threats to Last Chance townsendia populations include poor rangeland conditions, trampling by OHV recreation use, trampling by livestock, and mining (USFWS 1993a).

### Ute Ladies'-Tresses

Ute ladies'-tresses was first listed as threatened on January 17, 1992. It is currently designated as threatened across the entire range. The species is known to occur in Colorado, Idaho, Montana, Nebraska, Utah, Washington, and Wyoming (USFWS 1992). Ute ladies'-tresses is found in moist to very wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores. It grows in sandy or loamy soils that are typically mixed with gravels. In Utah, the species ranges in elevation from 4,301 to 7,001 feet. Populations have been documented in wetlands near Utah Lake in northern Utah (2 populations) and in low-elevation riparian areas in the Colorado River drainage in eastern Utah (6 populations) (USFWS 1992). The species occurs in Garfield and Wayne counties in the planning area.

A member of the orchid family, Ute ladies'-tresses is a perennial herb with a flowering stem (8–20 inches tall) that rises from a basal rosette of grass-like leaves. The flowers are ivory-colored, arranged in a spike at the top of the stem, and bloom mainly from late July through August. Recovery objectives for the species are documented in the *Ute Ladies'-Tresses Recovery Plan* (USFWS 1995b).

Threats to the species include loss of habitat from fragmentation of land due to conversion to suburban and urban areas and management of water and stream systems for municipal, agricultural, and recreation uses (USFWS 1995b).

The Ute ladies'-tresses is not currently known to occur on lands administered by the BLM RFO. The species exists within the boundary of the planning area; however, it is located only on lands administered by the Fish Lake National Forest and the Capitol Reef National Park. Surveys have been conducted on BLM land, and to date, this species has not been identified. BLM lands in the planning area provide limited habitat that could support the Ute ladies'-tresses.

### Maguire Daisy

Maguire daisy is a federally listed threatened plant that occurs in Emery, Garfield, and Wayne counties. The species grows on the sand and rubble weathered from Wingate, Chinle and Navajo Sandstone, and rarely, the Kayenta Formation (Utah Native Plant Society 2004 and Clark and Clark 1999). It is found in slickrock-crevices, on ledges, and in the bottoms of washes, at elevations ranging from 5,248 to 8,200 feet (Clark and Clark 1999). In 1996, the Maguire daisy was downlisted from endangered to threatened based on the discovery of 12 additional populations. Threats to existing Maguire daisy populations are primarily from OHV use and livestock trampling (USFWS 1995d).

## 3.3.8.2 BLM Sensitive Species

Table 3-16 identifies those non-listed special status plant and animal species that are known or thought to occur on public lands administered by the RFO (IM-UT 2003-027). The Utah BLM Sensitive Species list changes periodically and is updated accordingly as species are added to or deleted from the list. Changes to the Utah BLM Sensitive Species list would be incorporated into the RFO RMP as they occur.

## Table 3-16. Utah BLM Sensitive Species

| Common Name | Scientific Name | UDWR Status |
|---|---|---|
| **Mollusks** | | |
| California Floater | *Anodonta californiensis* | Species of Concern |
| Ninemile Pyrg | *Pyrgulopsis nonaria* | Species of Concern |
| Otter Creek Pyrg | *Pyrgulopsis fusca* | Species of Concern |
| Southern Bonneville Pyrg | *Pyrgulopsis transversa* | Species of Concern |
| Carinate Glenwood Pyrg | *Pyrgulopsis inopinata* | Species of Concern |
| Smooth Glenwood Pyrg | *Pyrgulopsis chamberlini* | Species of Concern |
| Black Canyon Pyrg | *Pyrgulopsis plicata* | Species of Concern |
| ***Amphibians*** | | |
| Western (Boreal) Toad | *Bufo boreas* | Species of Concern |
| Great Plains Toad | *Bufo cognatus* | Species of Concern |
| Columbia Spotted Frog | *Rana luteiventris* | Conservation Agreement Species |
| ***Reptiles*** | | |
| Common Chuckwalla | *Sauromalus ater* | Species of Concern |
| Desert Night Lizard | *Xantusia vigilis* | Species of Concern |
| ***Birds*** | | |
| Bald Eagle | *Haliaeetus leucocephalus* | Species of Concern |
| American White Pelican | *Pelecanus erythrorhynchos* | Species of Concern |
| Ferruginous Hawk | *Buteo regalis* | Species of Concern |
| Greater Sage-Grouse | *Centrocercus urophasianus* | Species of Concern |
| Long-Billed Curlew | *Numenius americanus* | Species of Concern |
| Burrowing Owl | *Speotyto cunicularia* | Species of Concern |
| Short-Eared Owl | *Asio flammeus* | Species of Concern |
| Black Swift | *Cypseloides niger* | Species of Concern |
| Lewis's Woodpecker | *Melanerpes lewis* | Species of Concern |
| American Three-Toed Woodpecker | *Picoides dorsalis* | Species of Concern |
| Northern Goshawk | *Accipiter gentilis* | Conservation Agreement Species |
| Grasshopper Sparrow | *Ammodramus savannarum* | Species of Concern |
| ***Mammals*** | | |
| Fringed Myotis | *Myotis thysanodes* | Species of Concern |
| Western Red Bat | *Lasiurus blossevillii* | Species of Concern |
| Spotted Bat | *Euderma maculatum* | Species of Concern |
| Townsend's Big-Eared Bat | *Corynorhinus townsendii* | Species of Concern |
| Allen's Big-Eared Bat | *Idionycteris phyllotis* | Species of Concern |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | Species of Concern |
| Pygmy Rabbit | *Brachylagus idahoensis* | Species of Concern |
| Kit Fox | *Vulpes macrotis* | Species of Concern |
| ***Fish*** | | |
| Bonneville Cutthroat Trout | *Oncorhynchus clarkii utah* | Conservation Agreement Species |
| Colorado River Cutthroat Trout | *Oncorhynchus clarkii pleuriticus* | Conservation Agreement Species |
| Southern Leatherside Chub | *Lepidomeda aliciae* | Species of Concern |
| Roundtail Chub | *Gila robusta* | Conservation Agreement Species |

| Common Name | Scientific Name | UDWR Status |
|---|---|---|
| Bluehead Sucker | *Catostomus discobolus* | Conservation Agreement Species |
| Flannelmouth Sucker | *Catostomus latipinnis* | Conservation Agreement Species |
| ***Plants*** | | |
| Rabbit Valley Gilia, also known as Wonderland Alice-flower | *Gilia cespitosa also known as Aliciella cespitosa* | Conservation Agreement Species[1] |
| Utah Phacelia | *Phacelia utahensis* | |
| Basalt Milkvetch | *Astragalus subcinereus var. basalticus* | |
| Pinnate Spring Parsley | *Cymopterus beckii* | Conservation Agreement Species[1] |
| Creutzfeldt cryptanth | *Cryptantha creutzfeldtii* | |
| Hole-in-the-Rock Prairie-Clover | *Dalea flavescens var. epica* | |
| Cronquist Wild Buckwheat | *Eriogonum corymbosum var. cronquistii* | |
| Smith Wild Buckwheat | *Eriogonum corymbosum var. smithii* | |
| Utah Spurge | *Euphorbia nephradenia* | |
| Cataract Gilia | *Gilia latifolia var imperialis* | |
| Mussentuchit Gilia | *Gilia tenuis*<br>*Also known as Aliciella tenuis* | Conservation Agreement Species[1] |
| Alcove Bog-Orchid | *Habenaria zothecina* | |
| Greenwood's Goldenbush | *Haplopappus lignumviridis* | |
| Claron Pepperplant | *Lepidium montanum var. claronense* | |
| Entrada Rushpink | *Lygodesmia grandiflora var. entrada* | |
| Jones' Indigo Bush | *Psorothamnus polydenius var. jonesii* | |
| Arapien Blazingstar | *Mentzelia argillosa* | |
| Jane's Globemallow | *Sphaeralcea janeae* | |
| Psoralea Globemallow | *Sphaeralcea psoraloides* | |
| Alpine Greenthread | *Thelesperma subnudum var. alpinum also known as Thelesperma windhamii* | |
| Sigurd Townsendia | *Townsendia jonesii var. lutea* | |

Note:

[1]Central Utah Navajo Sandstone Endemics Conservation Agreement for *Aliciella caespitosa* (Rabbit Valley gilia or Wonderland alice-flower), *Aliciella tenuis* (Mussentuchit gilia), *Astragalus harrisonii* (Harrison's milkvetch), *Cymopterus beckii* (Pinnate spring-parsley), *Erigeron maguirei* ( Maguire's Daisy). 2006. Forest Service, Fishlake National Forest; Bureau of Land Management, Utah State Office; National Park Service, Capitol Reef National Park; Fish and Wildlife Service, Utah Field Office.

Unless otherwise noted, the information presented below for non-listed special status plant and animal species comes from the UDWR website (www.wildlife.utah.gov). Additional information on these species can be obtained at this site.

## Mollusks

### California floater *(Anodonta californiensis)*

The California floater has been found in Piute and Otter Creek reservoirs within the RFO planning area. At least 2 other extant occurrences are known in Utah and Millard counties. Known habitat ranges from muddy bottoms with depths of 6 to 10 inches among watercress to creeks 5 to 15 feet wide, up to 18

inches deep, with a bottom of gravel and sand in flowing areas and mud in pools. It is thought that populations of this species may be declining due to pesticides in agricultural run-off, habitat degradation by cattle, and water diversion.

### Ninemile Pyrg *(Pyrgulopsis nonaria)*

The Ninemile pyrg is known to inhabit 2 springs near Ninemile Reservoir in Sanpete County. It is not known to inhabit public land administered by the RFO; however, springs on BLM land may provide habitat for the species. The species is "abundant" in 1 of the 2 springs it inhabits, but actual population size and trends are unknown. The limited occurrence of this species and the vulnerability of its habitat suggest that potential threats to the species are great. Inventories for this species within potential habitat on RFO-administered land would be beneficial.

### Otter Creek Pyrg *(Pyrgulopsis fusca)*

The Otter Creek pyrg is associated with habitats produced by the outflow of springs. Only 3 known populations of this species exist; 1 population is in Piute County and 2 are in Sevier County. None of these populations is on public land administered by the RFO; however, springs on BLM land may provide potential habitat for the species. It is reported to be "common" at 2 of the 3 localities, but due to its limited distribution, its overall population should be regarded as very low. The restricted habitat and distribution of the species suggest that threats to its survival are potentially great. Inventories for this species within potential habitat on RFO-administered land would be beneficial.

### Southern Bonneville Pyrg *(Pyrgulopsis transversa)*

This species is known from 6 springs, all in north-central Utah; 4 of these localities are in Tooele County, 1 is in Utah County, and 1 is in Sanpete County. Although the population in Sanpete County is within the RFO planning area, it is not on BLM-administered land. Despite the relative abundance of this species being reported as "common" to "abundant," its restriction to 6 springs implies a low population. Inventories for this species within potential habitat on RFO-administered land would be beneficial.

### Carinate Glenwood Pyrg *(Pyrgulopsis inopinata)*

There are 2 known populations of this species, both inhabiting springs near Glenwood in Sevier County. Neither population is on public land administered by the RFO; however, springs on BLM land may provide potential habitat for this species. This species is considered "scarce" at one locality, and at the other, it may be hybridizing with another species. Habitat degradation due to recreational use has occurred at these springs. The limited distribution and habitat degradation are threats to this species. Inventories for this species within potential habitat on RFO-administered land would be beneficial.

### Smooth Glenwood Pyrg *(Pyrgulopsis chamberlini)*

There are 2 known populations of this species, both inhabiting springs near Glenwood in Sevier County. Neither population is on public land administered by the RFO; however, springs on BLM land may provide potential habitat for this species. This species was reported as "abundant"; however, because it occurs only in 2 closely associated springs, its overall abundance must be considered very low. The habitat used by this species is highly disturbed from recreational use. The threat to the continued existence of the species is considered high due to its limited distribution and the degradation of its habitat. Inventories for this species within potential habitat on RFO-administered land would be beneficial.

### Black Canyon Pyrg *(Pyrgulopsis plicata)*

The single locality of occurrence for this species is described as a series of small springs emerging from a steep hillside in Black Canyon, East Fork Sevier River, Garfield County, Utah. It is reported as "common" at this locality; however, its overall abundance must be extremely low because it occurs in only one spring complex. This known population is on private land within the RFO planning area. Inventories for this species within potential habitat on RFO-administered land would be beneficial.

## Amphibians

### Western (Boreal) toad *(Bufo boreas)*

Often known as the Western toad, this species is widely scattered throughout the northwestern United States and Canada. It is found throughout much of Utah in a variety of habitats, including slow moving streams, wetlands, desert springs, ponds, lakes, meadows, and woodlands. Many of these habitats are located on lands administered by the RFO.

### Great Plains toad (*Bufo cognatus)*

The Great Plains toad inhabits the central United States, much of Mexico, and limited areas of Canada. In Utah, the Great Plains toad occurs in scattered areas throughout the State, including portions of the RFO planning area, where it prefers desert, grassland, and agricultural habitats. This species breeds in shallow water after rains during spring and summer months. Females lay clutches of approximately 3,000 eggs, which hatch in several days. Adult toads eat insects primarily, whereas tadpoles eat plants, detritus, and algae. In cold winter months, the Great Plains toad burrows underground and becomes inactive. The Great Plains toad is usually light brown with darker brown or brownish-green irregular splotches.

### Columbia spotted frog *(Rana luteiventris)*

This species is on the UDWR Sensitive Species List (UDWR 2003) as a Conservation Species, and a multi-agency conservation agreement was completed in 1998. In Utah, isolated Columbia spotted frog populations exist in the West Desert and along the Wasatch Front. Within these regions, populations are tied to aquatic habitat and perennial sources of water (Bosworth 2003). UDWR has documented populations of Columbia spotted frog in Sanpete, Sevier, Piute, Wayne, and Garfield counties.

Adult frogs eat a wide variety of food items, ranging from insects to snails, whereas tadpoles eat algae, plants, and small aquatic organisms. Typically, breeding sites have little or no current and are surrounded by dense aquatic vegetation. The Columbia spotted frog breeds as early in the spring as winter thaw allows, with eggs hatching in 3–21 days depending on temperature. During cold winter months, spotted frogs burrow in the mud and become inactive.

Populations are vulnerable to the loss and degradation of aquatic habitat. Historically, wetland destruction associated with development, as well as water withdrawal, pollution, livestock use, or competition from non-native species, have contributed to the species' decline (UDWR 2005a, NatureServe 2004).

## Reptiles

### Common chuckwalla *(Sauromalus ater)*

Chuckwallas are large lizards, sometimes exceeding 8 inches in length not including the tail. They occur in the southwestern United States and in parts of Mexico. In Utah, the species occurs only in the southern portion of the State, including areas of Garfield County administered by the RFO. Chuckwallas are predominantly found near cliffs, boulders, or rocky slopes, where they use rocks as basking sites and rock crevices for shelter. Chuckwallas are primarily herbivores, although they also consume insects. Female

chuckwallas lay 1 clutch of 5 to 15 eggs during the summer months. They are most active from spring through fall, remaining inactive in deep rock crevices during the cold of winter. They will also retreat into rock crevices during extreme heat.

### Desert Night Lizard *(Xantusia vigilis)*

The desert night lizard is found in the southwestern United States and in Baja, California. In Utah, it occurs in a few small areas in the southern part of the State. It has been found in Garfield County on lands administered by the RFO. The desert night lizard is rarely seen because it is extremely secretive and spends much of its time under cover. It is a small lizard, only about 1.5 inches long, not including the tail. This species breeds in May and June. Females give birth to live young (usually 1 to 3) in late summer or early fall. The desert night lizard eats a variety of insects and other small invertebrates.

## Birds

### Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle, the national symbol of the United States, was first protected under the Bald Eagle Protection Act of 1940, and then later listed as an endangered species in most of the lower 48 states in 1966 and again in 1973. Since DDT was banned in 1972, the bald eagle has made a remarkable recovery throughout the United States. Its status was changed to threatened in 1995, and the bald eagle was delisted in 2007. Even though they are delisted, bald eagles are still protected by the MBTA and the Bald and Golden Eagle Protection Act. These Acts require some measures to continue to prevent bald eagle "take" resulting from human activities. The bald eagle is found throughout the State of Utah (more often seen in winter than summer). Habitat consists of communal winter roosting habitat and foraging habitat that is located within the RFO. Feeding areas, diurnal perches, and night roosts are fundamental elements of bald eagle winter range. In Utah, eagles nest in mature cottonwoods. Nesting has been documented in Wayne County (UDWR 2003). Wintering habitat exists within Sanpete, Sevier, Piute and Wayne counties. Fish and waterfowl are the primary sources of food for bald eagles, but they will also feed on rabbits, carrion, and small rodents.

### American white pelican (*Pelecanus erythrorhynchos*)

The primary breeding habitat for this species is in the northern part of the State. However, during spring migration, the breeding season, and fall staging and migration periods, American white pelicans can be observed at many reservoirs throughout the State. Fall migration can extend from October through December, and birds typically return to Utah in early March. Within the RFO area, this species can be found on Piute and Otter Creek reservoirs.

The white pelican's primary food is fish, which is often sought in water less than 8.2 feet (2.5 meters) deep. White pelicans are diurnal and nocturnal foragers, and cooperative foraging is often used in shallow water. They forage mainly on "rough fish," which are often small (less than one-half bill length). Nesting in colonies and using cooperative flight and foraging strategies, pelicans are among the most gregarious and social of avian species. They are often observed sleeping, roosting, and sun bathing together. They are monogamous; pair formation occurs after arrival in Utah, typically the last week in March. For the colony as a whole, nest initiation extends over 3 months in Utah. The 2-egg clutch is incubated for 30 days. Nestlings are attended by parents for about 3 weeks; then the young congregate into pods.

### Ferruginous hawk *(Buteo regalis)*

This species is distributed throughout much of Utah, although it is rare and productivity may not be sufficient to maintain the State's populations. Use of nesting substrate varies throughout this species'

range and includes trees, shrubs, cliffs, utility structures, and ground outcrops. Haystacks and abandoned buildings have also been used. Ferruginous hawk density varies regionally and temporally as prey densities vary. Their primary food source is small mammals, such as rabbits and hares, prairie dogs, and pocket gophers. Ferruginous hawk habitat is found in much of the area administered by the RFO. Threats include human disturbance (recreation, mineral development, etc.) and loss of preferred pinyon-juniper woodland habitats. The species is prone to abandon nest sites with low levels of human disturbance.

### Greater sage-grouse *(Centrocercus urophasianus)*

This species inhabits sagebrush plains, foothills, and mountain valleys. Sagebrush is the predominant plant of quality habitat. The largest population of Greater sage-grouse in Utah is found in Wayne County. The species is also distributed throughout Sanpete, Sevier, Piute, and Garfield counties in areas dominated by sagebrush. An understory of grasses and forbs, as well as wet meadow areas, are essential elements of sage-grouse habitat, especially for survival of young chicks. The Greater sage-grouse is an herbivore, and insectivore and is associated with both tall and short sagebrush types. Sage-grouse use the same breeding grounds, or "leks," over several consecutive breeding seasons. Greater sage-grouse are ground nesters and are susceptible to predators and human disturbance, including mineral exploration and development and OHV use. Greater sage-grouse rely entirely on sagebrush for their winter diet and are found in sagebrush habitats during the winter months where the sagebrush remains above the level of the snow, or on windswept ridges where sagebrush is available as both forage and cover. Additional threats to the species include habitat loss, invasive plants, and conversion of large areas from shrub steppe to non-native grasslands (UDWR 2005a, NatureServe 2004).

Several research projects targeting the Greater sage-grouse population in the Parker Mountain area indicate that the population has increased from about 600 birds in 1997 to about 6,000 birds in 2007 (Guttery et al. 2007). The vitality of the Parker Mountain sage-grouse population is evidenced by the fact that this population is one of the few areas in Utah where sufficient numbers of breeding individuals are present to allow a limited annual harvest. (UDWR 2007). Monitoring indicates that the vegetation treatments in the Parker Mountain area provide greater vegetation diversity than untreated or control plots (Guttery et al. 2007). Monitoring in 2007 also discovered that most-sage-grouse pellets were found within fewer than 131 feet (40 meters) of intact sagebrush or treatment areas (Guttery et al. 2007).

### Long-billed Curlew *(Numenius americanus)*

In Utah, this species is a fairly common summer resident and migrant. The curlew lives and breeds in higher and drier meadowlands than many other shorebird species. Uncultivated rangelands and pastures located within the planning area support the majority of breeding populations. Food sources include crustaceans, mollusks, worms, toads, insects, and sometimes berries. According to the UDWR, long-billed curlews have 4 essential nesting habitat requirements: short grass (less than 12 inches [30 cm]), bare ground components, shade, and abundant vertebrate prey.

### Burrowing owl *(Speotyto cunicularia)*

This species prefers open areas within deserts, grasslands, and sagebrush steppe communities. Both primary and secondary breeding habitat exists in Sanpete, Sevier, Piute, Wayne, and Garfield counties. Habitat consists of well-drained, level-to-gently-sloping areas characterized by sparse vegetation and bare ground, such as moderately or heavily grazed pasture. Burrowing owls breed in native prairie as well as in cultivated pasture, hay fields, fallow fields, road and railroad rights-of-way (ROW), and in a number of urban habitats. They are obligate nesters that nest in ground burrows of prairie dogs or other burrowing mammals. Threats to the population include habitat loss, declining prairie dog populations, and pesticides (UDWR 2005a, NatureServe 2004).

### Short-eared owl *(Asio flammeus)*

This is a medium-sized owl that frequently flies during daylight, especially at dusk and dawn, as it forages for rodents. The short-eared owl is usually found in grasslands, shrublands, and other open habitats common in the RFO. It is nomadic, often choosing a new breeding site each year, depending on local rodent densities. The owls nest on the ground in a small depression that is usually lined with a small amount of grass and other plant material. There is some concern that short-eared owl populations are declining in Utah.

### Black swift *(Cypseloides niger)*

The black swift occurs in mountainous regions of the western United States and Canada. Little is known of the historic range of this species. Currently, black swifts occur in 3 widely separated areas, 1 of which is central Colorado through central Utah. They are thought to be extremely rare in Utah, with only 2 confirmed breeding locations. Black swifts are aerial insectivores and feed exclusively on flying insects. They nest is small colonies near and often behind waterfalls. Adults are long lived. Nesting sites are typically surrounded by coniferous forests, often mixed conifer or spruce-fir forests. The preferred habitat for the black swift is limited in the RFO.

### Lewis's woodpecker *(Melanerpes lewis)*

This species ranges from southern British Columbia to its wintering grounds in northwestern Mexico. In Utah, it is primarily found in the central part of the State. The Lewis's woodpecker is a cavity nester, excavating a hole in tall trees that are often dead or blackened by fire. It will also nest in utility poles or stumps but prefers ponderosa pine, cottonwood, or sycamore, all of which are found within the RFO. The diet of this woodpecker consists of insects, nuts, and berries depending on the time of the year. Areas with a good understory of grasses and shrubs to support insect prey populations are preferred.

### American three-toed woodpecker *(Picoides dorsalis)*

This species of woodpecker extends from Canada through Utah and into New Mexico. It is found in Engelmann spruce, subalpine fir, Douglas fir, ponderosa pine, tamarack, aspen, and lodgepole pine forests. This woodpecker tends to stay in its territory year-round, although insect outbreaks, such as spruce bark beetle infestations, may cause irregular movements. Habitat of the American three-toed woodpecker is found in the higher elevations of the RFO.

### Northern goshawk *(Accipiter gentilis)*

The northern goshawk is found in much of the northern hemisphere. It is a permanent resident in Utah, but is not common in the State. The hawk prefers mature mountain forest and riparian zone habitats, both of which are found in the planning area. Nests are constructed in trees in mature forests. The northern goshawk often nests in the previously used nests of northern goshawks or other bird species. This species cruises low through forested areas and also perches to hunt prey. Major prey includes rabbits, hares, squirrels, and birds.

### Grasshopper sparrow *(Ammodramus savannarum)*

This species of sparrow is a grasslands bird; therefore, potential habitat is limited in the RFO. In Utah, breeding populations have been found only in the northern parts of the State. Nests are built of grass on the ground at the base of grass clumps. As its name implies, this species' primary diet is grasshoppers.

## Mammals

### Fringed myotis *(Myotis thysanodes)*

This small bat is found in much of the western United States. It is widely distributed throughout Utah but is not very common in the State. The fringed myotis commonly inhabits caves, mines, and buildings, most often in desert and woodland areas, which are common in the RFO. Beetles are the major prey for this species.

### Western red bat *(Lasiurus blossevilli)*

The Western red bat is found in the western United States. It is extremely rare in Utah and is known to inhabit only a few locations in the State. As a result, it is included on the UDWR Sensitive Species List. This species of bat is normally found near water, often in wooded areas. While some individuals hibernate during cold times, most will migrate south to warmer climates for the winter. The species is nocturnal. It feeds on insects, often foraging near riparian areas.

### Spotted bat *(Euderma maculatum)*

This species occurs throughout much of the western United States. It is found statewide in Utah, but has probably never been abundant in any particular location. The spotted bat may be found in a variety of habitats, ranging from deserts to forested mountains. It roosts and hibernates in caves and rock crevices. These types of habitats are scattered throughout the RFO. Spotted bats eat insects, primarily moths, which are captured in flight. Current data suggest that populations of this species may be declining in Utah. Consequently, the spotted bat is now included on the UDWR Sensitive Species List.

### Townsend's big-eared bat *(Corynorhinus stownsendii)*

This species occurs in western North America from southwestern Canada to Mexico. In Utah, it occurs statewide at elevations below 9,000 feet. Townsend's big-eared bat can be found in many types of habitat, but is often found near forested areas. Caves, mines, and buildings are used for day roosting and winter hibernation. The species is nocturnal, and individuals typically do not leave their roosts until well after sunset. This species is thought to be declining in population in Utah due to human disturbances of caves and the closings of abandoned mines.

### Allen's big-eared bat *(Idionycteris phyllotis)*

Allen's big-eared bat is one of the most poorly known bat species in North America. It was not known to inhabit Utah until 1969. It is known to occur only in the southern portion of the State. Because of its rarity, this species is included on the UDWR Utah Sensitive Species List. Preferred habitats include rocky and riparian areas in woodland and scrubland regions. Allen's big-eared bat is an insectivore, eating insects captured in flight or plucked from vegetation. It is nocturnal, roosting in caves or rock crevices during the day.

### Big free-tailed bat *(Nyctinomops macrotis)*

This species is found in the western United States. It is rare in Utah, occurring primarily in the southern half of the State. The big free-tailed bat prefers rocky and woodland habitats. Roosting occurs in caves, mines, old buildings, and rock crevices. It is typically active year-round, migrating to warmer areas in the south during the winter months. This species eats insects, primarily moths.

### Pygmy rabbit *(Brachylagus idahoensis)*

This species can be found throughout Utah, including within the RFO. The pygmy rabbit habitat in the RFO is limited to 1 percent of the planning area. The species prefers areas with tall, dense sagebrush and loose soils. Pygmy rabbits occur in isolated patches because of their specific life history requirements. Their habitat consists of deep soils and tall, dense sagebrush and high shrub cover. Pygmy rabbits are active throughout the year and are most often above ground near dawn and dusk. Inactive periods are spent in underground burrows. Pygmy rabbits depend on sagebrush for their winter diets and during summer shift to more grasses and forbs. Declines in population are related to the degradation or loss of sagebrush steppe habitat. If actions were proposed in pygmy rabbit habitat, site-specific National Environmental Policy Act (NEPA) provisions would be needed to address restrictions (e.g., avoidance or mitigation) around pygmy rabbit habitat.

### Kit fox *(Vulpes macrotis)*

The kit fox is the smallest canid in North America. It is found exclusively in arid and semi-arid landscapes and occupies habitats that provide favorable combinations of low predator abundance, sufficient prey, and soils suitable for denning. The kit fox is one of the few canids in the world to use year-round dens which provide protection from predators, aid in thermoregulation, and reduce water loss. The kit fox opportunistically eats small mammals (primarily rabbits and hares), small birds, invertebrates, and plant matter. It is capable of meeting all its water requirements metabolically without the need for drinking water. The fox is primarily nocturnal. It mates in late winter, with 4 to 7 pups being born about 2 months later.

There are many threats to the kit fox in Utah. Invasive weeds affect their prey base by decreasing small mammal diversity and abundance. To compensate for a reduced prey base, kit fox home ranges become larger, fecundity declines, and dispersing young are required to travel further making them more vulnerable to predators. Water developments for game and livestock effectively decrease the amount of arid lands suitable only for kit fox occupation. Increased year-round availability of water in the most arid areas of Utah serves to extend the distribution of coyotes and red fox, which prey upon kit fox, into areas previously too arid to support them. Competitive interactions with larger canids, especially when populations are already depressed, can have major effects on kit fox populations.

## Fish

### Bonneville cutthroat trout *(Oncorhynchus clarki utah)*

The Bonneville cutthroat trout is a subspecies of the cutthroat trout native to the Bonneville Basin of Utah, Wyoming, Idaho, and Nevada. Pure Bonneville cutthroat trout are rare throughout their historic habitat, but several populations exist in Utah, including within the RFO. Major threats to this species include habitat loss/alterations, predation by and competition with non-native fishes, and hybridization with non-native fishes, such as the rainbow trout. This species feeds primarily on insects, but large individuals also eat fishes. It can be found in a variety of habitats ranging from high-elevation mountain streams and lakes to low-elevation grassland streams. In all of these habitat types, the Bonneville cutthroat trout requires a functioning stream riparian zone that provides structure, cover, shade, and bank stability.

### Colorado River cutthroat trout *(Oncorhynchus clarki pleuriticus)*

This species is a race, or subspecies, of the cutthroat trout that is native to the upper Colorado River drainage of Utah, Wyoming, Colorado, Arizona, and New Mexico. This subspecies is restricted to the upper Colorado River drainage and occurs in headwater streams and mountain lakes of the Uinta, La Sal,

and Abajo Mountains; the Tavaputs Plateau; and the Escalante and Fremont River drainages (Bosworth 2003). UDWR has documented cutthroat trout populations within Sevier, Wayne, and Garfield counties within the planning area (UDWR 2005a).

The Colorado River cutthroat trout eats primarily invertebrates, but adults also eat small fishes. Like other cutthroat trout, the subspecies spawns in streams over gravel substrate in the spring. The cool, clear water of high-elevation streams and lakes is the preferred habitat for Colorado River cutthroat trout (Bosworth 2003).

Threats to the species include land and water use activities such as grazing, mining, and the construction of water impoundments, as well as the introduction of non-native fish. In addition, fragmentation of metapopulations, which affects gene flow and seasonal movements, is thought to be an especially important factor in population declines (Bosworth 2003). UDWR is currently working to restore pure Colorado River cutthroat trout to historic areas in Utah. Since 1999, large numbers of Colorado River cutthroat trout have been raised in hatcheries and then released into lakes in the Uinta Mountains in the northeastern part of the State.

#### Southern leatherside chub *(Lepidomeda aliciae)*

Recent genetic evidence shows that the leatherside chub, *Gilia copei*, separated into two distinct species—the northern leatherside chub, *Lepidomeda copei*, and the southern leatherside chub, *Lepidomeda aliciae,* whose range includes portions of the RFO. The leatherside chub is a small minnow native to streams and rivers of the southwestern portion of the Bonneville Basin. It was once common throughout its native range but presently is listed as a State sensitive species due to substantial decreases in population levels.

#### Roundtail chub *(Gilia robusta)*

This species is a fairly large minnow native to the Colorado River system of the western United States. It prefers large rivers and is most often found in murky pools near strong currents in the main-stem Colorado River and tributaries. Locally common in places, the roundtail chub has been reduced in numbers and distribution due to flow alteration and the introduction of exotic fishes. It eats terrestrial and aquatic insects, mollusks, and other invertebrates, fishes, and algae.

#### Bluehead sucker *(Catostomus discobolus)*

The bluehead sucker is native to parts of Utah, Idaho, Arizona, New Mexico, and Wyoming. Specifically, the species occurs in the upper Colorado River system, the Snake River system, and the Lake Bonneville Basin. In Utah, bluehead suckers have been reduced in numbers and distribution due to stream flow alteration, habitat loss/alteration, and the introduction of non-native fishes. It is a benthic (bottom dwelling) species with a mouth modified to scrape algae from the surface of rocks. Fast-flowing water in high gradient reaches of mountain rivers has been identified as important habitat for this species.

#### Flannelmouth sucker *(Catostomus latipinnis)*

This species is native to the Colorado River system of the western United States and northern Mexico. In Utah, the species occurs in the main-stem Colorado River and in many of the Colorado's large tributaries. Flannelmouth suckers are usually absent from impoundments. The species prefers large rivers, where it is often found in deep pools of slow-flowing, low-gradient reaches. The sucker is a benthic (bottom dwelling) fish that eats primarily algae. Invertebrates and many types of plant matter are also consumed. Utah flannelmouth sucker populations have recently been reduced in numbers and distribution, primarily due to flow alteration, habitat loss/alteration, and the introduction of non-native fishes.

## Plants

### Rabbit Valley gilia *(Gilia cespitosa or Alicella cespitosa)*

Rabbit Valley gilia (also known as Wonderland Alice-flower) is a federal candidate for listing under the ESA and occurs in Wayne County. Rabbit Valley gilia is primarily associated with Navajo Sandstone and to a lesser extent, the Kayenta and Wingate Formations. Growing in sand-filled crevices, sand pockets, and on detrital slopes, it is found in open pinyon-juniper woodlands, often mixed with mountain brush, sagebrush, or ponderosa pine, at elevations ranging from 5,198 to 8,997 feet (Clark and Clark 1999). Rabbit Valley gilia is known from 15 populations scattered over a distance of about 19 miles near the Fremont River from the northern portion of the Waterpocket Fold westward to Rabbit Valley in Wayne County, an area locally known as Wayne Wonderland. Threats to the population include plant collection and trampling associated with recreation and livestock grazing (NatureServe 2004).

### Utah phacelia *(Phacelia utahensis)*

This central Utah endemic species occurs in portions of Sanpete and Sevier counties. It is found on often-precipitous, barren slopes of the Arapien Shale Formation. The plant grows in desert shrub and pinyon-juniper woodland communities. Alder-leaf mountain mahogany, shadscale, and Utah greasebush communities are also known to contain populations. The plant grows at elevations ranging from 5,500 to 6,200 feet. Evidence of gypsum mining has been observed over much of the habitat, and the plants were never observed occupying disturbed locations. Livestock grazing and off-highway vehicle use are present, but due to the often steep habitat, are not a concern at all locations. The recent discovery of oil in the Sevier Valley may add another potential impact to this plant's habitat (Utah Native Plant Society 2007, UDWR 2005d).

### Basalt (or Silver) milkvetch *(Astragalus subcinereus var. basalticus)*

The basalt milkvetch is found in eastern Sevier and western Garfield and Emery counties in Utah. It prefers pinyon-juniper woodland and ponderosa pine communities on igneous gravels between 4,500 and 8,000 feet in elevation (Utah Native Plant Society 2007).

### Pinnate spring parsley *(Cymopterus beckii)*

This species is found in pinyon-juniper woodland, mountain brush, ponderosa pine/Manzanita, conifer/oak, and Douglas fir communities in sandy or stony soils. It is often found in rock crevices and near cliff bases on north and east exposures between 5,600 and 7,500 feet in elevation. It is endemic to San Juan and Wayne counties in Utah and Navajo Tribal Lands in Arizona (Utah Native Plant Society 2007).

### Creutzfeldt cryptanth (Cryptantha creutzfeldtii)

This species is endemic to central Utah in Carbon, Emery, and Sevier counties. It inhabits shadscale and mat *Atriplex* communities on the Mancos shale formation between 5,250 and 6,500 feet. It flowers from late April through June (Utah Native Plant Society 2007).

### Hole-in-the-Rock prairie-clover *(Dalea flavescens var. epica)*

This species is endemic to Utah in Carbon, Emery, Garfield, Kane, San Juan, and Wayne counties. It grows on sandstone bedrock and sandy areas in blackbrush and mixed desert shrub communities between 4,700 and 5,000 feet in elevation (Utah Native Plant Society 2007).

### Cronquist wild buckwheat *(Eriogonium corymbosum var. cronquistii)*

Cronquist wild buckwheat is endemic to the Henry Mountains in Garfield and Wayne counties in Utah. It is found almost entirely on public lands administered by the BLM RFO. The species prefers pinyon, *Holodiscus*, rabbitbrush, mountain brush, and rock-spirea communities. It occurs on steep talus slopes between 8,800 and 8,900 feet in elevation (Utah Native Plant Society 2007).

### Smith (or Flat Tops) wild buckwheat *(Eriogonum corymbosum var. smithii)*

This species is located in the San Rafael Desert portion of Emery and Wayne counties in Utah. It is endemic to the Colorado Plateau. The plant is a perennial shrub with bright yellow flowers and shiny green leaves. It is found in purple sage, matchweed, Ephedra-Indian rice grass, desert shrub, and rabbitbrush communities on the Entrada Formation and on stabilized sand dunes between 4,500 and 5,600 feet in elevation. Livestock currently graze in the habitat of this species but do not appear to be a threat to the plant. The potential also exists for oil and gas related activity to occur within the habitat of this species (Utah Native Plant Society 2007; UDWR 2007).

### Utah spurge *(Euphorbia nephradenia)*

Endemic to the Colorado Plateau, the Utah spurge is found in Emery, Garfield, Kane, and Wayne counties. It is found in mat saltbush, blackbrush, Ephedra, mixed sandy desert shrub, and grassland communities on dark clay hills, blown sand, and stabilized dunes mainly on Tropic Shale and Entrada Formations between 3,800 and 4,800 feet in elevation (Utah Native Plant Society 2007).

### Cataract gilia *(Gilia latifolia var. imperialis)*

Cataract gilia is endemic to Emery, Garfield, Grand, Kane, San Juan, and Wayne counties, Utah. It is found in shadscale and other mixed desert shrub communities, especially in wash bottoms and at the bases of ledges between 3,800 and 5,200 feet in elevation (Utah Native Plant Society 2007).

### Mussentuchit gilia *(Gilia tenuis)*

This species is known from 7 locations in Emery and Sevier counties (NatureServe 2004 and Utah Native Plant Society 2004). The species is restricted to a discontinuous stretch of habitat of sandstone outcrops and sandy slopes in association with mountain brush, pinyon-juniper woodlands, and cushion plants (NatureServe 2004). Often Mussentuchit gilia is located on material derived from the Curtis Formation and the Dakota and Navajo sandstones, between 5,198 and 7,117 feet in elevation (Welsh *et al*. 1993 and Utah Native Plant Society 2004). The number of plants is not recorded for the population located within the planning area, and no threats have been identified to either the populations or habitat (UNHP 2004, NatureServe 2004).

### Alcove bog-orchid *(Habenaria zothecina)*

Alcove bog-orchid is located in Emery, Garfield, Grand, San Juan, and Uintah counties in Utah and in Arizona and Colorado. It is found in seeps, hanging gardens, and moist stream banks in mixed desert shrub, pinyon-juniper woodland, and oak brush communities between 4,000 and 6,200 feet in elevation (Utah Native Plant Society 2007).

### Greenwood's goldenbush *(Haplopappus lignumviridis)*

The habitat of this very rare species is restricted to riparian areas with willows, nettles, and *Conyza* in Sevier County, Utah. It is found at about 6,200 feet in elevation (Utah Native Plant Society 2007).

**Claron pepperplant *(Lepidium montanum var. claronense)***

The Claron pepperplant is endemic to the Paunsaugunt and Table Cliff Plateau in Garfield, Kane, and Piute counties in Utah. It is restricted to sagebrush, pinyon-juniper woodland communities, and ponderosa pine/bristlecone pine communities on the Claron member of the Wasatch Limestone Formation and other fine textured substrates between 6,400 and 8,000 feet in elevation (Utah Native Plant Society 2007).

**Entrada pinkrush (Lygodesmia grandiflora var. entrada)**

This species is endemic to Emery, Grand, and San Juan counties with potential habitat within the RFO area. It occurs in mixed desert shrub and juniper communities between 4,400 and 4,800 feet in elevation and flowers in June (Utah Native Plant Society 2007).

**Arapien blazingstar (*Mentzelia argillosa*)**

The Arapien blazingstar is a rare plant endemic to the Arapien shale in Sevier and Sanpete counties. It occurs at elevations ranging from about 5,600 to 6,300 feet. It is sympatric with *Phacelia utahensis* and *Townsendia jonesii* var. *lutea*, both BLM sensitive species.

**Jones' indigo-bush (*Psorothamnus polydenius jonesii)***

This species is endemic to Emery, Grand, and Wayne counties. It inhabits shadscale, mat-saltbush, Ephedra, and galleta communities on the Mancos shale formation (Blue Gate and Tununk members) and less commonly sandy terrace gravels. It occurs at elevations ranging from 4,200 to 4,900 feet and flowers late May–July (Utah Native Plant Society 2007).

**Jane's globemallow *(Sphaeralcea janeae)***

This rare species is endemic to Wayne and San Juan counties in Utah. It prefers warm and salt desert shrub communities on the White Rim and Organ Rock members of the Cutler Formation between 4,000 and 4,600 feet in elevation (Utah Native Plant Society 2007).

**Psoralea globemallow *(Sphaeralcea psoraloides)***

This species is endemic to the Colorado Plateau and is found on the southeastern footslopes of the San Rafael Swell in Wayne and Emery counties, Utah. It is typically found in *Zuckia-Ephedra*, shadscale, *Eriogonum*, *Lepidium*, and pinyon-juniper woodland communities. Soil types on which the psoralea globemallow is found include saline and gypsiferous Mancos Shale, Buckhorn Conglomerate, Curtis sandstone, Entrada siltstone, Carmel, and Kaibab Limestone between 4,000 and 6,300 feet in elevation. Researchers visiting populations of this species have noted OHV use, grazing, recreation, exotic weed encroachment, mining, and urbanization occurring within the habitat. However, the species appears to be stable at this time (Utah Native Plant Society 2007, UDWR 2005d).

**Alpine greenthread *(Thelesperma subnudum var. alpinum also known as Thelesperma windhamii)***

The alpine greenthread is a rare species endemic to portions of Wayne County, Utah. It occurs in pinyon-juniper communities, mountain brush, and western bristlecone pine communities. The plant grows in sandy soil pockets, cracks of slickrock, and on ledges and clay flats on Carmel Limestone and Navajo Sandstone between 6,000 and 8,000 feet in elevation. The known populations of this species are fairly isolated (Utah Native Plant Society 2007; UDWR 2005d).

### Sigurd townsendia *(Townsendia jonesii var. lutea)*

This very rare species is found in Juab, Piute, Sanpete, and Sevier counties in Utah. Its habitat is salt desert, mixed desert shrub, and juniper-sagebrush communities on Arapien shale and clays in volcanic rubble at 3,500 to 6,300 feet elevation (Utah Native Plant Society 2007).

## 3.3.9 Fish and Wildlife

The BLM manages public lands to provide habitat for fish and wildlife. The diverse ecosystems and mosaic landscapes of the lands managed by the RFO provide habitat for more than 600 species of fish and wildlife. Fish and wildlife habitat are managed according to principles outlined by *Utah Fish and Wildlife 2000* (BLM 1993b). The BLM implements this general guidance through specific management actions associated with species located in the public lands managed by the RFO.

The BLM manages wildlife habitat, and the UDWR manages wildlife populations. To the extent practicable, the BLM collaborates with UDWR to achieve the habitat management goals and objectives of the various UDWR Wildlife Management Unit Plans, as well as species-specific management plans, by providing appropriate quantities and quality of habitats on public lands, consistent with the principles of multiple-use management. These habitats reflect the influence of various past and ongoing human activities and disturbances, resulting in significant increases in some species populations, declines in others, and the modification of large blocks of habitat. The habitats and the wildlife species that rely on them rarely exist solely on BLM lands and often extend across administrative boundaries to other federal, state, and private lands.

Fish and wildlife species can be broadly defined in 2 management categories that reflect preferences in public interest. Some species, commonly called game species, are economically important for hunting, fishing, and wildlife viewing opportunities. Others that do not have direct economic importance for hunting and fishing are referred to as non-game species. Both categories have economic importance that varies locally and nationally. Species not specifically discussed in this plan are also important and contribute to the diversity and health of plant and animal communities on public land. Many species fill ecological roles that are important but not fully understood.

### 3.3.9.1 Fish and Fisheries Habitat

Fisheries habitat includes perennial and intermittent streams and flat water (e.g., lakes and reservoirs) that support fish through at least a portion of the year. The condition of fisheries habitat is related to riparian habitat and stream channel characteristics. Riparian vegetation moderates water temperatures and provides bank structures that reduce erosion and provide overhead vegetation cover for fish. Intact riparian communities also serve to slow overland flow, capture sediments, and provide a filter that enhances water quality. Water quality, especially factors such as sediment, temperature, and dissolved oxygen, also greatly affects fisheries habitat.

Streams and lakes in the RFO provide habitat for at least 30 species of warm- and cool-to cold-water fish species, with 18 of these considered game fish (Sigler and Sigler 1996). Past stocking efforts have established many non-native fish species in streams, lakes, and reservoirs. Aquatic invertebrates and amphibians are integral components of all fish communities.

The factors limiting or affecting fish habitat in the RFO include excess siltation, elevated water temperatures, stream dewatering, riparian areas in less than PFC, livestock impacts, and past mining practices. Factors limiting or affecting native fish production include competition and predation from non-native species, stream dewatering, hybridization, fish loss through irrigation diversions, excess siltation, and isolation of populations.

### 3.3.9.2 Wildlife and Wildlife Habitat

Wildlife habitat can be segregated into 7 types: desert shrub, sagebrush steppe, pinyon-juniper woodland, forested, riparian/wetland, aspen, and non-vegetated (cliff talus). These habitat types are used as a basis

for describing existing conditions, focusing on a broader scale approach as opposed to single-species management.

Livestock grazing, fire suppression, development patterns, natural conditions, and introduced plant species have influenced the condition of the habitats. When management focuses on habitat condition and composition rather than on individual species, a more ecological effect is achieved on wildlife species than when focused on an individual species. Disturbances enhance habitat for some species but limit opportunities for others. Generally, disturbances promote use by mobile species or species that tolerate a broad range of habitat conditions. The availability of habitat may vary during the year as a result of elevation, aspect, and proximity of disturbance. Habitat use is also limited by wildlife species' different levels of social tolerance and by learned or inherent behavior. These factors may limit movement of wildlife species into new habitats even if the habitat appears suitable for the species' needs.

Wildlife habitat needs vary significantly by species. It is generally true that healthy and sustainable wildlife populations can be supported where there is a diverse mix of vegetation communities to supply structure, forage, cover, and other specific habitat requirements.

### Desert Shrub

Desert shrub includes numerous upland vegetation communities with a shrubland component and a variable understory of grass and forbs. Desert shrub contains a large number of reptile species. A variety of other wildlife occupies salt desert habitats. Herbaceous plants are vital to the majority of all wildlife species because they provide food, cover, and structure. Shrub cover helps wildlife survive the rigors of summer heat and winter cold. It supplies browse, seeds, and cover for birds and small and large mammals. Intermingled areas of desert grasslands add diversity to vegetation and habitat structure in desert shrub communities.

### Sagebrush Steppe

Sagebrush habitat is prevalent in the western and central portions of the RFO. At mid to lower elevations, Wyoming big sagebrush is the dominant vegetation type, providing important winter habitat for highly mobile wildlife species (e.g., mule deer, pronghorn, and Greater sage-grouse) and localized yearlong habitat for sagebrush-obligate species (e.g., pygmy rabbit). Sagebrush also provides crucial breeding, nesting, and brood-rearing habitat for these species. Intermingled occurrences of grasslands and several low sages add to the diversity of vegetation and habitat structure. Sagebrush-obligate species are restricted to sagebrush habitats during the breeding season or year round, and near-obligate species occur in both sagebrush and grassland habitats. As a consequence of the regional losses of sagebrush communities and the number of sagebrush-obligate wildlife, maintenance and improvement of existing sagebrush habitat are crucial for community structure and diversity and for providing critical habitat for obligate species.

### Pinyon-Juniper Woodlands

Pinyon-juniper woodlands are widely dispersed and have expanded into sagebrush and other vegetation communities. Pinyon-juniper woodlands provide some wildlife habitat. Although understory vegetation is reduced beneath pinyon-juniper stands, pinyon-juniper woodlands provide greater structural diversity than desert shrub or sagebrush steppe shrubland habitats.

### Forested Areas

Coniferous habitats are a small but important habitat component within the RFO and are primarily located along national forest boundaries and in the Henry Mountains. Forested habitats, which provide security areas (e.g., hiding cover) for big game species, can provide important linkage corridors for wildlife movement between other seasonal habitats.

### Riparian Ecosystems

Riparian habitats are crucial components in the landscape. They serve as important use areas for wildlife in providing various life-cycle requirements such as foraging, nesting, roosting, and hiding cover, as well as travel corridors for numerous highly mobile species. Usually a high degree of plant diversity occurs along riparian corridors, exhibiting variable density and composition, allowing both openness and ground cover. Invasive species, such as tamarisk, are degrading the health of riparian systems, shifting the systems to a vegetation monoculture.

### Aspen

Aspen stands provide habitat for many wildlife species. Many predaceous birds are adapted to aspen forest and the adjacent open brush, meadows, and grasslands. Aspen ecosystems provide cover, calving, and fawning habitat for big game, and nesting habitat for migratory birds.

### Non-Vegetated (Cliff Talus)

Talus slopes are accumulations of angular rock debris at the bases of cliffs or steep slopes. Talus provides wildlife species with basking sites and crevices for hiding. Slopes with large boulders provide caves that may be large enough for a species such as bobcat to occupy. Cliffs are faces of vertical exposed rock that sometimes have a talus slope at their base. Several raptor species and non-perching birds, such as black swifts, use cliff and talus areas for nesting and brood-rearing habitat. Prairie falcons generally nest on rock outcrops and cliffs that range from 30 to 400 feet high. Canyon and rock wrens nest in the fractured talus slope below cliff faces, particularly in areas interspersed with open, patchy forests of ponderosa pine, Douglas fir, and sagebrush steppe communities.

## 3.3.9.3 Wildlife Species of Interest

Wildlife species of interest include big game animals, raptors, upland game birds, and other species. Big game populations are managed cooperatively by the BLM and UDWR based on habitat condition, long-term vegetative trends, annual monitoring of wildlife utilization levels, and the desired age class of animals produced in each Wildlife Management Unit. UDWR establishes Wildlife Management Unit boundaries to encompass the seasonal habitat requirements of large, free-roaming wildlife species, and they are frequently bounded by such physical features as ridgetops or drainages, or artificial features such as major roads or highways. Boundaries of Wildlife Management Units rarely match the administrative boundary of the RFO.

Seasonal habitats are mapped in the GIS and represent an outside perimeter within which a particular seasonal use could be expected to occur by a particular species. However, the mapping is not precise because distribution varies annually as a result of weather, forage availability, and population size and distribution. Some areas do not lend themselves to a particular use as a result of topography, different vegetation, or disturbances that are too small to map on a broad scale (e.g., north slopes on winter ranges, forested patches in sagebrush). The RFO includes all or portions of the following UDWR Wildlife Management Units—

- Beaver
- Central Mountains, Manti South
- Fillmore
- Henry Mountains
- Monroe
- Mount Dutton
- Plateau Boulder
- Plateau Fishlake
- Plateau Thousand Lake

- San Rafael.

## Game Wildlife Species

Crucial habitats for big game species are included within the RFO (Maps 3-5, 3-6, and 3-7). Crucial-value habitat is any range or habitat component that directly limits a community from reproducing or maintaining a certain population level over the long term. Moderate-value and low-value habitat is abundant in the planning area, and includes any particular habitat that is common or of intermediate importance. Wildlife may be displaced due to development activities in these habitats.

### Bison

The Henry Mountains are the habitat of the only free-roaming and huntable herd of American bison on public land in the 48 contiguous United States. The herd was transplanted to the San Rafael Desert in the 1940s and migrated into the Henry Mountains in the 1960s (Map 3-5). Bison are grazers, feeding mainly on grasses and other vegetation. Although bison typically give birth in spring, young may be born as late as midsummer. An annual hunt is held to maintain a harvest population of about 275 animals. Conflicts with livestock and bison grazing occur on allotments where both are present. Drought increases the potential for conflict between livestock and bison.

### Bighorn Sheep

Desert bighorn sheep are found in the Dirty Devil portion of the San Rafael Wildlife Management Unit. Desert bighorn sheep are considered to be yearlong residents of their range—they do not have seasonal ranges like mule deer and elk (Map 3-5). Bighorn sheep prefer very open vegetation types, such as low shrub, grassland, and other treeless types typically associated with steep talus and rubble slopes. Bighorn sheep diets comprise a variety of shrubs, forbs, and grasses. Bighorn sheep lambing occurs on steep talus slopes, typically within 1 to 2 miles of reliable water sources.

Bighorn sheep are extremely vulnerable to a variety of viral and bacterial diseases carried by livestock, principally by domestic sheep. In some cases reported in the literature, exposures to some of these diseases have resulted in the decimation of entire bighorn populations. The diseases are transmitted in numerous ways, including nose-to-nose contact and wet soils associated with areas of concentrated use, such as stock watering ponds. The BLM has adopted guidelines for domestic sheep grazing in or near bighorn sheep habitat to prevent the spread of disease.

Management of bighorn sheep is guided by 3 herd management plans and guidelines: The *Utah BLM Statewide Desert Bighorn Sheep Management Plan* (BLM 1986), *Revised Guidelines for Domestic Sheep and Goat Management in Native Wild Sheep Habitats* (BLM 1998a), and the *Utah Bighorn Sheep Statewide Management Plan* (UDWR 1999). Additional guidance is found in the *Henry Mountains Desert Bighorn Sheep Habitat Management Plan* (BLM 1990a).

### Pronghorn

There are 5 Wildlife Management Units that contain pronghorn habitat within the planning area (San Rafael, Henry Mountains, Plateau, Monroe, and a portion of Mt. Dutton). Pronghorn prefer very open vegetative habitat types, such as salt desert shrub, grassland, and other treeless types. Typically, pronghorn avoid slopes greater than 20 percent. Pronghorn fawning occurs throughout the range of the species (Map 3-5). Pronghorn diets comprise a variety of forbs, shrubs, and grasses. Forbs are of particular importance during spring and summer, and shrubs are more important during the winter.

### Mule Deer

There are 6 mule deer Wildlife Management Units that occur in the planning area. Mule deer are migratory, moving seasonally between summer and winter ranges (Map 3-6). Mule deer usually summer at high elevations and winter at low elevations. Their diet consists largely of sagebrush, primarily

Wyoming sagebrush. Shrubs such as true mountain mahogany, fourwing saltbush, and antelope bitterbrush are important winter forage species. Mule deer fawn during the spring on their migration back to their summer range.

Mule deer have a high degree of fidelity to specific winter ranges, where high population densities concentrate on relatively small areas. Because of the relatively small winter range area, high population densities, and the natural stress of winter survival, mule deer are vulnerable to stress caused by human activity in winter range areas, such as antler hunting and other recreational activities. Mule deer are displaced an average of 600 feet from areas of human activity.

### Elk

The planning area includes portions of 4 elk Wildlife Management Units: Plateau, Monroe, Beaver, and Mt. Dutton (Map 3-7). Elk are migratory, moving seasonally between summer and winter ranges. They summer at higher elevation ranges in aspen and forested habitats, where their diet consists primarily of grasses and forbs. Elk calve during late spring and early summer in aspen-mountain browse, intermixed vegetation types. Elk winter at mid-to-lower elevation ranges, occupying the sagebrush and woodland habitat types and congregating in herds of 50 to 200 or more. Human activity in elk winter range intensifies the natural stress of winter survival.

### Black Bear

Black bear is currently the only bear species inhabiting Utah. Black bears are native to Utah and are fairly common. In the planning area, black bears are present in Wayne and Garfield counties, where they can be found primarily in large forested areas.

### Cougar

Cougar, or mountain lions, are found statewide in Utah, occupying habitat types ranging from rugged desert areas to above the timberline. The species is fairly common throughout Utah, but individuals are rarely seen because of their secretive nature. Seasonally, their movements follow their main prey: mule deer. Cougar will also feed on rabbits, elk, or other animals, but about 80 percent of their diet consists of deer. Cougars are active year-round, during day and night, although most activity occurs at dawn and dusk. They are hunted on a limited and closely monitored basis in Utah.

### Furbearers

Several furbearer species are found in the planning area. Furbearers, as defined by UDWR, include bobcats, raccoons, badgers, weasels, red fox, and beavers. Red fox are found throughout the planning area, and numbers are relatively high. Bobcats are fairly common in Utah; however, they are rarely seen due to their secretive nature.

### Upland Game Birds

The lands managed by the RFO provide important migration, nesting, and winter habitats for upland game birds. Upland species include Greater sage-grouse, blue grouse, pheasants, and quail. (Greater sage-grouse are discussed in more detail in Section 3.1.1, Special Status Species.) Upland species feed frequently on upland grasses and forbs in grassy fields and meadows, where such vegetation is succulent and sufficiently open to enable rapid flight and avoidance of harboring predators. Such habitats support upland game birds year round.

### Other Non-game Species

Information on small mammals, bats, reptiles, and amphibians is lacking. Databases maintained by the Utah Natural Heritage Program document general occurrences and potential for many of these groups of wildlife, but site-specific inventories have not been conducted for most of the RFO. However, as

inventories are conducted, new occurrences and range extensions are being discovered, which emphasizes the need for more comprehensive work.

### 3.3.9.4 Migratory Birds

Migratory birds have been protected by treaty (with Great Britain) since 1916 and by law under the MBTA since 1918. In EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, signed by President Clinton in 2001, federal agencies were directed to "design migratory bird habitat and population conservation principles, measures, and practices into agency plans and planning processes…." Bird Habitat Conservation Areas (BHCA) were identified in an effort to focus cooperative migratory bird habitat enhancement or restoration efforts in these important areas. The BHCAs are not special designations and do not require additional regulation. In the *Coordinated Implementation Plan for Bird Conservation in Utah* (IWJV 2005), 3 BHCAs were identified on lands managed by the RFO:

- **BHCA 30:** Sevier Bridge/Chicken Creek Reservoirs—open water with large marsh areas
- **BHCA 43:** Parker Mountain—sagebrush-steppe habitat
- **BHCA 51:** Henry Mountains (north of Mount Ellen)—mountain riparian habitat.

Neotropical migratory birds are found in all habitats within the planning area (Parrish *et al.* 2002). These birds include a diverse array of species, such as hummingbirds, finches, flycatchers, warblers, thrushes, and orioles. Most of these birds are summer residents that use habitats ranging from lower elevation wetlands to high-elevation forests for breeding and raising young. Some species, such as the American robin and mallard, are migratory, but small populations may be present yearlong depending on seasonal conditions. Winter residents, such as rough-legged hawk, snow buntings, and rosy-crowned gray finches, arrive from arctic breeding grounds or high-elevation, alpine areas to use winter habitats in lower elevation foothills and major river valleys, seasonally replacing summer residents.

The following list includes birds on the *USFWS Birds of Conservation Concern (BCC) 2002* list and the *Utah Partners in Flight (PIF) Priority Species for Conservation* that may inhabit the RFO area based on RFO data and information in the UDWR's Utah Conservation Data Center (http://dwrcdc.nr.utah.gov/ucdc/).

**Table 3-17. Birds of Conservation Concern within the Richfield Field Office**

| Common Name | Scientific Name | BCC List[1] | PIF List[2] |
|---|---|---|---|
| Marbled Godwit | *Limosa fedoa* | X | |
| Wilson's Phalarope | *Phalaropus tricolor* | X | |
| American Avocet | *Recurvirostra americana* | X | X |
| Solitary Sandpiper | *Tringa solitaria* | X | |
| Long-billed Curlew | *Numenius americanus* | X | X |
| American White Pelican | *Pelecanus erythrorhynchos* | | X |
| Black-necked Stilt | *Himantopus mexicanus* | | X |
| Western Yellow-billed Cuckoo | *Coccyzus americanus* | X | X |
| Black Swift | *Cypseloides niger* | X | X |
| Broad-tailed Hummingbird | *Selasphorus platycercus* | | X |
| Golden Eagle | *Aquila chrysaetos* | X | |

| Common Name | Scientific Name | BCC List[1] | PIF List[2] |
|---|---|---|---|
| Peregrine Falcon | *Falco peregrinus* | X | |
| Prairie Falcon | *Falco mexicanus* | X | |
| Swainson's Hawk | *Buteo swainsonii* | X | |
| Ferruginous Hawk | *Buteo regalis* | X | X |
| Northern Harrier | *Circus cyaneus* | X | |
| Burrowing Owl | *Anthene cunicularium* | X | |
| Flammulated Owl | *Otus flammeolus* | X | |
| Short-eared Owl | *Asio flammeus* | X | |
| Loggerhead Shrike | *Lanius ludovicianus* | X | |
| Pinyon Jay | *Gymnorhinus cyancephalus* | X | |
| Greater Sage-grouse | *Centrocercus urophasianus* | X | X |
| Gambel's Quail | *Callipepla gambelii* | | X |
| Lewis's Woodpecker | *Melanerpes lewis* | X | X |
| Williamson's Sapsucker | *Sphyrapicus thyroideus* | X | |
| American Three-toed Woodpecker | *Picoides dorsalis* | | X |
| Virginia's Warbler | *Vermivora virginiae* | X | X |
| Grace's Warbler | *Dendroica graciae* | X | |
| Black-throated Gray Warbler | *Dendroica nigrescens* | X | X |
| Black Rosy-finch | *Leucosticte atrata* | | X |
| Gray Vireo | *Vireo vicinior* | X | X |
| Sage Sparrow | *Amphispiza belli nevadensis* | X | X |
| Brewer's Sparrow | *Spizella breweri* | X | X |

Notes:
1—Based on bird lists for Bird Conservation Regions 16 (Colorado Plateau) and 9 (Great Basin), which cover the RFO area.
2—The PIF list of 24 priority species for conservation actions can be found in the document entitled *Coordinated Implementation Plan for Bird Conservation in Utah*, prepared by Utah Steering Committee, Intermountain West Joint Venture, 2005 (http://iwjv.org/Images/UTPlan2005.pdf).

### 3.3.9.5 Raptors

Raptor management on public lands in Utah is guided by the use of best management practices (BMP) (Appendix 10), which are BLM-specific recommendations for implementation of the USFWS, Utah Field Office's *Guidelines for Raptor Protection from Human and Land Use Disturbances*. The guidelines were originally developed by USFWS in 1999 and were updated during 2002 to reflect changes brought about by court decisions, policy changes, and new EOs. The guidelines were provided in an attempt to ensure project compatibility with the biological requirements of raptors and to encourage an ecosystem approach to raptor management.

Raptors have very specific requirements for nesting territories, including vegetation structure and diversity. Requirements for physiographic features (e.g., elevation, slope), as well as prey availability, vary by species. Raptors typically reuse the same nesting territory for years, and alterations to these areas could reduce the viability of raptor populations. Threats to raptors include loss of habitat, reduction in

food supply, and disturbance during nesting. Habitat loss from changing land use to industrial, agricultural, or recreational could reduce available food supply or alter nesting territories. Each raptor nest, its offspring, and supporting habitat are considered important to the long-term viability of raptor populations. Changes in vegetation structure and diversity could reduce the areas meeting nest site requirements.

Generally, courtship, nest construction, incubation, and early brooding are considered higher risk periods during which adults are easily prone to temporarily or permanently abandoning nests in response to disturbance. This may result in abandonment of eggs or young. Loss or alteration of habitat for any raptor species can also result in a loss of or change in the raptor prey base or historical nesting territories (USFWS 2002e).

## 3.3.10 Wild Horses and Burros

The goal of the Wild and Free-Roaming Horse and Burro Act is to manage wild horses and burros, "in the area where presently [1971] found as an integral part of the natural system of the public lands." The Act and subsequent regulations direct that wild horses and burros be managed to ensure a thriving natural ecological balance with the minimum feasible management required to maintain the populations. The management of wild horse and burro populations to maintain a sufficient size to be genetically viable is an important aspect of this goal. Some management decisions could affect the viability of wild horse or burro populations. Long-term intensive management actions on burro populations, that fail to meet the minimum feasible management regulations, would be noted as an impact. Following passage of the Wild, Free-Roaming Horse and Burro Act of 1971, BLM identified 2 wild horse and burro management areas in the planning area: the Robbers Roost Herd Management Area (HMA) for wild horses and the Canyonlands HMA for wild burros.

### 3.3.10.1 Robbers Roost Herd Management Area

The Robbers Roost HMA straddles the Wayne-Emery County line. Vegetation in the area is largely desert grassland, with desert shrub interspersed throughout. As is common throughout the area, the lack of water limits the habitat available for horses. Management intervention is required to maintain a viable population level of 15 to 25 horses. In 2003, it was estimated that there were about 17 horses in the HMA.

A 1975 agreement between the Moab and Richfield district managers directed the Moab District to administer the Robbers Roost HMA. This agreement was updated in 1995, again directing that the Moab District, now part of the Price Field Office (FO), manage the wild horses within the HMA. Thus, the management of and planning for the Robbers Roost HMA is the responsibility of the Price FO and is consequently not addressed in this PRMP/FEIS.

### 3.3.10.2 Canyonlands Herd Management Area

The Canyonlands HMA is more than 89,000 acres, including several State of Utah parcels. It is located in eastern Wayne County, adjacent to Glen Canyon National Recreation Area on the east and the Horseshoe Canyon unit of Canyonlands National Park on the west. The HMA overlaps portions of the French Spring/Happy Canyon WSA, Horseshoe Canyon South WSA, Horseshoe Canyon North WSA, and Dirty Devil WSA. Vegetation in the area is a mix of desert grasses and desert shrub, although areas with deeper soils support sagebrush and juniper.

Existing planning allocates forage for fewer than 20 burros. However, a recent grazing use adjustment on a portion of a grazing permit and preference has resulted in additional forage for burros and has eliminated most competition with livestock for habitat resources, such as forage and water on the HMA. Throughout the area, the lack of water resources limits the habitat available for burros. Current herd management includes regular inventories to monitor burro numbers. Data gathering in the Canyonlands wild burro herd has historically been aerial and on-the-ground. The most recent inventory of the Canyonlands HMA identified nearly 60 burros. An appropriate management level of 60 to 100 burros is required to maintain a viable herd unit. The isolated and remote location of this burro HMA makes extensive management intervention and monitoring difficult.

The burros of the Canyonlands HMA are unique in that pinto coloration, usually rare in wild burros, predominates. The remote nature of the Canyonlands HMA, coupled with the rough terrain, limit opportunities for the public to view these unique animals.

## 3.3.11 Fire and Fuels Management

Fire is a natural phenomenon. Vegetation communities in the planning area have adapted to the presence or absence of wildland fire over several thousand years. Geographic, topographic, elevational, and climatic variances throughout the planning area have resulted in an array of conditions in which fire has historically (from 200 to 400 years ago) affected vegetation differently. Consequently, forests, woodlands, and rangelands throughout the planning area have adapted to fire. In addition to natural fire regimes, many vegetation communities were affected by Native American use of fire to manipulate the environment (Williams 2003). Therefore, the role of anthropogenic (human-caused) fires cannot be separated from the role of natural fires for at least the last 10,000 years.

Research has shown that many of the forest, woodland, and rangeland ecosystems in the planning area are not functioning properly. Vegetation communities are considered as functioning properly when they can withstand and/or recover from fire naturally. Appendix 6 provides detailed information concerning the fire ecology of each major vegetation cover type potentially affected by the decisions made in this Proposed RMP/Final EIS. The historic fire-return intervals are identified, as are the responses to fire disturbance of each cover type. Appendix 6 also includes information about the general condition cover type and departure from historic conditions.

### 3.3.11.1 Wildland Fire Occurrence

Studies of fire-scarred trees in the Henry Mountains and national forest lands within the planning area indicate that before European settlement, fires burned the areas in a relatively consistent pattern. Tree rings from ponderosa pines in a predominantly Douglas-fir stand indicated that the area burned an average of every 19 years (Bartos and Campbell 1998). Note that this does not indicate that the entire planning area burned this regularly. However, areas of similar vegetation types would have been adapted to similar fire intervals.

Yearly wildfire occurrence data for the RFO is available from 1979 to 2003. (Note: Earlier data is for the old Richfield District, which encompassed what is now both the Richfield and Fillmore FOs.) Figure 3-16 lists the yearly number of wildfires and acres burned over this time. As displayed in Figure 3-17, most wildfires (81 percent) in the RFO occur from June through August. Figure 3-18 displays the size distribution of the 300 wildfires since 1979.

Figure 3-19 illustrates the distribution of the 300 wildfires by cause. Approximately 76 percent of the wildfires in the RFO were ignited by lightning.

**Figure 3-16. Richfield Planning Area Wildfires and Acreages (1979–2003)**

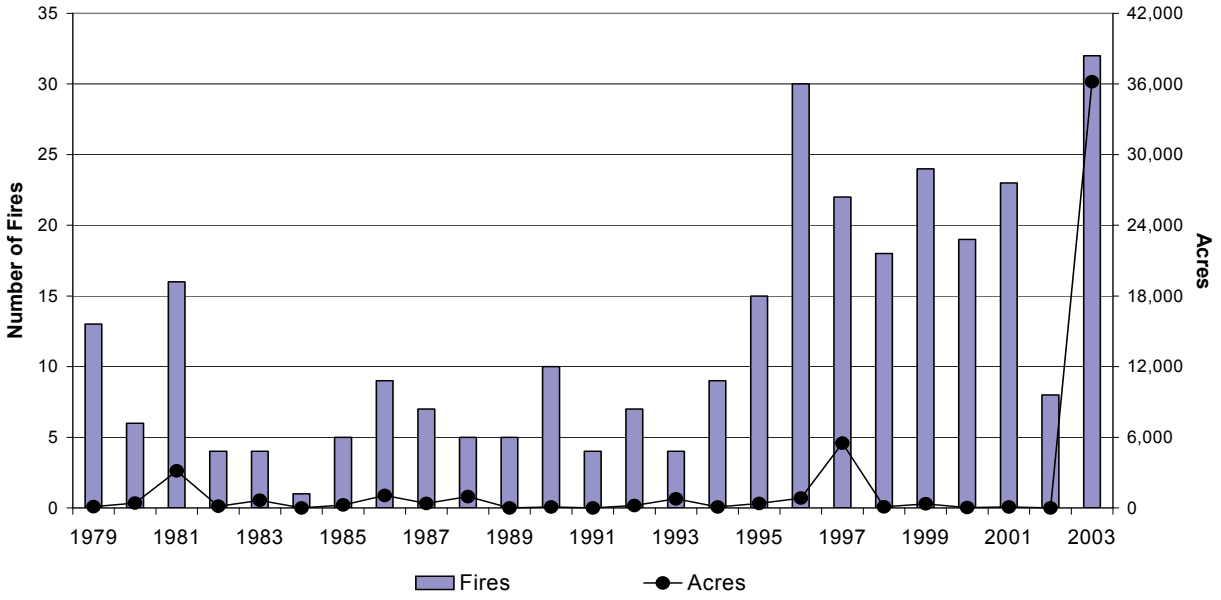



**Figure 3-17. Richfield Field Office Wildfire Occurrence by Month (1979–2003)**

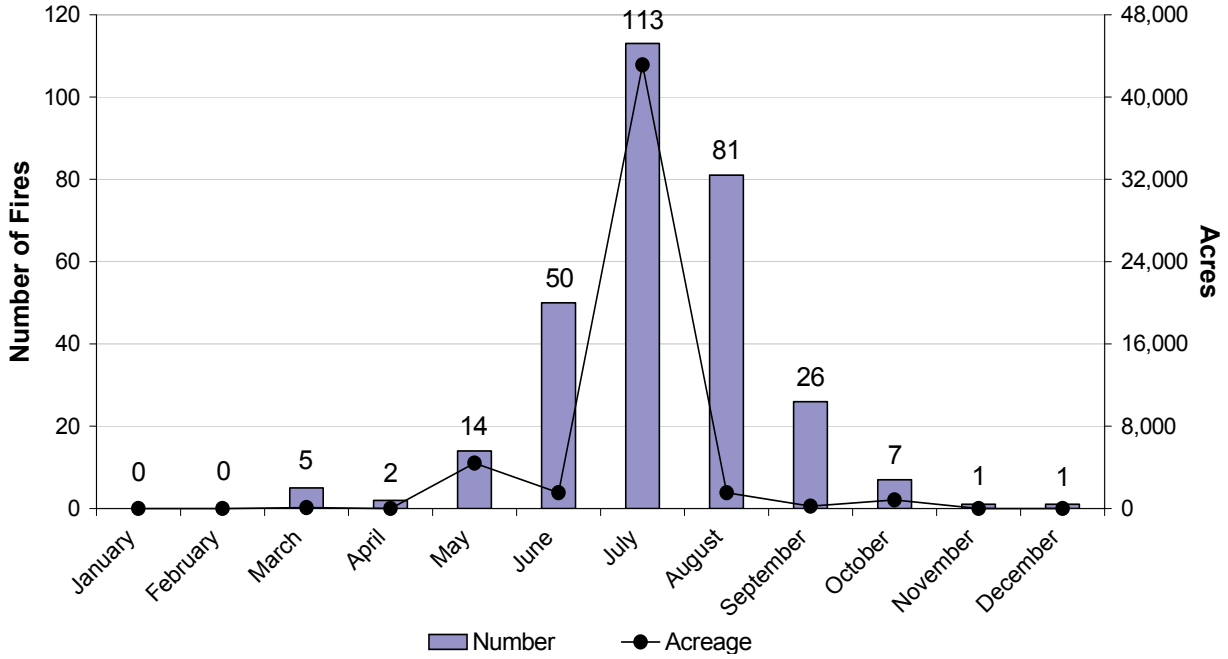


**Figure 3-18. Richfield Field Office Wildfires by Size (1979–2003)**

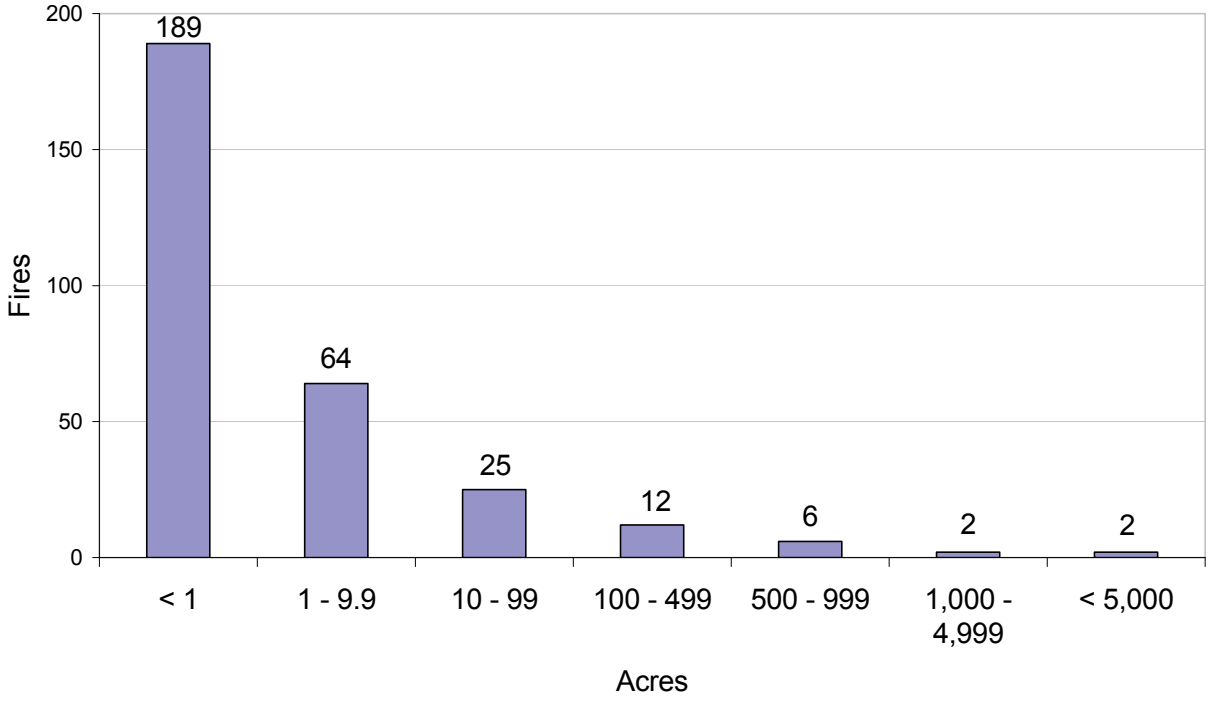
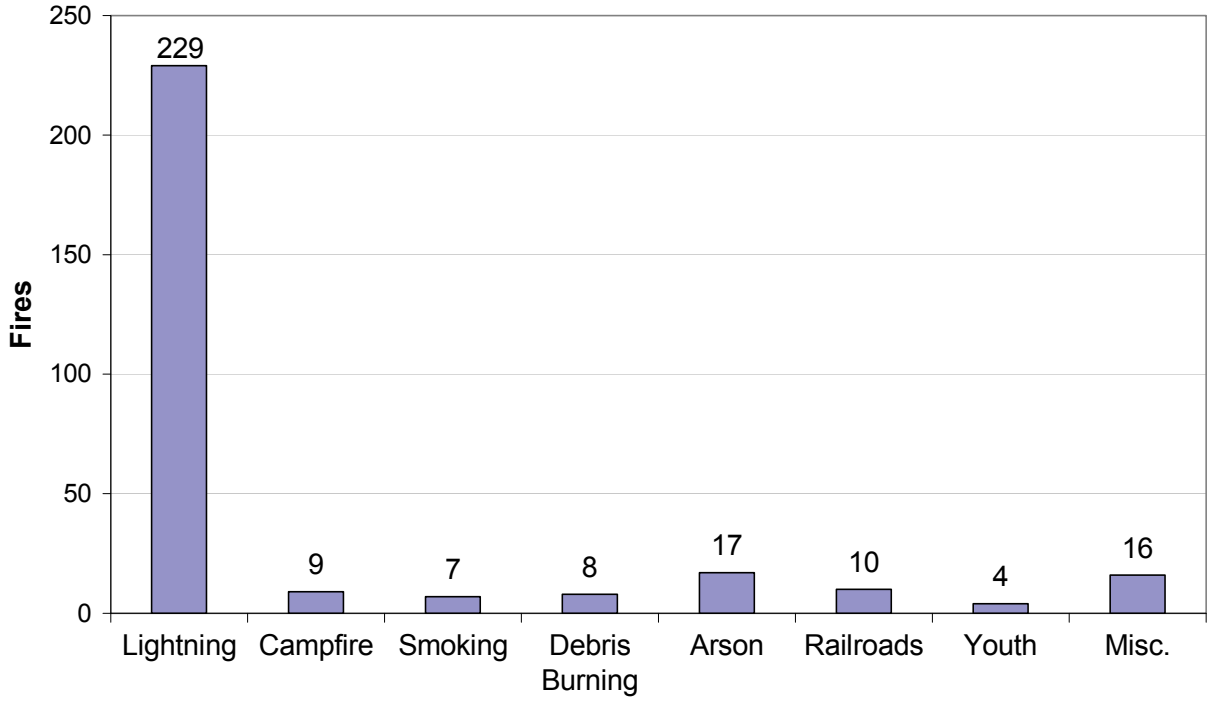



**Figure 3-19. Richfield Field Office Wildfire Causes (1979–2003)**



### 3.3.11.2 Hazardous Fuels Reductions

Many areas in the lands managed by the RFO have changed from historic disturbance regimes. Aspen forest types, which reproduce through suckering rootstock, need disturbance or dieback to stimulate regeneration (O'Brien and Waters 1998). In the absence of disturbance, areas once dominated by aspen have been supplanted by conifers or sagebrush (Bartos and Campbell 1998). Areas with small amounts of aspen in a stand may indicate that the area was once dominated by aspen (Bartos and Campbell 1998). "An approximately 60% decline in aspen dominated landscapes has occurred on National Forest System lands across Utah" (Bartos and Campbell 1998, pp. 23). Aspen in the planning area, either adjacent to USFS land or in the Henry Mountains, is intermingled with and adjacent to stands of mixed conifer. Conditions noted throughout Utah are not expected to be different from those in the planning area.

The exclusion of frequent, low-intensity fires in ponderosa pine stands has resulted in a buildup of understory fuels in these stands. This change threatens the pine stands, which are resistant to low-intensity fire but susceptible to larger crown fires. Understory fuels act as ladders, allowing fire to jump to the trees' crown, burning ponderosa pine stands.

Using Forest Inventory and Analysis data collected on public lands administered by the RFO, the Rocky Mountain Research Station found that more than 67 percent of plots had a stand age of less than 150 years. These stands form a closed-canopy "belt" between lower valley shrub lands and higher mountain forests. Reduction of fine fuels and decreases in fire return intervals have encouraged pinyon-juniper encroachment, leading to large acreages of closed canopy pinyon-juniper in formerly treeless areas (USFS 2000). As a result, structural stages are strongly weighted to stands much denser than typical conditions.

Stands are considered as functioning properly when they can withstand and/or recover from disturbance. Many vegetation communities, specifically those described above, are not considered in PFC. For further discussion on fire ecology of the various vegetation types, refer to Appendix 6. Table 3-18 identifies existing vegetation acreages and their estimated departure from historic (200–400 years before the present) acreages. It is estimated that Native American -initiated fires composed approximately 40 percent of historic fires (Williams 2003). Therefore, allowing wildland fires at natural levels would not include the Native American –initialed fires.

The increasing size, intensity, and severity of wildfires pose greater threats to human life and property. More people are recreating on and adjacent to public lands and building homes in wildland areas, increasing their exposure to naturally ignited wildland fires and increasing the risk of human-caused wildfires. Additionally, the threat to other resource values from uncharacteristically intense and severe wildfires has increased, resulting from uncharacteristic changes in vegetation, fuel loadings, and fire behavior. Consequently, fire suppression costs have also increased.

**Table 3-18. Vegetation Departure from Historic Acreages**

| Class Name | Historic Acreages | Percentage of Total | Existing Acreages | Percentage of Total |
|---|---|---|---|---|
| Other Non-Vegetation | 67,858 | 3.2% | 67,858 | 3.2% |
| Spruce-Fir[3] | 17,022 | 0.8% | 29,317 | 1.4% |
| Aspen | 20,251[1] | 1.0% | 5,786 | 0.3% |
| Ponderosa Pine | 44,463 | 2.1% | 42,785 | 2.0% |
| Oak | 26,330 | 1.2% | 19,629 | 0.9% |
| Mountain Shrub | 24,781 | 1.2% | 16,378 | 0.8% |

| Class Name | Historic Acreages | Percentage of Total | Existing Acreages | Percentage of Total |
|---|---|---|---|---|
| Pinyon-Juniper | 216,036[2] | 10.2% | 551,674 | 25.9% |
| Sagebrush Steppe | 660,468 | 31.0% | 343,781 | 16.2% |
| Desert Grassland | 324,652 | 15.3% | 324,652 | 15.3% |
| Desert Brush | 726,085 | 34.1% | 726,085 | 34.1% |
| **Total** | **2,127,946** | | **2,127,945** | |

Notes—
1—Desired aspen figure created by dividing existing acreage by 0.4, basing this figure on Campbell and Bartos (1998) conclusion that aspen in Utah has undergone a 60% reduction in coverage.
2—Forest Inventory and Analysis data collected and determined from public lands within the planning area indicates that approximately 67.6% of the pinyon-juniper woodland type in the RFO is 150 years old or younger. It is assumed that 90% of that 67.6% is not in PFC and requires treatment within the next 100 years. The trees older than 150 years and 10% of those younger than 150 years, are assumed to be stable stands that are not adapted to the 10–30 year fire interval (e.g., those located on dry, rocky ridges, very xeric soils).
3—The highest elevations of the spruce/fir type have very long fire return intervals, and these ecosystems have not been adversely affected by fire exclusion.

Sources: Fishlake National Forest Prescribed Natural Fire Plan (1998); USFS, 2000; USFS, 2004

### 3.3.11.3 Fuels Treatments

Over the last 20 years, the construction of homes and businesses in the wildland-urban interface (WUI) has compounded the problem of fuels accumulation. The resulting risk of exposure to high-intensity fires that could threaten safety and property has increased. Declining vegetation conditions and increased construction have required a more active hazardous fuel treatment program to reduce the number and severity of wildfires.

Before implementation of the 1995 Federal Wildland Fire Management Policy, fewer than 1,000 acres of vegetation per year were treated in the RFO. This acreage included prescribed fire and other means of treating fuels. Since 1995, hazardous fuel reduction efforts within the RFO have treated roughly 4,000 acres per year. The focus of most of these treatments has been on reducing hazardous fuels in WUI areas, although treatments were also implemented to improve ecosystem health, improve rangeland production, and enhance wildlife habitat.

### 3.3.11.4 Fire Regimes and Condition Classes

Fire regimes address the nature of disturbance by fire by describing its historic intensity, frequency, and effect on vegetation. Knowledge of fire regimes is a critical component in managing landscapes and analyzing changes in fire frequencies and intensities. Table 3-19 lists the natural fire regimes by which vegetation is classified in the RFO. Categorization of vegetation types by fire regimes was based on information that is provided in Appendix 6.

**Table 3-19. Fire Regime Classifications and RFO Estimated Acreage**

| Regime | Fire Frequency | Fire Intensity | Estimated Acres in RFO | Percentage of Total |
|---|---|---|---|---|
| Fire Regime I | 0–35 years | Low Severity | 43,600 | 2.1% |
| Fire Regime II | 0–35 years | Stand Replacing | 903,000 | 44.0% |
| Fire Regime III | 35–100 years | Mixed Severity | 34,700 | 1.7% |

| Regime | Fire Frequency | Fire Intensity | Estimated Acres in RFO | Percentage of Total |
|---|---|---|---|---|
| Fire Regime IV | 35–100 years | Stand Replacing | 1,070,600 | 52.2% |
| Fire Regime V | More than 200 years | Stand Replacing or Mixed Severity | 300 | <0.1% |

Source: U.S.C. 2003; USFS 2001; USGS 2004.

As they relate to fire, vegetation conditions are evaluated by the degree of departure from fire regimes that a specific vegetation community demonstrates. Departure from fire regimes is indicated by changes to key ecosystem components (e.g., species composition, structural stage, stand age, canopy closure, and fuel loadings). The degree of departure is ranked using 3 condition classes that categorize vegetation communities by evaluating the difference between their historic fire regime and related indicating characteristics, and their current condition and its indicating characteristics. Simply put, fire regime "condition classes are a qualitative measure describing the degree of departure from historical fire regimes" (Schmidt K.M. *et al.* 2002). Table 3-20 shows the estimated acreage of vegetation in the RFO in each condition class.

**Table 3-20. Fire Regime Condition Class Description and RFO Estimated Acreage**

| Condition Class | Description | Estimated Acres in RFO | Percentage of Total |
|---|---|---|---|
| 1 | 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. | 2,300 | <1% |
| 2 | Fire regimes have been moderately altered from their historical ranges. The risk of losing key ecosystem components from fire is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased), resulting in moderate changes to the size, intensity, or severity of fires or to landscape patterns. Vegetation attributes have been moderately altered from their historical range of attributes. | 281,000 | 14% |
| 3 | Fire regimes have been significantly altered from their historical ranges. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical frequencies by multiple return intervals, resulting in dramatic changes to the size, frequency, intensity, or severity of fires or landscape patterns. Vegetation attributes have been significantly altered from their historical range of attributes. | 1,768,900 | 86% |

Sources: Schmidt K.M. *et al.* 2002; U.S.C. 2003; USGS 2004.

Areas in Condition Classes 2 and 3 are of most concern because they often need management intervention before allowing fire to return naturally. Acreage of vegetation in Condition Class 3 is high because much of the RFO has converted to pinyon-juniper and sagebrush vegetation types.

## 3.3.12 Non-WSA Lands with Wilderness Characteristics

Since WSAs were established in the 1980s, designation of wilderness in Utah has become a prominent state and national issue. For more than 20 years, the public has debated which lands have wilderness characteristics and should be considered by Congress for wilderness designation. As a result of the debate (and a significant passage of time since BLM's original inventories), in 1996 the Secretary of the Interior directed the BLM to take another look at some of the lands in question. In response to this direction, the BLM inventoried these lands and found approximately 2.6 million acres of public land statewide (outside of existing WSAs) to have wilderness characteristics (BLM 1999).

In September 2005, the BLM and the State of Utah, the Utah School and Institutional Trust Land Administration (SITLA), and the Utah Association of Counties (collectively "Utah") reached an agreement negotiated to settle a lawsuit originally brought in 1996 by the State of Utah, which challenged the BLM's authority to conduct new wilderness inventories. The settlement stipulated that the BLM's authority to designate new WSAs expired no later than October 21, 1993. Pursuant to the Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. § 1712(c), the BLM, however, does have the authority to conduct inventories for characteristics associated with the concept of wilderness and to consider management of these values in its land use planning process. The BLM's *Land Use Planning Handbook* (H-1601-1) states that decisions on whether or not to protect wilderness characteristics are to be considered during planning. This section addresses lands outside existing WSAs that have been identified as having wilderness characteristics.

Non-WSA lands with wilderness characteristics are those that have the appearance of naturalness and outstanding opportunities for solitude or primitive and unconfined recreation, and also comprise an area of 5,000 acres, or areas less than 5,000 acres that are contiguous to designated wilderness, WSAs, or other administratively endorsed for wilderness management lands, or, in accordance with the Wilderness Act's language, areas "of sufficient size as to make practicable its preservation and use in an unimpaired condition." BLM used the same criteria for determining wilderness characteristics as in the 1979 wilderness inventory. The 5,000-acre value was helpful to BLM in making preliminary judgments, but it was not considered a limiting factor. The size criterion of 5,000 acres was applied only to standalone units, that is, units not contiguous with other federal lands previously determined to possess wilderness characteristics (e.g., WSAs and NPS and USFS lands that are administratively endorsed for wilderness). Units contiguous with federal lands with wilderness characteristics were evaluated for all wilderness characteristics found in the inventoried area. Opportunities for solitude and primitive recreation were assumed present in association with the larger contiguous area.

Detailed information about non-WSA lands with wilderness characteristics is part of the administrative record for this Proposed RMP/Final EIS. The following records are available for public review at the RFO: 1) 1999 Utah Wilderness Inventory; 2) 1999 Utah Wilderness Inventory Revision Document for the Richfield Field Office (December 2002); 3) 1999 Utah Wilderness Case Files for the RFO; 4) Reasonable Probability Determinations for the RFO; and 5) Documentation of Wilderness Characteristics Review for the RFO.

Non-WSA lands with wilderness characteristics that were inventoried by BLM in the 1999 Utah Wilderness Inventory included approximately 511,200 acres in 20 wilderness inventory areas (WIA). On the basis of subsequent public comments and after conducting additional field checks, the BLM revised the inventory in December 2002. The revised inventory identified a total of 551,770 acres in 20 WIAs within the RFO possessing wilderness characteristics. The inventory and the inventory revision also identified areas in portions of WIAs that did not have wilderness characteristics.

In addition to the lands that were inventoried in the 1999 Utah Wilderness Inventory and its revision, additional lands in the RFO have been reviewed for wilderness characteristics by BLM. These lands are currently proposed for wilderness as part of S.1179, America's Red Rock Wilderness Act of 2007, and are neither WSAs nor WIAs. (Note: The Act has been introduced in Congressional Term 110 as S.1170). The wilderness characteristics review process involved a BLM interdisciplinary team that reviewed available information and followed up with field trips where necessary. The BLM interdisciplinary team evaluated information provided by the public about these areas, their on-the-ground knowledge of these areas, information in case files and field files, master title plats, aerial photos, GIS data layers, and field inspections, and determined that all or parts of these areas have wilderness characteristics. When the initial review process was completed, the interdisciplinary team reviewed about another 200,000 acres, of which 130,830 acres were found to have wilderness characteristics.

In summary, since the beginning of the 1999 Utah wilderness inventory process, the BLM has evaluated 31 areas totaling 848,500 acres for their wilderness characteristics in the RFO. Of these, the BLM determined that 29 areas totaling 682,600 acres met the criteria for wilderness characteristics of size, naturalness, and outstanding opportunities for solitude or primitive recreation (Table 3-21 and Map 3-9). These lands, non-WSA lands with wilderness characteristics, have been carried through this land use planning process to determine how their wilderness characteristics will be managed. Of the 38 total areas evaluated in table 3-21, 9 of the inventoried areas were found to lack wilderness characteristics, and are also summarized in the table. During the comment period for the DRMP/DEIS, 7 new submittals were received and evaluated for their wilderness characteristics. None of these areas were found to possess wilderness characteristics. The Proposed RMP/Final EIS includes management prescriptions for 12 of the 29 areas totaling 78,600 acres.

Wilderness characteristic areas generally fall into one (or 2) of 3 broad categories:

- Areas contiguous to BLM WSAs
- Areas adjacent to NPS lands administratively endorsed for wilderness designation
- Areas (generally over 5,000 acres) that stand alone as separate units.

**Table 3-21. Non-WSA Lands With Wilderness Characteristics Evaluation**

| # | Area Evaluated | County | Acres Evaluated | Acres Found to Possess Wilderness Characteristics | Comments |
|---|---|---|---|---|---|
| 1 | Bull Mountain | Garfield | 4,800 | 3,800 | Contiguous to Bull Mountain WSA. |
| 2 | Bullfrog Creek | Garfield | 42,600 | 33,700 | |
| 3 | Cane Spring Desert | Garfield | 18,300 | 0 | |
| 4 | Dirty Devil/ French Spring | Garfield Wayne | 149,500 | 133,100 | Contiguous to Dirty Devil and French Spring WSAs. Includes Dirty Devil eligible wild and scenic river (WSR) segment. |
| 5 | Dogwater Creek | Garfield | 3,500 | 3,500 | Contiguous to Capitol Reef National Park lands that are administratively endorsed for wilderness designation. |
| 6 | Fiddler Butte | Garfield | 22,000 | 19,700 | Contiguous to Fiddler Butte WSA. |
| 7 | Flat Tops | Wayne | 23,000 | 23,000 | Adjacent to non-WSA lands with wilderness characteristics in the Price FO (Emery County) |

| # | Area Evaluated | County | Acres Evaluated | Acres Found to Possess Wilderness Characteristics | Comments |
|---|---|---|---|---|---|
| 8 | Fremont Gorge | Wayne | 20,100 | 16,000 | Contiguous to Fremont Gorge WSA and Capitol Reef National Park lands that are administratively endorsed for wilderness designation. Includes Fremont Gorge eligible WSR segment |
| 9 | Horseshoe Canyon South | Wayne | 20,600 | 20,600 | Contiguous to Horseshoe Canyon South WSA, Canyonlands National Park (Horseshoe Canyon Unit) and Glen Canyon National Recreation Area (NRA) lands that are administratively endorsed for wilderness designation |
| 10 | Jones Bench | Sevier | 3,300 | 3,300 | Contiguous to Capitol Reef National Park lands that are administratively endorsed for wilderness designation |
| 11 | Kingston Ridge | Piute | 10,200 | 10,200 | |
| 12 | Labyrinth Canyon | Wayne | 27,100 | 12,300 | Adjoins Horseshoe Canyon North WSA, Canyonlands National Park (Horseshoe Canyon Unit) and Glen Canyon NRA lands that are administratively endorsed for wilderness designation |
| 13 | Limestone Cliffs | Sevier | 24,900 | 24,800 | Adjacent to non-WSA lands with wilderness characteristics in the Price Field Office (Emery County) |
| 14 | Little Rockies | Garfield | 23,300 | 23,200 | Within Little Rockies National Natural Landmark, contiguous to Little Rockies WSA and Glen Canyon NRA lands that are administratively endorsed for wilderness designation |
| 15 | Long Canyon | Garfield | 16,600 | 16,600 | Contiguous to Capitol Reef National Park lands that are administratively endorsed for wilderness designation |
| 16 | Mount Ellen—Blue Hills | Garfield<br>Wayne | 66,900 | 49,800 | Contiguous to Mount Ellen/Blue Hills WSA |
| 17 | Mount Hillers | Garfield | 2,300 | 1,800 | Contiguous to Mount Hillers WSA. |
| 18 | Mount Pennell | Garfield | 77,000 | 65,600 | Contiguous to Mount Pennell WSA |
| 19 | Muddy Creek/Crack Canyon | Wayne | 65,600 | 61,800 | Adjacent to non-WSA lands with wilderness characteristics in the Price Field Office (Emery County) |
| 20 | Mussentuchit Badlands | Sevier | 700 | 700 | Adjacent to non-WSA lands with wilderness characteristics in the Price FO (Emery County) |
| 21 | Notom Bench | Wayne | 8,700 | 8,000 | Contiguous to Capitol Reef National Park lands that are administratively endorsed for wilderness designation |
| 22 | Phonolite Hill | Piute | 7,900 | 7,900 | |

| # | Area Evaluated | County | Acres Evaluated | Acres Found to Possess Wilderness Characteristics | Comments |
|---|---|---|---|---|---|
| 23 | Pole Canyon/Hunter Spring | Garfield | 6,000 | 6,000 | |
| 24 | Ragged Mountain | Garfield | 30,100 | 25,900 | |
| 25 | Red Desert | Wayne | 40,900 | 40,700 | Contiguous to Capitol Reef National Park lands that are administratively endorsed for wilderness designation |
| 26 | Robbers Roost Flats | Wayne | 7,700 | 0 | |
| 27 | Rock Canyon | Sevier | 1,300 | 1,300 | Adjacent to non-WSA lands with wilderness characteristics in the Price FO (Emery County) |
| 28 | Rocky Ford | Piute | 6,700 | 6,700 | |
| 29 | Sweetwater Reef | Wayne | 6,200 | 6,200 | Adjacent to non-WSA lands with wilderness characteristics in the Price FO (Emery County) |
| 30 | Wild Horse Mesa | Wayne | 88,300 | 49,700 | Adjacent to non-WSA lands with wilderness characteristics in the Price Field Office (Emery County) |
| 31 | Wildcat Knolls | Sevier | 22,400 | 6,700 | Adjacent to non-WSA lands with wilderness characteristics in the Price FO (Emery County) |
| 32 | Aquarius Plateau | Garfield and Wayne | 16,500 | 0 | |
| 33 | North Sevier Plateau | Piute and Sevier | 35,900 | 0 | |
| 34 | Pahvant Range | Sevier | 3,800 | 0 | |
| 35 | South Sevier Plateau | Piute | 17,100 | 0 | |
| 36 | Thousand Lakes | Wayne | 3,000 | 0 | |
| 37 | Tushar Mountains | Piute and Sevier | 4,300 | 0 | |
| 38 | Wasatch Plateau | Sevier | 1,100 | 0 | |
| | **Total** | | **930,200** | **682,600** | |

# 3.4 RESOURCE USES

## 3.4.1 Forestry and Woodland Products

### 3.4.1.1 Forest and Woodland Types and Products

Forested and woodland areas within the RFO range from oak and pinyon-juniper stands to aspen, ponderosa pine, Douglas fir, white fir, Englemann spruce, and limber pine. Generally, lower elevations (6,000 feet to 8,400 feet) are dominated by woodland species, such as juniper. Middle elevations (7,000 feet to 7,500 feet) are a mix of pinyon-juniper, whereas in higher elevations (7,500 feet to 8,000 feet) pinyon and oak brush dominate with the occasional juniper. Pinyon-juniper stands compose the largest forest cover type within the RFO (see Section 3.3.4, Vegetation).

As elevation increases, timber species dominate the cover type. Between 8,000 feet and 9,600 feet, ponderosa pine and aspen are the major species, whereas Douglas fir, white fir, subalpine fir, Engelmann spruce, aspen, and limber pine are found at elevations above 9,600 feet. Generally, timber species are located on north- and northwest-facing slopes or in canyon bottoms where there is enough soil moisture to sustain timber. The largest concentrations of timber cover types are found in the Henry Mountains and along the border between BLM and USFS-administered lands (Map 3-3).

Pinyon-juniper woodlands cover 552,000 acres, about one-quarter of the RFO. In contrast, true forests—including ponderosa pine, mixed-conifer, and aspen—represent only 5 percent of the RFO and are located primarily in the Henry Mountains. Forests and woodlands within the RFO are of limited commercial value because of their low productivity and distance from markets. By and large, the aesthetic and ecological importance of forests far outweighs their limited economic value.

**Pinyon-Juniper Woodlands**

Pinyon-juniper woodlands are increasing in size and density over a large portion of the RFO. This increase is attributed to the absence of wildland fire for the last century and long-term pinyon-juniper management. Where pinyon-juniper canopy cover is dense with large trees, very few, if any, desirable forage species are present. Plant species diversity is decreasing because of the increasing tree canopy cover.

The boundaries of the pinyon-juniper woodlands are also increasing. Pinyon-juniper woodlands are invading sagebrush areas and are outcompeting desirable forage species. Shrubs and herbaceous plants reduce erosion better than pinyon-juniper trees. Increasing pinyon-juniper density adversely affects watershed health. Areas with steep slopes and erodible soils in pinyon-juniper tree cover are vulnerable to serious soil erosion. Pinyon-juniper woodlands do not burn in normal precipitation years but during years of drought, the buildup of continuous fuels is a fire hazard. Because these woodlands have expanded into areas formerly occupied by other vegetation types, management attention has focused on reducing, rather than the sustaining them.

Pinyon pine provides utilitarian value in the form of firewood, Christmas trees, and pine nuts. Juniper is used for fence posts and firewood. Both are unsuitable for lumber because of their small size, irregular shape, and lack of self-pruning lower limbs. Approximately 600 cords of firewood (both commercial and non-commercial) and 150 Christmas trees are harvested from the RFO per year.

### Ponderosa Pine

Ponderosa pine forests cover 43,000 acres, or about 2 percent of the RFO. In the inland west and southwest, ponderosa pine is a commercially valuable and productive timber tree. Currently, this species is less important economically in the planning area, but there have been limited sales of ponderosa pine in the past. Permits for ponderosa pine harvesting are limited to a few trees each and occur primarily for fire salvaged trees. Requests are evaluated on a case-by-case basis.

### Mixed-Conifer

Less than 2 percent of the RFO (29,000 acres) is forested by mixed-conifer stands, which include Engelmann spruce, white fir, subalpine fir, Douglas fir, and several pine species. Although commercially important elsewhere, these forests are of limited economic value within the RFO. Requests for harvesting of mixed conifer species are evaluated on a case-by-case basis, and there have been no known recent sales.

### Aspen

Quaking aspen forests cover 12,000 acres, less than 1 percent of the RFO. Because it is easy to cut, aspen is sometimes used for firewood. It has no commercial value within the RFO. No recent permits have been issued for aspen. Requests are evaluated on a case-by-case basis.

## 3.4.1.2 Current Level of Forest and Woodland Activity

In 2001, RFO and Henry Mountain Field Station issued 647 permits for forest products; 268 of these permits were for collecting seeds from wildland sources. In 2002, the 2 offices issued 456 permits for forest products, with 109 of them for collecting seeds from wildland sources. Because of the serious drought and the decrease in seed production in 2002, the RFO did not issue as many seed permits in 2002, and did not issue any seed permits at all in the fall/winter of 2002–2003.

## 3.4.1.3 Forest and Woodland Health

The RFO has many areas of diseased or insect killed trees in the pinyon-juniper woodlands. This is generally limited to single trees, but some small patches, usually less than an acre, are scattered throughout the area. During the prolonged drought of the late 1990s and early 2000s, areas of pinyon-juniper woodlands died. Forests in the Henry Mountains also suffered from disease and insect infestations. In 2003, a large number of pinyon and juniper trees died on the north end of the Henry Mountains and in other areas. Portions of Mount Ellen, Mount Pennell, and Mount Hillers burned during 2003.

In 2001 and 2002, in accordance with the National Fire Plan, the RFO and the Interagency Fire Management organization began a cooperative effort to reduce fuels and restore forest and woodland health on a much larger scale. In 2002, mechanical methods were used to reduce fuels and restore woodland health on 4,061 acres within the RFO.

## 3.4.2 Livestock Grazing

Passage of the Taylor Grazing Act in 1934 initiated the federal effort to regulate livestock grazing on public lands to provide for the orderly use, improvement, and development of the range. The act established a system for allotting grazing privileges to livestock operators based on grazing capacities and priorities of use, and to delineate allotment boundaries. It also established standards for rangeland improvements and implemented grazing fees. The act placed 142 million acres of land in western states under the jurisdiction of the Grazing Service, which evolved into the BLM in 1946. FLPMA and the Public Rangelands Improvement Act (PRIA) of 1978 provide additional authority for the management of livestock grazing on public land.

### 3.4.2.1 Grazing Authorization

Within the RFO, the BLM manages livestock grazing on public lands in Sanpete, Sevier, Wayne, and Piute counties; portions of Garfield County; and some allotments within Glen Canyon NRA and Capitol Reef National Park. Livestock grazing on public land is administered through livestock grazing allotments, shown on Map 2-7. Through an inter-district agreement, the Price FO manages several allotments within the RFO, and the RFO manages several allotments within the Price FO. In 2002, 194 allotments in the RFO were used by 143 livestock operators. The total forage available for livestock use in the RFO is 109,951 animal unit months (AUM). The total AUMs authorized for the past 15 years are shown in Table 3-22. Grazing permits are usually issued for 10 years. Active use varies from the permitted use shown in the table as a result of fluctuations in forage availability and decisions of livestock operators to use or not use the public range in a given year. Appendix 7 (Table A7-1) provides detailed information on existing grazing allotments in the RFO.

**Table 3-22. Comparison of Total Permitted Use to Active Use**

| Year | Active Use | | | Permitted Use |
|---|---|---|---|---|
| | Cattle | Sheep | Total | |
| 1988 | 40,467 | 9,426 | 49,893 | 109,951 |
| 1989 | 35,337 | 8,282 | 43,619 | 109,951 |
| 1990 | 30,202 | 7,793 | 37,995 | 109,951 |
| 1991 | 35,837 | 6,423 | 42,260 | 109,951 |
| 1992 | 39,783 | 7,478 | 47,261 | 109,951 |
| 1993 | 42,768 | 9,393 | 52,161 | 109,951 |
| 1994 | 43,338 | 8,913 | 52,251 | 109,951 |
| 1995 | 47,532 | 11,514 | 59,046 | 109,951 |
| 1996 | 48,996 | 8,788 | 57,784 | 109,951 |
| 1997 | 48,894 | 10,051 | 58,945 | 109,951 |
| 1998 | 59,930 | 9,664 | 69,594 | 109,951 |
| 1999 | 62,295 | 10,062 | 72,357 | 109,951 |
| 2000 | 50,246 | 9,160 | 59,406 | 109,951 |
| 2001 | 63,743 | 12,848 | 76,591 | 109,951 |
| 2002 | 52,287 | 7,647 | 59,934 | 109,951 |
| 2003 | 31,011 | 8,910 | 39,921 | 109,951 |

| Year | Active Use | | | Permitted Use |
|---|---|---|---|---|
| | Cattle | Sheep | Total | |
| Average | 45,792 | 9,147 | 54,939 | 109,951 |

Source: RFO Grazing Files.

### 3.4.2.2 Allotment Categorization and Management

Allotments in the RFO are divided into 3 selective management categories. These categories were developed in 1981 to prioritize grazing allotments to achieve cost-effective improvement of rangeland condition and production. This selective management process emphasized those allotments with the most need and the best potential for return on the investment of public funds. Most allotments have been placed into one of the 3 categories according to management needs, resource conflicts, potential for improvement, and funding and/or staffing constraints. The 3 management categories are: Improve, Maintain, and Custodial.

Improve category allotments are managed to improve current resource conditions on allotments with resource issues and which have a high potential for return on investment. They receive the highest priority for funding and management actions. Maintain category allotments are managed to maintain current satisfactory resource conditions. They are actively managed to ensure that resource values do not decline. Custodial category allotments are under custodial management by the BLM to protect resource conditions and values. As watersheds are evaluated, the allotment category is reviewed. The RFO has 91 Improve category allotments covering 1,657,475 acres, 25 Maintain category allotments covering 589,884 acres, and 25 Custodial category allotments covering 80,339 acres. There are 10 allotments that have not been categorized because they were unallotted at the time the allotment categorization process was implemented. Information specific to each of the 184 allotments in the RFO is provided in Appendix 7.

### 3.4.2.3 Rangeland Improvement Projects

The BLM and its cooperators have completed structural and nonstructural projects on public lands to improve and manage rangelands since 1943. The nonstructural projects include seeding, plowing, harrowing, chaining, contour furrowing, and herbicide spraying. The structural projects have included wells, pipelines, troughs, fences, guzzlers, reservoirs, and cattle guards.

Non-native seeding has occurred since the 1950s, with most activity occurring in the 1960s. Seeding has been implemented on a very limited scale from the 1970s to the present. The original objectives of rangeland seeding with non-native species were watershed protection and increases in wildlife and livestock forage. Seeding in the Henry Mountains was undertaken to increase forage to accommodate both bison and livestock. Development of various grazing systems resulted in implementing a variety of vegetation treatments (including seedings), which were used to take grazing pressure off adjacent native vegetative communities. Most seedings completed since the 1970s have been developed because of emergency fire rehabilitation on sites that were susceptible to erosion and the invasion of noxious weeds and non-native annual grass species (such as cheatgrass).

As mandated in FLPMA and PRIA, a portion of the grazing fees is invested in range improvements, with the expectation that these improvements may benefit wildlife, watersheds, and livestock producers. Using emergency fire rehabilitation funds, additional public land resources have been protected through rehabilitation of burned areas, thereby reducing soil loss and decreasing the ability of noxious weeds and annual non-native grasses to become established. Livestock operators, state and federal agencies, and other interested public entities have continued to fund rangeland improvement construction.

### 3.4.2.4 Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration

In May 1997, under the authority of the regulations at 43 CFR 4180 (Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration), the Utah State Director approved Utah's *Standards for Rangeland Health and Guidelines for Livestock Grazing*. These standards and guidelines provide a clear statement of agency policy and direction for those who use public lands for livestock grazing and for those who are responsible for their management and accountable for their conditions. The fundamentals of rangeland health combine the basic precepts of physical function and biological health with elements of law relating to water quality and plant and animal populations and communities.

The standards are goals for the desired condition of the biological and physical components and characteristics of the rangelands. These standards are measurable and attainable, comply with various federal and state statutes, policies, and directives applicable to BLM rangelands, and are the minimum resource condition that must be achieved and maintained. An interdisciplinary team conducts watershed assessments with participation from permittees and other interested parties. The assessments determine whether the *Standards for Rangeland Health* are being met. The 4 standards for rangeland health are as follows:

- **Standard 1:** Uplands soils are in PFC.
- **Standard 2:** Riparian and wetland areas are in PFC.
- **Standard 3:** Desired species, including native, threatened, endangered, and SSS, are maintained at an appropriate level.
- **Standard 4:** Water quality meets state standards.

In accordance with the regulations at 43 CFR 4180, if existing grazing management and livestock use is a significant factor in the non-attainment of a standard, appropriate actions must be taken that will result in significant progress toward attainment of the standard(s).

## 3.4.3 Recreation

The recreational resources of the lands managed by the RFO represent some of the most unusual and least explored recreation opportunities in the region. However, in certain parts of the RFO, increased visitor use is affecting soil, water, vegetation, and wildlife. Conflicts among recreationists are also beginning to increase. In some areas, recreation use conflicts with other resources and uses, such as livestock grazing, wildlife habitat needs, and wilderness characteristics.

All of the RFO is included in a recreation fee project in the Henry Mountains/Sevier River area. Participation in the recreation fee program is authorized by the Federal Lands Recreation Enhancement Act (FLREA) and allows an FO to collect fees for specific types of recreational uses, and then expend the fees to manage the lands where they were collected. Monies collected have been used to maintain and improve campgrounds and picnic areas, install new informational signs, replace waterlines and hydrants to supply drinking water, monitor recreation uses, improve hiking trails, and generally improve the recreational experience within the RFO.

### 3.4.3.1 Recreation Management Areas

Recreation Management Areas (RMA) are BLM's primary means of managing recreational use of the public lands. Public land falls within either a Special RMA (SRMA) or Extensive RMA (ERMA). SRMAs are areas that require a recreation investment, where more intensive recreation management is needed, and where recreation is a principal management objective. These areas often have high levels of recreation activity and valuable natural resources. Under existing LUPs, only a small area at the head of Yuba Lake is established as an SRMA. The Yuba Lake SRMA is and will continue to be managed by the Fillmore FO. All other lands are managed as an ERMA. The ERMA consists of areas in which recreation is nonspecialized and dispersed and does not require intensive management (although such areas may contain recreation sites). Although the primary management objective of the ERMA is not necessarily recreation, the large number of attractive recreation sites and areas make recreation management an important consideration.

### 3.4.3.2 Special Recreation Permitting

As authorized by 43 CFR 2932, 4 types of uses exist for which special recreation permits (SRP) are required: commercial use, competitive events, organized groups, and recreation use in special areas.

The BLM issues SRPs for noncommercial use in certain special areas, including long-term visitor areas, river use areas, and backcountry hiking or camping areas. The RFO issues noncommercial recreation use permits (RUP) for individual use of 3 fee-site campgrounds. The RFO issued 254 RUPs during the 2004 fiscal year (FY).

Commercial SRPs are issued for commercial and competitive uses of public lands and organized events. SRPs may be issued for 10 years or less, with annual renewal, after which time outfitters must reapply for permits. The permits are issued as a means of managing visitor use, protecting natural and cultural resources, and for providing a mechanism for accommodating commercial recreational uses. The RFO issued 32 SRPs during the 2004 fiscal year. The total number of participants in recreational activities authorized by SRPs during 2004 was 12,008, generating $109,077 in revenue.

### 3.4.3.3 Recreation Visitation

BLM recreation visitation is recorded in the Recreation Management Information System (RMIS). RMIS estimates recreation participation for 65 types of recreation activities recorded at BLM sites and areas

based on registrations, permit records, observations, and professional judgment. Visitation is estimated by numbers of participants as well as counted by actual visitor days. Participants are the actual number of people who take part in a recreational activity. A visitor day is a common recreation unit of measure used among federal agencies. One visitor day represents an aggregate of 12 visitor hours at a site or area.

In the past decade several activities made substantial contributions to total visitation (e.g., total visitor days) within the RFO. Camping, driving for pleasure, and backpacking were the most common forms of recreation. Aggregate OHV use (attributed to all-terrain vehicles [ATV] as well as cars, trucks, and sport utility vehicles [SUV]) is another common form of recreation. Picnicking, hiking, and viewing wildlife, as well as fishing and big game hunting, were also common recreation activities.

Table 3-23 lists the RMIS figures for the RFO for the FY 2001 through 2004.

## Table 3-23. Recreation Visitation

| Activity | Oct. 2000–Sept. 2001 | | Oct. 2001–Sept. 2002 | | Oct. 2002–Sept. 2003 | | Oct. 2003–Sept. 2004 | |
|---|---|---|---|---|---|---|---|---|
| | Participants | Visitor Days[1] | Participants | Visitor Days[1] | Participants | Visitor Days[1] | Participants | Visitor Days[1] |
| Backpacking | 72,368 | 74,079 | 54,754 | 56,338 | 49,766 | 50,826 | 50,786 | 51,610 |
| Camping | 128,418 | 125,787 | 98,951 | 96,285 | 103,968 | 100,783 | 105,128 | 102,144 |
| Climbing (Mountain/Rock) | 2,122 | 583 | 1,514 | 414 | 1,413 | 353 | 1,480 | 370 |
| Driving for Pleasure | 156,429 | 73,151 | 129,200 | 55,149 | 132,402 | 53,477 | 132,195 | 55,034 |
| Environmental Education | 2,320 | 800 | 1,769 | 639 | 1,722 | 620 | 1,882 | 670 |
| Fishing (Freshwater) | 26,815 | 5,890 | 28,075 | 6,215 | 56,103 | 13,246 | 53,296 | 12,581 |
| Gather Non-Commercial Products | 4,885 | 1,221 | 4,825 | 1,206 | 4,680 | 1,170 | 4,455 | 1,114 |
| Hiking/Walking/Running | 80,699 | 42,967 | 62,744 | 31,152 | 65,323 | 30,247 | 66,189 | 31,507 |
| Horseback Riding | 4,905 | 1,026 | 4,825 | 1,005 | 4,680 | 975 | 4,455 | 928 |
| Hunting—Big Game | 22,364 | 15,878 | 18,684 | 12,240 | 17,955 | 11,720 | 17,871 | 11,945 |
| Hunting—Small Game | 9,770 | 2,035 | 9,650 | 2,010 | 9,419 | 1,950 | 8,910 | 1,856 |
| Hunting—Waterfowl | 990 | 165 | 1,055 | 176 | 2,675 | 446 | 2,540 | 423 |
| OHV (ATV) | 75,751 | 29,652 | 60,945 | 22,254 | 63,062 | 21,750 | 63,834 | 22,492 |
| OHV (Cars/Trucks/SUVs) | 76,600 | 43,785 | 58,804 | 31,954 | 56,483 | 30,625 | 57,787 | 31,836 |
| Pack Trips | 2,076 | 2,078 | 1,478 | 1,476 | 1,413 | 1,413 | 1,480 | 1,480 |
| Picnicking | 112,439 | 9,811 | 81,422 | 7,213 | 78,082 | 6,916 | 81,055 | 7,148 |
| Powerboating | 8,110 | 1,352 | 8,290 | 1,382 | 13,471 | 2,245 | 12,800 | 2,133 |
| Rockhound/Mineral Coll. | 4,128 | 1,032 | 2,951 | 738 | 2,826 | 706 | 2,960 | 740 |
| Row/Float/Raft | 2,064 | 2,069 | 1,476 | 1,476 | 1,413 | 1,413 | 1,480 | 1,480 |
| Snow Play (General) | 977 | 81 | 965 | 80 | 936 | 78 | 891 | 74 |
| Swimming/Water Play | 9,125 | 760 | 9,360 | 780 | 16,181 | 1,348 | 15,375 | 1,281 |
| Target Practice | 9,770 | 814 | 9,650 | 804 | 9,360 | 780 | 8,910 | 743 |
| Viewing (Wildlife) | 46,832 | 7,356 | 41,131 | 5,897 | 50,721 | 6,586 | 49,481 | 6,594 |
| Viewing (All Other) | 16,228 | 1,373 | 14,732 | 1,203 | 14,528 | 1,177 | 14,206 | 1,026 |
| Other | 117 | 141 | 104 | 106 | 155 | 154 | 95 | 86 |
| **Total** | **876,302** | **443,886** | **707,354** | **338,192** | **758,737** | **341,004** | **759,541** | **347,295** |

Note:
1—A recreation visitor day is equivalent to 12 hours of participation in a given recreational activity.
Source: Bureau of Land Management, Recreation Management Information System.

### 3.4.3.4 Developed Recreation Sites

The RFO manages a small number of developed recreation sites as shown in Table 3-24.

**Table 3-24. Developed Recreation Sites—Richfield Field Office**

| Site Name | Description |
|---|---|
| Otter Creek Reservoir<br>Fisherman's Beach<br>Tamarisk Point<br>South Point | Minimal day-use facilities, dispersed camping areas, and fishing access to the reservoir. Primary activities are fishing and boating. |
| Wolverton Mill | Day-use and interpretive facilities at a relocated cultural site adjacent to the BLM office in Hanksville. |
| Hog Springs Picnic Area | Day-use facility. The site serves primarily as a roadside rest stop, picnic site, and trailhead. |
| Lonesome Beaver Campground | Fee site with day-use and camping facilities, along with culinary water. Primary use is camping. |
| McMillan Spring Campground | Fee site with day-use and camping facilities with culinary water. Primary uses are camping, OHV driving, and viewing bison. |
| Starr Springs Campground/ Picnic Area | Fee site that features day-use and camping facilities with culinary water. Panorama Knoll Nature Trail and the Starr Ranch are at the site. Site is primarily used for camping. |
| Dandelion Flat Picnic Area | Day-use and primitive camping facilities with culinary water. Serves picnicking and primitive camping uses. Also serves as a trailhead for Mount Ellen. |
| Koosharem Reservoir | Minimal day-use facilities. Primarily serves as a roadside rest stop. |

### 3.4.3.5 Recreation Use Conflicts

Recreational activities can conflict with one another and affect the available opportunities and experiences. For example, heavy use of an area by motorized users can displace non-motorized users. Various recreation activities also affect other resources, such as riparian areas, cultural resources, vegetation, wildlife, soils, grazing, and mineral extraction. Specific areas where recreation and/or resource conflict occurs include the Dirty Devil region, Factory Butte, and the Henry Mountains.

## 3.4.4 Travel Management

Development of the existing transportation system in the RFO has been associated with providing access for resource uses such as mineral development, livestock grazing, and recreation. Increased demand for access to public lands, combined with the research on the impacts of roads to resources and resource uses, has increased the need for a well designed and managed transportation system.

The transportation system includes state, county and BLM system roads, some of which receive regular maintenance. For portions of the transportation system roads that cross BLM-administered land, various government entities and individuals acquire ROWs from BLM. Issuance of ROWs is based on access needs and resource considerations. State and county system roads (depending on class of the road) are usually constructed and maintained to higher standards than BLM roads and provide the primary arterial and collector road systems for access to and through BLM lands. These state and county system roads are not maintained by BLM.

Some locations within the RFO are known and occasionally used for aircraft landing and departure activities that, through such casual use, have evolved into backcountry airstrips. Backcountry airstrips in the RFO receive occasional use by backcountry pilots to camp, explore, or for safety purposes.

In addition to arterial and collector routes, numerous smaller routes lace throughout the RFO that connect more remote locations to the larger roads. These routes are used for recreational purposes, access to range improvements, mineral developments, and non-BLM managed inholdings. Most of these routes are not paved, and most are unimproved in nature; they are of native surface (dirt, gravel, or sand). The BLM used a variety of methods to inventory existing routes/ways within the RFO for consideration in the planning process, including Global Positioning System data (when available), data provided by the counties, map and orthophoto data, and staff/cooperator knowledge. Based on this inventory, the BLM identified 4,380 miles of routes/ways (Map 3-10) within the RFO. It should be noted that route designations are implementation decisions and that the resulting transportation network could change over time. Detailed route inventory maps by alternative will be available for review at the RFO and on the project website for the Richfield PRMP//FEIS at http://www.blm.gov/ut/st/en/fo/richfield/planning.html. Appendix 9 provides additional details on the travel management/route designation process, the implementation process, and the process that would be required to add or remove route designations following completion of the RMP.

### 3.4.4.1 Off-Highway Vehicles

Management direction for off-highway vehicles is provided in 43 CFR 8340, BLM Manual 8340, and the BLM National OHV Management Strategy. Resource management plans designate areas as open, closed, or limited, with regards to OHV use. Under the existing LUPs, 77 percent (1,636,400 acres) of the RFO is open to cross-country OHV use, 13 percent (277,600 acres) is limited to existing/designated/maintained routes, and 10% (214,000 acres) is closed to OHV use (Map 2-12).

The number of OHVs registered in Utah grew nearly 70 percent between 2001 and 2004. Registrations of OHVs within counties in the planning area have grown as well. County and statewide OHV registrations are shown in Table 3-25.

**Table 3-25. OHV Registrations**

| County | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|
| Garfield County | 353 | 585 | 569 | 745 |

| County | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|
| Piute County | 195 | 256 | 281 | 367 |
| Sanpete County | 2,594 | 3,060 | 2,969 | 3,885 |
| Sevier County | 3,523 | 3,819 | 3,708 | 4,554 |
| Wayne County | 277 | 344 | 341 | 462 |
| **State Total** | **95,569** | **127,556** | **124,954** | **161,350** |

Note: Registrations are for State of Utah fiscal year (July 1–June 30).
Source: Eric Stucki, Utah Division of State Parks, Personal communication 2004.

The 11 WSAs within the RFO are designated as either closed or limited for OHV use. There are 188,600 acres closed to OHV use and 258,300 acres where OHV use is limited to identified routes. Within the use areas, there are 42 miles of inventoried ways within WSAs that are currently open to motorized travel.

The Factory Butte area in the eastern portion of the RFO was identified as open to OHV use under 43 CFR 8342.1 in the 1982 Henry Mountain Management Framework Plan (MFP). One section of land (640 acres), commonly referred to as Swing Arm City, was identified as an OHV activity area. This section of land is where the most intensive use was occurring. OHV use in the Factory Butte area has continued to increase and expand beyond the OHV activity area to the point that OHVs are causing or will cause considerable adverse effects on T&E plant species in the area. In September 2006, a restriction order notice was published in the *Federal Register* for the Factory Butte area. The restriction order limited OHV use to designated routes on 142,023 acres of the Factory Butte area. The order did not affect OHV use within Swing Arm City; 2,602 acres remained open as an OHV activity area, and the 2,200 acres of North Caineville Mesa remained closed to OHV use. This restriction order will remain in effect until the RFO Record of Decision (ROD) becomes final. BLM proposes to designate the Factory Butte area as a SRMA to allow for recreational opportunities while protecting the T&E species.

The Paiute and Great Western Trail systems run through the western and central portions of the planning area. They are managed under a memorandum of understanding (MOU) between the BLM, USFS, the State of Utah, and several local governments. The Paiute Trail System is a 900-mile system that crosses several BLM FO jurisdictions, as well as USFS, state, Native American reservation, and private lands. The RFO manages 136 miles of the Paiute Trail System. A portion of the Great Western Trail System also crosses the planning area, the majority of which is on USFS lands. The Great Western Trail totals 138 miles within the planning area, with only 4 miles on BLM-administered land.

Use of these trail systems has been monitored over the past 9 years using trail counters to provide readings of use trends over time. During the 2003 season, the BLM used 25 infrared trail counters strategically located across the 2 trail systems. Use data are also based on observations and comparisons offered by Paiute Trail rangers, district trail managers, trail hosts, and representatives from the BLM, state parks, Paiute ATV Trail Committee, and the Southern Utah OHV Club. Most use (90 percent) was via ATVs, with motorcycles and jeeps accounting for the remaining 10 percent. The OHV monitoring report does not include snowmobile use.

The Paiute system sustained a 16% use increase between 2002 and 2003, while the Great Western Trail experienced a 4% increase during the same period. Results are reported in Table 3-26.

**Table 3-26. Paiute ATV and Great Western Trail Systems Estimated Use**

| Trail | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|
| Paiute ATV Trail | 18,000 | 17,268 | 24,866 | 29,663 | 38,618 | 43,367 | 45,310 | 43,152 | 50,245 |
| Great Western Trail | 5,600 | 5,450 | 11,755 | 11,571 | 13,514 | 12,137 | 14,851 | 13,579 | 14,167 |
| Total Annual OHV Use | **23,600** | **22,718** | **36,621** | **41,234** | **52,132** | **55,504** | **60,161** | **56,731** | **64,412** |

Source: USFS 2003.

Growth of OHV use has become a significant issue within the planning area because of concerns related to the potential resource degradation that can result from unmanaged use.

### 3.4.4.2 Transportation and Access (SITLA Lands)

Throughout much of Utah, the State owns and manages four isolated sections in each 36-section township. These are generally sections 2, 16, 32, and 36, and are ordinarily one mile square (640 acres). They are primarily administered by the SITLA for the purpose of economic support of the state's public schools and institutional trust funds. Activities on state land generally are not substantially different from those on the surrounding land administered by BLM. Many of the SITLA lands generate funds through grazing permits, ROW easements and permits, and hydrocarbon or other mineral leases.

Many BLM lands with management restrictions, such as WSAs, have state lands that are adjacent to or within their boundaries. State lands that are completely or almost entirely surrounded by BLM lands with management restrictions, or that are managed with administratively endorsed NPS lands, are termed state inholdings.

Existing access to inheld state lands varies. Some of the parcels have direct access through cherry-stemmed or boundary roads of WSAs. Inheld parcels may or may not currently have access, depending upon whether or not existing vehicle routes lead to them. BLM policy, as required by the Cotter decision, is that "the state must be allowed access to the state school trust lands so that those lands can be developed in a manner that will provide funds for the common school..." This decision confined the issue of access to situations directly involving economic revenues generated for the school trust. For example, if a holder of a state oil and gas lease on a parcel of state land that is completely surrounded by a WSA requires access to develop that lease, BLM must grant the leaseholder reasonable access with consideration given to minimize impacts to wilderness character.

## 3.4.5 Lands and Realty

Public land policy in the United States fundamentally changed with passage of FLPMA in 1976, which directed that "public lands be retained in Federal ownership, unless as a result of the land use planning procedure provided for in this Act, it is determined that disposal of a particular parcel will serve the national interest…." The lands and realty program is a support program to all other resources and resource uses. The goals of the lands and realty program are to manage the public lands to support the goals and objectives of other resource programs, provide for uses of public lands in accordance with applicable laws and regulations while protecting sensitive resources, and improve management of the public lands through land tenure adjustments. The program responds to requests for ROWs, permits, leases, withdrawals, and land tenure adjustments from other programs or outside entities. The frequency of such requests is anticipated to increase as neighboring communities grow and the demand for use of public lands increases. As a result, future management of the lands and realty program will likely become more intense, complex, and costly.

The primary responsibilities of the lands and realty program include land tenure adjustments, withdrawal review, ROWs, and other land use authorizations. The following sections describe the current conditions and status of the lands and realty program within the RFO.

The planning area comprises approximately 5.4 million acres in Sanpete, Sevier, Piute, and Wayne counties, and portions of Garfield County (Map 1-1). (There are also 21,500 acres of Kane County within the planning area; however, these acres lie entirely within Glen Canyon NRA so no decisions within this RMP will affect those lands.) Within this area, BLM manages 2.1 million acres of public land surface and mineral estate, and an additional 95,000 acres of split estate lands (federal minerals where the surface estate is in state or private ownership). Acreage of split estate lands by county is as follows:

- Garfield County: 7,600 acres
- Piute County: 2,800 acres
- Sanpete County: 40,400 acres
- Sevier County: 36,300 acres
- Wayne County: 7,900 acres.

The BLM also has administrative responsibility for 2,082,865 acres of mineral estate where the surface is managed by other federal agencies (USFS and NPS). Chapter 1 summarizes the surface land ownership within the planning area.

### 3.4.5.1 Land Tenure Adjustment

Land tenure adjustments are often associated with accommodating public and private needs, fulfilling State of Utah entitlements, allowing community expansion, consolidating public land, acquiring and protecting important resources, acquiring access to public lands, or serving a national priority. All land tenure adjustments must be in conformance with applicable LUPs and be subject to valid and existing rights. BLM uses several authorities to make land tenure adjustments through disposal and acquisition, including FLPMA and the R&PP Act.

#### Disposals

Lands can be disposed of through sale, exchange, state quantity grant, color of title, state In Lieu selection, desert land entry, Carey Act entry, patent under the R&PP Act or through federal legislation. Public lands have potential for disposal when they are isolated and/or difficult to manage. Disposal actions are usually in response to public request, such as community expansion. Disposals result in a title transfer, wherein the lands leave the public domain. All disposal actions are coordinated with adjoining

landowners, local governments, and current land users. Disposal actions require a site-specific environmental analysis in accordance with NEPA (unless the disposal is a result of federal legislation and is exempted from NEPA review). This NEPA analysis may reveal resource conditions that could not be mitigated to the satisfaction of the authorized officer and may therefore preclude disposal.

Public sales of BLM lands are managed under the disposal criteria set forth in Section 203 of FLPMA and the Federal Land Transaction Facilitation Act. Public lands determined suitable for sale are offered on the initiative of BLM unless their disposal was directed by federal legislation. The lands are sold at not less than fair market value. Specific lands suitable for sale must be identified in the applicable LUP. Any lands to be disposed of through sale that were not identified in the LUP would require a plan amendment before a sale could occur. Public lands classified, withdrawn, reserved, or otherwise designated as not available or subject to sale are unavailable.

Lands can also be disposed of as directed by federal legislation. Two past examples of this within the planning area are:

- Public Law 98-219 (dated February 17, 1984) provided for the transfer of title to 1,273.54 acres of public land within the RFO to the Paiute Indian Tribe of Utah.
- Public Law 102-292 (dated May 26, 1992) transferred title and jurisdiction of 10,172.89 acres of public land within the RFO to the Secretary of Agriculture. These lands were added to and are administered as part of the Fishlake National Forest.

Disposal actions were considered in previous LUPs Of the 5 existing LUPs that cover lands currently administered by the RFO, only the Mountain Valley MFP originally identified lands for sale. These LUPs have subsequently been amended to allow additional land sales. To date, a total of 3,557.63 acres have been sold in the RFO under authority of Section 203 of FLPMA. In addition, since the existing LUPs were prepared, 335.48 acres of public land have been disposed of through exchange; 1,171.94 acres have been disposed of by R&PP sales; 83.02 acres have been disposed of by placer mineral patent; and 640 acres have been disposed of by state grants. Future disposal actions are anticipated, as lands are identified for consideration for disposal to consolidate public land, facilitate community expansion, and remove from federal jurisdiction land parcels that are isolated or difficult to manage.

### Acquisitions

Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, purchase, or donations. Land exchanges are initiated in direct response to public demand, or by BLM to acquire sensitive resources and/or improve management of the public lands. Exchange proposals are evaluated on a case-by-case basis to determine if the proposed exchange would be in the public interest and would achieve RMP goals and objectives. A total of 36.37 acres of private land within the RFO have been acquired by BLM since the existing LUPs were prepared. Future land acquisitions are anticipated, as opportunities arise to acquire access to public lands and protect important resources.

## 3.4.5.2 Withdrawals

A withdrawal is a formal land designation that has the effect of reserving land for a certain use. Withdrawals remove certain public lands from the operation of one or more of the public land laws, excluding lands from settlement, sale, location, or entry, including under the general mining laws and mineral leasing laws. Withdrawals are used to protect major federal investments in facilities or other improvements, reserve lands for specific purposes and use, support national security, protect resources, and provide for public health and safety.

Section 204(l) of FLPMA requires the review of existing withdrawals to determine whether they are still serving the purposes for which they were made. If the withdrawals are no longer serving their intended purpose, they are to be revoked and the lands opened or partially opened to the uses that were previously prohibited. If withdrawals are determined to still meet the purposes for which they were made, they are recommended for extension for a specific term. While BLM can make recommendations to designate, revoke, or extend withdrawals, only the Secretary of the Interior has the authority to actually take these actions.

Approximately 154,700 acres of public land in the RFO are currently withdrawn for various purposes, as shown in Table 3-27. More detailed information on these existing withdrawals can be found in Appendix 5 (Table A5-7). There are currently no withdrawal applications pending. The lands listed in Table 3-27 are subject to withdrawal review.

**Table 3-27. Existing Withdrawals on Public Lands within the RFO**

| Withdrawal Type | Segregative Effect | Affected Acres |
|---|---|---|
| Public Water Reserve | Lands included within public water reserves are withdrawn from settlement, location, selection, sale, or entry. They are withdrawn from location of non-metalliferous minerals. | 12,230.77 |
| Henry Mountain Administrative Site | Lands are withdrawn from settlement, sale, location, or entry under the general land laws, including the mining laws, but not to leasing under the mineral leasing laws. | 41.21 |
| Federal Energy Regulatory Commission (FERC) | When an application is filed with FERC, the lands are withdrawn from operation of the public land laws. However, the lands remain open to location, lease, or disposal of the mineral estate. The issuance of a FERC permit or license withdraws the lands from operation of the mining laws. | 1,207.08 |
| Power Site | Lands are withdrawn from all forms of entry, selection, disposal, settlement, or location. | 72.80 |
| Oil Shale | Lands are withdrawn from lease, except oil and gas and sodium leasing, or other disposal, and from appropriation under the general mining laws. | 141,144.65 |
| **Total** | | **154,696.51** |

Source: BLM 2004c.

### 3.4.5.3 Rights-of-Way

Approximately 475 ROWs exist within the RFO, authorizing construction, operation, and maintenance of powerlines, electric substations, telephone lines and cables, irrigation and culinary water pipelines, springs and wells used for irrigation and culinary purposes, reservoirs, communication sites, ditches and canals, roads, highways, material sites, and other similar uses. The BLM has granted these ROWs to the State of Utah, various counties, individuals, corporations, rural electric associations, partnerships, and other entities. Whenever feasible, BLM encourages joint use and placement of new facilities in previously disturbed areas such as existing communications sites, roads, and highways. There are no officially designated ROW corridors in the planning area; however, several physical corridors containing facilities are not formally designated by an LUP. The BLM is currently addressing designation of energy corridors in an interagency Programmatic EIS (PEIS) for the Western United States (see Section 1.6.4 in Chapter 1).

Prior to 1982, ROWs for federal aid highway projects were issued using the same procedures as for other ROWs. After 1982, these ROWs were processed in accordance with an interagency agreement. The Federal Highway Administration (FHWA) can request the appropriation of public lands from BLM for highway or mineral material site ROWs for highway purposes only. The BLM then issues a Letter of Consent to FHWA, and FHWA, in turn, issues a Highway Easement Deed to the respective state agency. FHWA administers the deed. Since 1982, the BLM has issued more than 90 authorizations for federal aid highway projects statewide. Several of these projects were connected with the construction and/or associated maintenance of Interstate 70 (I-70), Highway 50, Highway 24, and other major highways in the RFO.

Several major power transmission lines in the western part of the RFO connect to the substation located near Sigurd and to numerous power distribution lines scattered across the RFO. Currently, 16 ROWs authorize culinary water sources within the RFO. Details on these ROWs can be found in Appendix 5.

Communication sites host communication equipment and facilities for various uses, such as television, radio, microwave, seismographic, and cellular services. There are currently 37 communication sites throughout the RFO; the BLM has issued 38 ROW grants for various communication uses at these sites. Detailed information is included in Appendix 5 (Table A5-10).

### 3.4.5.4 Leases and Permits

Land use permits authorize short-term uses of public land involving little or no land improvement, construction, or investment. They can also authorize uses that cannot be authorized under other authorities. A temporary use permit authorizes short-term use of public land for activities connected with construction, operation, maintenance, or termination of a ROW.

Leases are usually issued for longer periods of time than permits. The BLM can issue the following types of leases:

- Leases issued under the authority of Section 302(b) of FLPMA
- R&PP leases
- Airport leases.

Section 302(b) leases authorize uses such as residential, agricultural, industrial, and commercial, as well as uses that cannot be authorized under other authorities and that involve substantial construction, development, or land improvement and investment. R&PP leases authorize uses such as parks, shooting ranges, cemeteries, sanitary landfills, and other recreation and public purposes. Airport leases, as the name implies, authorize public airports.

R&PP leases have been issued for landfill sites, shooting ranges, parks, and other recreation and public purposes. Since 1982, the BLM has issued approximately 35 R&PP leases for public lands within the RFO, of which 9 are currently active. The decrease in R&PP leases can be partially attributed to a conversion of some leases to patents and also to a change in BLM policy that occurred in 1988. The policy was (and is) that no new sanitary landfill sites would be authorized on public land, that all existing R&PP leases for such sites would be terminated as quickly as possible, and that existing landfill sites would either be sold or closed and rehabilitated. This policy was adopted to minimize the potential liability associated with such sites. The R&PP Act was amended in 1988 to allow the disposal (sale) of public lands to be used for solid waste disposal or for any other purpose that includes the disposal, placement, or release of any hazardous substance. Sites other than landfills that qualify include shooting ranges, municipal water treatment plants, and municipal equipment storage facilities. Presently, all R&PP leases for sanitary landfill sites have been terminated. Of the 9 active R&PP leases in the RFO, 4

authorize shooting ranges. Information about these ranges is included in Appendix 5 (Table A5-11). The other 5 existing leases authorize parks and a riding arena.

### 3.4.5.5 Renewable Energy

Renewable energy generally is defined as energy derived from sources such as wind, solar, and biomass. Wind energy refers to the kinetic energy generated from wind produced by power-generating turbines. Solar energy includes electricity generated from photovoltaic panels. Bioenergy from biomass refers to energy from organic waste products that are either burned directly or converted to fuels that can be burned to produce energy.

A recent study, *Assessing the Potential for Renewable Energy on Public Lands* (USDI and U.S. Department of Energy [USDOE] 2003), presented a nationwide overview of renewable resources on BLM lands in the western United States. The study employed several screening criteria to consider factors that would affect the economic and technical feasibility of renewable power production. This would help to determine the true potential of an area to produce renewable energy. Screening criteria used in the assessment included access to roads and transmission facilities, available land surface, site condition, land use restrictions, distance to population centers, government policies, and regional market conditions. The primary goal of the assessment was to identify BLM planning units in the western United States with the highest potential for development of renewable energy.

The assessment indicates that portions of the RFO have a high potential for solar, wind, and biomass energy. However, the potential for development of these resources is moderate to low due to their distance from roads, transportation facilities, and population centers. There are no renewable energy facilities currently present within the RFO.

In June 2005, the BLM published the *Wind Energy Development, Final PEIS* (BLM 2005c). This PEIS evaluates the potential environmental and socioeconomic impacts associated with wind energy development on BLM-administered lands in 11 western states over the next 20 years (i.e., 2005–2025). To determine where potential development might occur on the basis of land status and wind energy resources, the National Renewable Energy Laboratory (NREL) constructed a maximum potential development scenario to project the amount of wind power that might be generated over the next 20 years in the 11-state study area. The projection included an assessment of the potential wind power supply and demand. Maps depicting BLM-administered lands with low, medium, and high potential for wind energy development were constructed for each of the BLM FOs in the 11-state study area. These maps serve as only a preliminary screening tool for site selection. Developers must still investigate the properties of the wind regime at any candidate site in much greater detail before assigning a practical value to the site and deciding on a course of development.

High and medium wind resource levels are identified within the easternmost portion of Sevier County, Utah, which is located near 345–500 kilovolt (kV) transmission lines. High and medium wind resource levels are also identified between Loa and Bicknell, east of Hanksville, Wayne County, Utah; and several isolated locations disbursed throughout Garfield County, Utah. Because of the remote nature and lack of existing infrastructure at the Wayne and Garfield County locations, the wind energy may not be economically developable and may create potential economic and resource impacts.

Solar resources are considered minimum to low throughout the RFO (5 to 6 kilowatt hours per square meter per day). The 6 kilowatt hours concentration is primarily located within the northwestern portion of Wayne County, while the 5 kilowatt hours concentration is primarily concentrated within Sanpete, Sevier, and Piute counties.

The programmatic policies and BMPs in the proposed Wind Energy Development Program are appropriate for wind energy development activities in the RFO (see Appendix 15).

## 3.4.6 Minerals and Energy

BLM minerals management policy falls into 3 categories: leasable minerals, locatable minerals, and salable minerals, which are respectively subject to the Mineral Leasing Act of 1920, the general mining laws, and the Materials Act of 1947, and their respective amendments and implementing regulations. Leasable fluid minerals include oil and gas, coalbed natural gas (CBNG), geothermal resources, and tar sands. Leasable solid minerals include coal and sodium. Locatable minerals include metals such as uranium, molybdenum, gold, copper, and manganese, and can include non-metals such as gypsum and limestone. Salable minerals (mineral materials) include sand and gravel, clay, stone, and humate.

The following sections contain summary information concerning mineral resources within the planning area. More specific information is contained in the *Mineral Potential Report* (BLM 2005b) and the coal resource evaluation reports (Appendix 8). The *Reasonably Foreseeable Development Scenario for Oil and Gas and Geothermal Resources (RFD)* contains information about anticipated activities related to those fluid minerals (Appendix 12).

### 3.4.6.1 Leasable Minerals

Exploration and development of leasable minerals occurs in several stages of activity. For the BLM, the process of leasing has 3 stages. The first stage (land categorization through land use planning) involves determining which public domain lands are available for leasing and under what conditions. The second stage is leasing. The third stage includes exploration, development, and production operations. Leasing for fluid minerals and solid minerals follows different regulatory requirements specific to 43 CFR 3100 for oil and gas, 43 CFR 3200 for geothermal resources, 43 CFR 3400 for coal resources, and 43 CFR 3500 for non-energy solid minerals. For oil and gas, geophysical operations do not require a lease. Leases include the right to explore (usually drilling) and to develop any producible oil and gas. All oil and gas leases are offered competitively, and if not bid on, noncompetitively for 2 years. Leasing of geothermal resources is similar to oil and gas. Coal resources require a license for exploration, and a lease for development (production). All coal leasing is by competitive bidding. Non-energy solid minerals require a prospecting permit or license for exploration, and leases are offered competitively, by preferential right, or noncompetitively.

For oil and gas leasing, the BLM has developed leasing categories to apply to all public lands to indicate availability for such leasing. The first 3 categories are open subject to the terms of the lease. The fourth category precludes oil and gas leasing altogether. These categories are described below.

- **Open Subject to Standard Lease Terms**—Areas identified as open to exploration and development subject to standard lease terms and conditions.
- **Open Subject to Timing Limitations and/or Controlled Surface Use (CSU) (minor constraints)**—Areas identified with these stipulations are open to exploration and development with relatively minor constraints. A timing limitation would preclude activities during specified time frames to protect resource values such as wildlife species. A CSU stipulation would require proposals for oil and gas activities to be authorized according to the controls or constraints specified, such as a distance or buffer from a particular area.
- **No Surface Occupancy (NSO) (major constraint)**—Areas identified as NSO are open to exploration and development, but with the major constraint of precluding oil and gas activities that use the surface of the land.
- **Closed**—Areas identified as closed are not available for oil and gas leasing.

Leasing for coal involves identifying lands that may have a minable coal resource, applying unsuitability criteria, and considering the impacts of coal exploration and development on other resources and vice

versa. For non-energy solid leasable minerals, lands that are open or closed to leasing must be identified along with any area-wide terms, conditions, or other special considerations needed to protect other resource values during exploration or development.

## Oil and Gas

The USGS has identified 8 oil and gas plays within the planning area. These are discussed in detail in the *Mineral Potential Report* (BLM 2005b). In simplest terms, oil and gas are most often found in the pore spaces of sedimentary rocks, such as sandstone and limestone, having migrated there from source rocks, such as marine shales, rich in organic material. When rocks containing this organic material are subjected to heat and pressure, the organic compounds break down over time, resulting in oil and natural gas. As the oil and gas are generated, they migrate through the pore spaces of the rock or along fractures until they encounter a structural or stratigraphic trap with an impermeable seal.

The *Mineral Potential Report* identifies high and moderate potential for oil and gas for the planning area. Most of the planning area has a high potential with a variable degree of certainty. It assigns moderate potential to most of Piute County and a relatively small area east of Factory Butte in Wayne County.

CBNG is a gas associated with coal beds. During the coalification process that accompanies burial, organic matter is converted into coal, and natural gas is produced, along with water, carbon dioxide, nitrogen, and heavier hydrocarbon fractions (Rice 2000). A portion of this natural gas becomes trapped as the coal seam is compacted and can later be extracted as an energy resource.

CBNG is produced by pumping water out of the coal, thereby lowering the hydrostatic pressure, which causes the natural gas to desorb from the coal and migrate through the coal cleats and fractures to the production well. Initially, large amounts of water are produced before natural gas can desorb and begin to flow toward the well bore. As the coal beds are de-watered, natural gas production from the well increases over time. Eventually, gas production declines as ground water production diminishes in the last stages of a well's production.

CBNG production poses some significant environmental issues, most notably the production of large volumes of water, particularly in the early stages of well development. Although water produced from CBNG wells can be potable, it is frequently saline to hypersaline and may contain TDS at concentrations up to 170,000 milligrams/liter (mg/L) (USGS 2000). Produced water from CBNG wells can also have high concentrations of dissolved organic constituents and metals. Depending on the water quality, the produced water is disposed of as waste or used for beneficial purposes, although some treatment is often required. Disposal includes surface discharge, including evaporation or injection in subsurface formations. Uses include livestock watering, irrigation, watering artificial wetlands, or water supplies.

Exploration and development of CBNG differs somewhat from conventional gas within the planning area. Two CBNG plays are identified within the planning area, both associated with Cretaceous coal beds. The Uintah and Piceance Basin play is associated with the Ferron Trend that extends approximately from Price southward onto the Wasatch Plateau. The other play is generally on the west side of the Henry Mountains, east of Capitol Reef. The Ferron Trend is assigned a high potential for the occurrence of CBNG, and the play west of the Henry Mountains is assigned a moderate potential, except for low potential near Factory Butte.

An RFD scenario predicting the likelihood of oil and gas exploration and development over the next 15 years within the planning area was developed as part of this planning effort and is included in Appendix 12. The RFD scenario is summarized in the following paragraphs.

The USGS estimates the distribution of undiscovered, technically recoverable hydrocarbon resources in the planning area to be 0 to 20,000 barrels of oil per square mile. As of 2004, some 220 exploration wells had been drilled in the planning area (IHS Energy Well Data 2004). The historical number of wells drilled each year is slightly more than three.

A discovery of oil in 2004 in western Sevier County at the Covenant field near Sigurd has promoted interest in oil and gas exploration in the western part of the planning area. Since then, the interest in leasing, the number of miles of seismic surveys, and the number of exploration wells has increased substantially and focuses mainly on the Sevier and Sanpete valleys, although other areas within the thrust play are being explored.

Since the discovery, a large area of public land near the Sevier and Sanpete valleys has been nominated for leasing, and the bidding for leases has been very competitive. Map 3-11 shows the current leases in the planning area. The RFD scenario assigns a high level of activity (high development potential) and predicts 360 wells to be drilled in the western part of the planning area near the Sevier and Sanpete valleys.

Additionally, 2 other areas have been of interest for leasing in recent years. On the Manti-LaSal National Forest, federal leases are authorized on the Wasatch Plateau and are associated with the Cretaceous Sandstone and CBNG plays. Only a few leases are authorized on the Fishlake National Forest on the Wasatch Plateau or elsewhere in the Forest at this time, but the BLM anticipates additional leasing in these areas in the future. The RFD scenario predicts 49 wells near the southern part of the Wasatch Plateau with a moderate level of activity (moderate development potential).

The other area that has been of interest for leasing in recent years is in the general vicinity of the Dirty Devil River and the benchlands above the river. As of August 2007, there has been no on-the-ground activity.

Aside from the Sevier and Sanpete valleys and the southern Wasatch Plateau, the planning area is assigned a low activity level (low development potential). In these areas, the historic drilling rate is applicable at 3 wells per year or 45 wells during the next 15 years.

As of April 2007, there are 223 oil and gas leases on BLM land, 3 leases on the Fishlake National Forest, and 30 leases on the Manti-LaSal National Forest.

## Geothermal Resources

Geothermal resources found on the federal mineral estate are considered leasable minerals. As such, the same laws governing other leasable minerals cover exploration and development of these resources.

Interest in the potential geothermal resources in Utah increased in the early 1970s, and lease applications were filed for all areas around hot springs or with other evidence of geothermal activity, including the hot springs near Monroe and Joseph within the planning area. The Monroe-Joseph Known Geothermal Resource Area (KGRA) was designated in 1974 due to anticipated interest in leasing geothermal resources in the Sevier Valley. The KGRA contained 16,363 acres in 2 separate parcels surrounding the Joseph hot spring and Monroe-Red Hill springs. Designation of this area as a KGRA meant that future leases could be obtained only through competitive bidding. For the town of Monroe, a limited number of gradient holes and one test production hole were drilled under a USDOE grant to explore the potential of using the geothermal resource for space heating. While the drilling did not locate an adequate resource of high enough temperature for the proposed use, the exploration was very limited.

In the 1980s, interest in geothermal resources waned, and in 1988, the KGRA was declassified after a competitive lease sale without any public interest. Currently, federal geothermal resources in the Sevier Valley or elsewhere in the RFO are not leased.

The *Mineral Potential Report* identifies areas with high, moderate, and low potential for the occurrence of geothermal resources in the planning area. In general, the western part of the planning area is assigned to high and moderate potential, and the eastern part is assigned to low potential.

The area with high potential is centered on the Sevier and Sanpete valleys and flanking ranges. The high potential is based on the known hot springs, including Monroe, Red Hills, and Joseph, and a favorable geologic setting with a relatively high heat flow and with faulting that would appear to provide conduits for the migration of geothermal resources. Monroe and Red Hill springs are located one-half mile east of the town of Monroe, while Joseph hot spring is located 5 miles southeast of the Town of Joseph, all in southwestern Sevier County. Maximum water temperature measured at Monroe, Red Hills, and Joseph range from 151° F. to 171° F. (Utah Geological Survey 2004). Reservoir temperatures have been estimated at slightly over 212° F., which is low for energy production; however, the resource potential has not been extensively explored. Commercial development includes the use of the hot springs at Red Hills and Monroe and a spring at Richfield, both non-federal minerals ownership, for heating swimming pools, a direct use.

The area with moderate potential generally encompasses the Southern High Plateaus and adjacent valleys not included in the area of high potential in the western part of the planning area. The eastern part of the planning area is considered low potential. The *Mineral Potential Report* characterizes geothermal resource development as unlikely in the next 15 years. However, the first competitive geothermal resource lease sale will be held this year (2007) for federal minerals at the Cove Fort-Sulphurdale KGRA, west of the planning area in Beaver and Millard counties, and interest in geothermal resources for energy production is increasing statewide.

The lands managed by the RFO are open to geothermal leasing, subject to the oil and gas leasing categories. As previously stated, no federal lands are currently leased for geothermal resources in the RFO.

## Oil Shale and Tar Sands

### Oil Shale

Oil shale is a very fine-grained, dense, sedimentary rock that is rich in organic material. This organic material can be converted into low viscous oil during thermal decomposition. In the planning area, oil shale deposits occur in the Green River Formation in Sanpete County and Sevier County.

In the planning area, lands with surface exposure of the Green River Formation were withdrawn from lease or other disposal by EO in 1930 in order to reserve the oil shale for the purposes of investigation, examination, and classification. Subsequent EOs and public land laws have modified the original EO. The withdrawal generally overlaps parts of the Gunnison Plateau, the Valley Mountains, and the Wasatch Plateau. The lands withdrawn for oil shale investigation are open to oil and gas as well as sodium leasing but are closed to mineral entry (mining claim location and operations) and certain realty actions. The federal lands withdrawn for oil shale investigation are shown on Map 11 in the *Mineral Potential Report* and are classified as prospectively valuable for oil shale. The *Mineral Potential Report* does not address oil shale because only limited information is available on the mineral potential in the RFO.

Under the Energy Policy Act of 2005, the BLM is required to develop regulations for leasing oil shale deposits. This leasing of oil shale, as well as tar sands, is being addressed in the ongoing Oil Shale and Tar Sands Leasing PEIS for the Western United States (Section 1.6.3 in Chapter 1).

### Tar Sands

Tar sands are loosely defined as any sedimentary rock impregnated with heavy, viscous crude oil that cannot be recovered by conventional techniques but rather requires an external energy source (e.g., heat) to mobilize the oil. Tar sands are also called bituminous sandstone, oil sands, and oil-impregnated rocks. In the planning area, the heavy oil is contained in sandstone, not sand as in Alberta, Canada, where these types of resources are currently being developed.

Areas of high and moderate tar sand occurrence potential were identified in the planning area. In eastern Wayne and Garfield counties, high potential is assigned to the Tar Sand Triangle, which is primarily east of the Dirty Devil River, and to the Circle Cliffs in the vicinity of Capitol Reef National Park. The Tar Sand Triangle encompasses approximately 230 square miles with an estimated 16 billion barrels of oil. At the Circle Cliffs, the Waterpocket Fold (Capitol Reef) is the eastern limb of the Circle Cliffs structure, and the western limb is in Grand Staircase-Escalante National Monument. The Circle Cliffs are estimated to contain more than 860 million barrels of oil. The Tar Sand Triangle and the Circle Cliffs, in part, are defined as Special Tar Sand Areas (STSA) because they contain known and delineated tar sand occurrences. In addition to the STSAs, there are indications of tar sand deposits in scattered outcrops along the Waterpocket Fold, and the occurrences are assigned a moderate potential for tar sand resources.

Tar sands contain heavy oil that could be mined or developed by drilling, depending on the depth of the deposit below the surface and the extraction method chosen. In addition, the federal lands with tar sand deposits also have a high potential for oil and gas. In an attempt to address the leasing of both oil and gas and tar sands, the Combined Hydrocarbon Leasing Act was passed in the early 1980s authorizing exploration and development of both conventional oil and gas and tar sands in a combined lease for both, which were called combined hydrocarbon leases (CHL). Existing oil and gas leases within the STSAs were to be converted to CHLs; however, this conversion process was never completed and the market for oil and gas declined starting in about 1985. A number of existing oil and gas leases are pending conversion to CHLs in the STSAs (Maps 10 and 22 of the *Mineral Potential Report*).

Under the Energy Policy Act of 2005, the BLM is required to develop new regulations for leasing tar sand deposits. As stated above, this leasing of tar sands, as well as oil shale, is being addressed in the ongoing Oil Shale and Tar Sands Leasing PEIS for the Western United States (Section 1.6.3 in Chapter 1).

## Coal

Significant coal resources are delineated in 3 coal fields within the planning area—the Wasatch Plateau, Emery, and Henry Mountains coal fields (Map 3-12). The coal resources within the planning area were evaluated for development potential based on available coal data; assumptions for depth, thickness, and continuity of the deposits; and assumptions on the parameters for certain mining methods. The most data exist for the Wasatch Plateau coal field; and the least are available for the Henry Mountains. The estimated unleased coal resources with development potential at each coal field are as follows: more than 290 million tons at the Wasatch Plateau, 199 million tons at the Emery, and 1,750 million tons at the Henry Mountains. The coal at the Wasatch Plateau would be mined by underground methods; the Emery, underground mostly (190 million tons); the Henry Mountains, surface and underground methods (466 million tons and 1,284 million tons, respectively).

Federal coal leases were authorized at all 3 coal fields in the past, mainly in the 1970s and early 1980s. Development has only occurred at the Wasatch Plateau coal field. At present, the Wasatch Plateau coal field is the only coal field within the planning area with a producing coal mine. The SUFCO Mine in Sevier County includes 7 federal coal leases and accounts for about one-quarter of the total coal production in Utah; the coal production exceeds any other coal mine in Utah. Approximately, 24,000 acres of public lands are under lease at the SUFCO Mine.

BLM acknowledges that the Flat Canyon Tract for the Skyline Mine is located on the Manti-LaSal National Forest and contains lands in Sanpete County (located in the west part of T. 13-14 S., R. 6 E.) with federal coal reserves. This new tract could have the potential for coal development that is not considered in the current unsuitability reports (Appendix 8).

Production and revenue figures are contained in Table 3-28.

**Table 3-28. Sevier County Coal Production[1] (1984–2001)**

| Year | Units[2] | Revenues[3] |
|---|---|---|
| 1984 | 2,141,000 | $96,113,384 |
| 1985 | 1,797,000 | $74,079,461 |
| 1986 | 2,360,000 | $94,657,512 |
| 1987 | 2,228,000 | $80,983,867 |
| 1988 | 2,625,000 | $82,325,371 |
| 1989 | 3,059,000 | $88,794,500 |
| 1990 | 2,887,000 | $79,919,360 |
| 1991 | 3,079,000 | $81,211,800 |
| 1992 | 2,580,000 | $67,144,882 |
| 1993 | 3,553,000 | $87,581,011 |
| 1994 | 3,569,000 | $81,639,793 |
| 1995 | 3,906,000 | $83,269,860 |
| 1996 | 4,214,000 | $85,263,758 |
| 1997 | 4,939,000 | $97,173,834 |
| 1998 | 5,719,000 | $107,867,625 |
| 1999 | 5,763,000 | $104,468,169 |
| 2000 | 5,906,000 | $102,298,887 |
| 2001 | 6,111,000 | $108,531,360 |

Notes:
1—No coal production was reported in Garfield, Piute, Sanpete, or Wayne counties between 1980 and 2001.
2—Units are shown in short tons (2000 pounds).
3—Revenues are in 2001 dollars.
Source: BLM 2003b.

On the basis of coal resource evaluations prepared in 2004–2005, exploration and development of coal resources in the Wasatch Plateau coal field are anticipated; however, coal resources in the Emery and Henry Mountains coal fields are not anticipated to be developed within the planning time frame, i.e., before 2030. This forecast for coal resources is likely to change because market conditions for coal are likely to change.

## Non-Energy Solid Leasable Minerals

Non-energy solid minerals include sodium and potassium. Such minerals in the RFO include salt and alunite. There are currently no prospecting permits or leases for non-energy solid leasable minerals in the RFO. The Sevier and Sanpete valleys, in part, are underlain by deposits of salt and other evaporitic

minerals, and near Marysvale, alunite deposits are associated with the volcanic rocks. Salt is currently mined on private land near Redmond, but there is no current interest in leases on BLM-administered lands. Alunite is an alteration of volcanic rock as clay. Depending on the composition and the proposed use, alunite could be a leasable mineral.

#### Salt

Saline deposits are loosely defined to include all minerals that have precipitated through evaporation from waters of either marine or continental origin (USGS 1969). Saline potassium minerals, such as sylvite and carnallite, are often referred to as potash, and the most common sodium mineral is halite, which is composed of sodium chloride. Other valuable salts include potassium sulfate, sodium carbonate, sodium sulfate, and salts of magnesium, lithium, bromine, and boron. Saline deposits, explored and prospected for their sodium and potassium content, would be considered as non-energy solid minerals. Within the planning area, salt deposits occur in the Arapien Shale in Sevier and Sanpete valleys and in the Pennsylvanian Paradox Formation in the subsurface in the eastern part of the planning area.

Salt mining has a long history in the Sevier Valley, dating back to 1879; it was the first mineral resource produced in the valley. Salt has been prospected at several locations in the Arapien Shale in the Sevier and Sanpete valleys, but there is only 1 mine now operating, which is the RCS salt mine located on private land near Redmond. This is the only current salt-producing mine in Utah besides those on the Great Salt Lake (UGS 2002).

Areas of high salt occurrence potential were identified in the Sevier-Sanpete Valley and in eastern Wayne County. Development of salt deposits on BLM-administered lands within the planning area is considered unlikely in the next 15 years.

#### Potassium (Alunite)

Alunite may be a non-energy leasable mineral if it is explored and developed for its potassium content. Alunite is either a vein deposit or a clay alteration product, both associated with Tertiary volcanic terranes near Marysvale. The altered alunite deposits are closely associated with other clays such as kaolinite. In the *Mineral Potential Report*, clays including alunite were considered as clay only, rather than differentiating specific clays as alteration types.

Alunite was historically mined near Marysvale. The vein deposits, southwest of Marysvale, were extensively mined during World War I, as were some altered alunite deposits north and east of Marysvale. The alunite was mined for potassium for use as an explosive material. Subsequently, during World War II, the alunite deposits were investigated as a possible source for alumina; however, alumina deposits in the Pacific Northwest were more prevalent and cheaper to process into aluminum. Following World War II, primarily in the 1950s and 1960s, the deposits were still evaluated as an alumina source as well as for potassium for fertilizer. Since then, given the variable chemical composition of alumina, potassium, and other constituents, the deposits have generated only limited interest.

### 3.4.6.2 Locatable Minerals

Locatable minerals include base metals (such as copper, lead, and zinc), precious metals (such as gold and silver), and some industrial minerals. Locatable minerals are subject to the U.S. mining laws, including the 1872 Mining Law, and are subject to location as mining claims and mineral entry (patenting). Open, unappropriated public land is open to entry and location, unless it has been withdrawn from the operation of the mining laws. Operations under the mining laws are subject to the "undue and unnecessary" standard in the regulations at 43 CFR Part 3809, and operations in WSAs are subject to the provision under the *Interim Management Policy for Lands Under Wilderness Review (IMP)* regarding non-

impairment of suitability for inclusion in the Wilderness Preservation System. Another locatable mineral management tool is 43 CFR 3715 regulations. These regulations limit use and occupancy of public lands for locatable development to that which is reasonably incident.

Developers of these minerals stake a mining claim (location) over the deposit and then acquire the necessary permits to explore or mine. As of October 2004, there were 4,199 active (recorded) mining claims in the planning area, and 3,158 of those are located on BLM-administered lands (March 2007, LR2000 database) (Map 3-13). In addition, 9 authorized Mining Law Notices are filed in the RFO, 1 plan of operation is pending approval, and 1 plan of operations is pending closure when reclamation is complete (May 2007, LR2000 database).

## Metals

Historically, metals have been prospected near Marysvale, the Henry Mountains, and the Colorado Plateau. Historically, gold, lead, and zinc have been mined in the vicinity of the Tushar Mountains near Marysvale; gold and copper have seen limited development in the Henry Mountains; and uranium has been mined in the Antelope Range north of Marysvale and in the Colorado Plateau. These mines were generally small-scale, underground operations.

The *Mineral Potential Report* assigns high, moderate, and low potential for the occurrence of metals in the planning area. The Colorado Plateau in the eastern part of the planning area is rated as having high potential for metals, including uranium, vanadium, and copper (due to favorable sedimentary deposits, known occurrences, and historic mining), as well as gold (due to known occurrences and favorable intrusive rocks). The western part of the planning area, generally near Marysvale, is assigned high potential for metals, including uranium, due to the presence of volcanic and intrusive rocks, known occurrences of precious and base metals and uranium, and historic mining. In the western part of planning area, moderate potential is assigned to the volcanic terrane outside the area of prevalent mineral occurrences and historic mining, and low potential is assigned to the area not associated with volcanic deposits.

The *Mineral Potential Report*, prepared in 2005, is based largely on market conditions in 2003 when metal prices were generally low. Since that time, the market value of uranium and other metals, including gold, has increased significantly, and exploration and development for metals are more likely under current market conditions. A substantial number of new mining claims have been located since 2005, most notably for uranium, and exploration activity for uranium in the RFO has increased. Between October 2004 and March 2007, the number of mining claims increased from approximately 1,000 to 5,000. In September 2007, the RFO granted an operating permit for the Tony M Mine uranium mine in Ticaboo in Garfield County. A few exploratory permits were also issued in 2007. Although development was considered unlikely in the *Mineral Potential Report*, exploration activity is likely to increase, and development is more likely than that reflected in the *Mineral Potential Report* due to current market conditions in 2007.

## Gypsum

Gypsum is formed by the evaporation of seawater and precipitation of calcium sulfate. Gypsum frequently occurs interbedded with limestone and calcareous shales. Most gypsum mined in Utah, as well as in the United States, is processed for plaster and used in the manufacture of wallboard, lath, and other prefabricated gypsum products. Raw gypsum is used in Portland cement as a setting retardant and in agriculture as a soil amendment.

Within the planning area, exploration and development of gypsum resources has been focused in the Sevier and Sanpete valleys. Gypsum has been mined from the Arapien Shale since 1918. The gypsum deposits in the Sevier Valley are centrally located in Utah, and wallboard and other products are shipped

to regional markets. Mills for processing gypsum are operated by U.S. Gypsum and Georgia-Pacific Corporation near Sigurd; the primary product being wallboard. In addition, Diamond K has constructed a mill at Richfield that processes pulverized gypsum for pharmaceutical uses; the gypsum for that use is mined within the San Rafael Swell. In Utah, gypsum production was 500,000 tons in 2000 and 390,000 tons in 2001.

In the *Mineral Potential Report*, high potential for the occurrence of gypsum was assigned within the planning area. In the Sevier and Sanpete valleys in the western part of the planning area, high potential is assigned to the known occurrence of gypsum associated with the Arapien Shale. In the eastern part of the planning area, gypsum also occurs in the Summerville and other formations; however, gypsum does not occur in beds that are economic to develop at this time.

Development in the Sevier and Sanpete valleys will likely continue over the next 20 years. The *Mineral Potential Report* considers commercial development elsewhere unlikely.

### 3.4.6.3 Salable Minerals

Salable minerals are mineral materials, subject to the Materials Act of 1947, the Surface Resource Act of 1955, and the regulations at 43 CFR 3600. Mineral materials include sand, gravel, clay, and stone. These minerals are disposed by sale contracts and by free use to government agencies and non-profit organizations. Disposal sites may be authorized for exclusive use and non-exclusive use; non-exclusive use disposal sites are community pits and common-use areas. The BLM will not dispose of salable minerals in areas not available by law (e.g., wilderness areas) or in areas identified in LUPs as not appropriate for disposal.

As of May 2007, 18 authorized community pits in the RFO provide commodities such as sand, gravel, topsoil, fill material, and stone. There are 7 exclusive, negotiated sales that provide riprap, sand and gravel, oyster shell, humate, and stone; and also 15 exclusive, free-use permits in the RFO that provide sand and gravel and fill material. Most of these mineral material sites are for the disposal of sand and gravel material (LR2000 database).

The FHWA also obtains sand and gravel and other mineral materials for federal highways and federal aid highways. These disposal sites are not authorized as salable minerals under the regulations at 43 CFR 3600. The disposals are authorized as a mineral material ROW under the regulations at 43 CFR 2800. These ROWs are obtained by the FHWA.

#### Sand and Gravel

Past and present exploration and development of sand and gravel deposits in the planning area has been for local public works projects. The largest single project was the construction of I-70 in the 1970s through the early 1990s. Because sand and gravel are generally the lowest-priced of industrial mineral products, transportation costs from the pit to the point of end use are a large part of the cost to consumers. Consequently, even short transportation distances can adversely affect the cost of the final product, and it is imperative that sand and gravel sources be located as close as possible to the point of use and major roadways. For this reason, the sand and gravel industry is widely dispersed across Utah, and disposal sites are generally associated with roadways and near population centers.

Most sand and gravel disposals in recent years have been to county road departments. Typically, the counties permit disposals between 10,000 and 20,000 cubic yards per year. Commercial disposals vary in volume, and most contracts are issued from community pits where the volume ranges from 30 to 500 cubic yards per individual sale.

## Clay

Clay is generally a salable mineral and is used for a variety of commercial and industrial purposes, including bricks, drilling and quarrying mud, sealants, liquid dyes, paints, china, ceramics, absorbents, molecular sieves, fillers, binders, cosmetics, and inert ingredients in pharmaceutical tablets. The end use of the clay is determined by its physical properties and purity. Physical properties that determine clay usage include plasticity, bonding strength, color, vitrification range, deformation with drying and heating, gelation, crystal structure and size, viscosity, and swelling capacity (USGS 1969). Bentonite and bentonitic clays are among the most desirable; they swell when saturated with water and can be used as natural sealants for reservoirs, stock ponds, ditches, and landfills. High-swelling bentonite is used primarily by the petroleum industry as a component of drilling mud and by the iron industry as a binder in casting molds and casts. As discussed under Section 3.4.6.1, alunite may be a non-energy solid leasable mineral if it is explored and developed for its potassium content, or a salable mineral as a clay (as an alteration product of volcanic rocks).

In Utah, the most common use for clay is for brick and tile. Within the planning area, clay has been used for swelling clays such as bentonitic clay, reservoir liner material, Fuller's earth, and other applications. Most of the clay resources in the planning area have a volcanic association.

On the western side of the planning area, high potential for the occurrence of clay has been assigned near Marysvale because of the alteration zones in the Tertiary Volcanics and known clay deposits in the Sevier Valley, which are also associated with volcanic deposits. This high potential includes alunite deposits. Moderate potential is assigned to the area with volcanic rocks, but where clay alteration is unreported. Two active clay mines exist at Box Creek on the Sevier Plateau in the Fishlake National Forest and at the Redmond clay mine north of Redmond on private land. Other clay deposits have been explored and/or mined in the past on a small scale in the western part of the planning area. In the last 3 or 4 years, a clay prospect in the Antelope Range, north of Marysvale, has been explored for the manufacture of cement and other possible uses.

In the eastern part of the planning area, high potential for clay is associated with outcrop (surface exposure) of the Morrison Formation and Dakota Sandstone. These deposits have been prospected mainly for swelling clays with minor, small-scale development, mostly for local use.

As stated in the *Mineral Potential Report*, clay is likely to be developed on BLM-administered land during the planning horizon of 15 years, but such development is likely to remain relatively small scale.

## Stone

Stone quarries are found throughout Utah and generally are small-scale operations. Transportation cost is a factor in the location of quarries. Most of the stone quarried in Utah and in the planning area is used by the construction industry for building stone, aggregate (crushed rock), or cement (pulverized limestone). Volcanic tuffs in Sevier and Sanpete counties have been quarried for use as dimension stone, crushed for lightweight aggregate in the manufacture of building block, and used as a soil amendment or as nutritional supplement for certain livestock animals, primarily poultry.

In the planning area, stone has been quarried from the following formations for the specified use:

- Limestone of the Green River Formation—building stone
- Sandstone of Crazy Hollow—building stone
- Limestone of the Flagstaff Formation—rock dust, kiln material, and cement manufacturing
- Tuff of the Moroni Formation—poultry feed and agricultural uses
- Tuff of the Joe Lott Tuff—building stone and crushed aggregate as an insulating block
- Tuff of the Bullion Canyon Volcanics—decorative rock (landscape and aquarium display)

- Sandstone of the Moenkopi Formation—building stone
- Navajo Sandstone—decorative rock.

In addition to quarried stone, the public has used pick-up stone or field stone. This material is generally boulders or cobbles and is present in numerous locations in the planning area. The areas that have the most use for collection are generally close to the population centers, and the material of interest has mainly included basalt, tuff, sandstone, or limestone. The demand has been relatively low, and the material is disposed in small tonnages. Although field stone is present throughout the planning area, the principal areas of interest have been in the Sevier Valley and near Loa.

Most of the stone quarries in the planning area are relatively small disposal sites, generally less than 5 to 10 acres. The disposals from BLM public lands range from a few tons to a few thousand tons per year. Development on a small scale at many quarries is likely to continue.

## Humate

Humates are carbonaceous shale associated with weathered coal beds. The material is mined as a dietary colloidal mineral supplement and as a soil amendment for agricultural applications. Humate increases the water holding and ion exchange capacity of the soil, acts as a pH buffer for alkaline soils, and may aid animal and plant growth as humic acids. Most humate in Utah is mined from coal beds in the Ferron Sandstone of the Mancos Shale. The only active mining in the planning area is near Factory Butte in Wayne County.

In the planning area, high potential for occurrence of humate has been assigned to Ferron Sandstone outcrop in the vicinity of Factory Butte, north of the Henry Mountains and to the east side of the Wasatch Plateau. Moderate potential is assigned to the west side of the Henry Mountains, and low potential is identified in the central and western part the Wasatch Plateau.

As stated above, the only authorized active mining for humates in the planning area is north of Highway 24, near Factory Butte; 2 sites are BLM-authorized contracts, and 1 is on State land. The mines are relatively small and only active periodically. Exploration and development are likely to continue near Factory Butte on a small scale and are not considered likely elsewhere in the planning area.

## Other Minerals

Other mineral materials considered in the *Mineral Potential Report* include oyster shell, petrified wood, jasper, agate, and chalcedony. Oyster shell from the Dakota Formation has been used for road surfacing in Wayne County. There is also interest in oyster shell for agricultural use. It is considered unlikely that the other mineral materials considered will be developed beyond hobby or casual use within the next 15 years.

# 3.5 SPECIAL DESIGNATIONS

## 3.5.1 Wilderness Study Areas

In 1964, Congress passed the Wilderness Act establishing (1) a national system of lands to preserve a representative sample of ecosystems in their natural condition for the benefit of future generations, and (2) a process for reviewing other lands for their wilderness potential. The act originally applied only to national forests, national parks, and national wildlife refuges. With the passage of FLPMA in 1976, Congress directed BLM to also inventory, study, and recommend which public lands under its administration should be designated wilderness.

In 1979, the BLM began a wilderness inventory of 22 million acres of public land in Utah. By 1986, following the inventory and public inventory process, and the settlement of appeals, the BLM designated 11 WSAs within what is now the RFO (Table 3-29 and Map 3-14). These WSAs total 446,900 acres, about 21 percent of the RFO. A discussion of the current resource values and uses in each WSA, established in 1980 under the authority of Section 603(c) of FLPMA, can be found in the *Utah BLM Statewide Wilderness Final Environmental Impact Statement* (BLM 1990b). Those values and resources described in the 1990 document have not changed significantly since that time, as documented in monthly WSA monitoring reports available in the RFO.

Although WSAs are, by definition, roadless, several of the WSAs in the RFO do include inventoried ways. During the 1979–1980 Utah Wilderness Inventory, it was necessary to divide routes used by motorized vehicles into "roads" and "ways." To be considered a road, 3 criteria must be met: (1) constructed; (2) maintained by mechanical means; and (3) regular and continuous use. All other motorized routes were defined as ways, which could be left open to motorized travel as long as their use did not "impair" the suitability of the area for wilderness designation. Decisions on which ways will remain open and which will be closed will be made as part of this land use planning process. The miles of inventoried ways are identified by WSA in Table 3-29. Map 3-10, Route Inventory for the RFO, depicts routes and how they overlay with WSAs.

**Table 3-29. Wilderness Study Areas**

| Wilderness Study Area | Acreage | Number of Inventoried Routes | Miles of Inventoried Ways |
|---|---|---|---|
| Bull Mountain | 13,200 | 7 | 3.9 |
| Dirty Devil | 72,100 | 21 | 15.6 |
| Fiddler Butte | 74,000 | 8 | 5.5 |
| Fremont Gorge | 2,800 | 1 | 0.2 |
| French Spring/Happy Canyon | 24,300 | 3 | 3.6 |
| Little Rockies | 40,700 | 3 | 1.3 |
| Mount Ellen/Blue Hills | 81,400 | 12 | 9.3 |
| Mount Hillers | 19,300 | 9 | 6.6 |
| Mount Pennell | 77,100 | 9 | 8.1 |
| Horseshoe Canyon (south) | 39,900 | 4 | 5.6 |
| Portion of the Horseshoe Canyon (north) | 2,100 | 0 | 0 |

| Wilderness Study Area | Acreage | Number of Inventoried Routes | Miles of Inventoried Ways |
|---|---|---|---|
| **Total** | **446,900** | **77** | **59.7** |

FLPMA Section 603(c) directs the BLM to manage the WSAs in a manner that does not impair their suitability for designation as wilderness. The *Interim Management Policy for Lands Under Wilderness Review* (BLM Handbook 8550-1) provides policy guidance to manage WSAs to a non-impairment standard. The wilderness characteristics that must be protected include the appearance of naturalness and outstanding opportunities for primitive and unconfined recreation. The status of the existing WSAs will not change as a result of the Richfield RMP. Only Congress can designate the WSAs as wilderness or release them for other uses.

BLM policies and guidance providing for management of existing WSAs and consideration of values associated with wilderness characteristics in land use planning are detailed in:

- Handbook H-1601-1, *Land Use Planning Handbook*
- Hand book H-8550-1, *Interim Management Policy and Guidelines for Lands Under Wilderness Review.*

The BLM's IMP provides specific policy and guidance for management of most resource values and uses in WSAs. However, VRM decisions and OHV designations and route designations are made during land use planning. A summary of some aspects of WSA management are as follows:

- The non-impairment standard applies to all uses and activities except those specifically exempted from this standard by FLPMA (grandfathered uses and valid existing rights).
- Activities that are permitted in WSAs (except valid existing rights and grandfathered uses) must be temporary, create no new surface disturbance, and not involve the permanent placement of structures. There are exceptions to this standard.
- Grazing, mining, and mineral leasing uses that existed as of the passage of FLPMA (October 21, 1976) may continue in the same manner and degree, even if this would impair wilderness suitability.
- WSAs may not be closed to location under the mining laws in order to preserve their wilderness character (although the wilderness character of the area cannot be impaired through actions to perfect claims located after October 21, 1976). Valid existing rights will be recognized.
- WSAs will be managed to prevent unnecessary and undue degradation, as required by law.

## 3.5.2 Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 established legislation for a National Wild and Scenic Rivers System to protect and preserve designated rivers throughout the nation in their free-flowing condition and to protect and preserve their immediate environments. The act includes policy for managing designated rivers and created processes for designating additional rivers for the National Wild and Scenic Rivers System. Section 5(d) of the Act directs federal agencies to consider the potential for national wild, scenic, and recreational river areas in all planning for the use and development of water and related land resources.

The first phase of the WSR review was to inventory all potentially eligible rivers within the RFO to determine which of those rivers were eligible for consideration as part of the National Wild and Scenic Rivers System. To be eligible, rivers must be free-flowing and possess at least one outstandingly remarkable value. Outstandingly remarkable values are evaluated in the context of regional and/or national significance, and must be river-related. Each river/segment determined to be eligible is then given a tentative classification based on the current level of human development associated with that river/segment. The tentative classification is based on the criteria listed in the classification table from *Wild and Scenic River Review in the State of Utah* (BLM 1996) as noted below.

- A "*wild"* river is free of impoundments, with shorelines or watersheds essentially primitive, and with unpolluted waters.
- A "*scenic"* river may have some development, and may be accessible in places by roads.
- A "*recreational"* river is accessible by road (or railroad), may have more extensive development along its shoreline, and may have undergone some impoundment or diversion in the past.

The BLM conducted a WSR review as part of this planning process. The BLM inventoried 304 drainages/rivers/streams in the lands managed by the RFO. Of those, 12 segments totaling 135 miles were determined to be free-flowing and possess one or more outstandingly remarkable values, making them eligible for further consideration for inclusion in the National Wild and Scenic Rivers System. The eligible rivers, along with their outstandingly remarkable values, tentative classifications, and river miles, are shown in Table 3-30 and on Map 3-15. Detailed descriptions and analysis can be found in Appendix 2 and Appendix 3. BLM policy requires protection of the outstandingly remarkable values, tentative classification, and free-flowing nature of eligible river segments on a case-by-case basis until a suitability determination is made. For rivers designated as suitable as a result of this planning effort, protections for wild and scenic values will continue, and the decisions in the RMP will support such protection. Rivers designated as not suitable will not be managed for wild and scenic purposes but rather in conjunction with other decisions in the RMP.

**Table 3-30. Eligible Wild and Scenic Rivers**

| River or River Segment | Outstandingly Remarkable Value(s) | Tentative Classification | BLM Miles |
|---|---|---|---|
| Dirty Devil River | Scenic, recreational, geologic, fish and wildlife, cultural | Wild | 54 |
| Beaver Wash Canyon | Scenic, ecological | Wild | 6.8 |
| Larry Canyon | Scenic, recreational, wildlife, ecological | Wild | 4 |
| No Mans Canyon | Scenic, recreational, cultural | Wild | 7.1 |
| Robbers Roost Canyon | Scenic, recreational, historic, cultural | Wild | 31 |
| Sams Mesa Box Canyon | Scenic and wildlife | Wild | 9.5 |

| River or River Segment | Outstandingly Remarkable Value(s) | Tentative Classification | BLM Miles |
|---|---|---|---|
| Twin Corral Box | Scenic and wildlife | Wild | 9 |
| Fish Creek | Cultural | Scenic | .25 |
| Fremont River—Fremont Gorge | Scenic | Wild | 5 |
| Fremont River—Capitol Reef NP to Caineville Diversion | Scenic and geologic | Recreational | 4 |
| Maidenwater Creek | Scenic, recreational, geologic, wildlife, ecological | Scenic | 3 |
| Quitchupah Creek | Cultural | Recreational | 1.4 |
| **Total BLM Miles:** | | | **135.05** |

## 3.5.3 Areas of Critical Environmental Concern

FLPMA defines an area of critical environmental concern (ACEC) as an area "within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards" (43 CFR 1601.0-5 (a)). Private lands and lands administered by other agencies are not included in the boundaries of ACECs.

FLPMA states that the BLM will give priority to the designation and protection of ACECs in the development and revision of LUPs. ACECs differ from some other special designations in that designation by itself does not automatically prohibit or restrict other uses in the area. The special management attention is designed specifically for the relevant and important values, and therefore varies from area to area. The one exception is that a mining plan of operation is required for any proposed mining activity that would create surface disturbance greater than casual use within a designated ACEC (in accordance with 43 CFR 3809).

To qualify as a potential ACEC, both relevance and importance criteria outlined in 43 CFR 1610.7-2 must be met. These criteria are defined as:

- **Relevance:** A significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or a natural hazard must be present.
- **Importance:** The value, resource, system, process, or hazard must have substantial significance and value. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern.

### 3.5.3.1 Existing Areas of Critical Environmental Concern

There are currently 4 ACECs in the RFO. These ACECs, and their relevant and important values, are listed in Table 3-31. Refer to Map 3-16 for their locations.

**Table 3-31. Existing Areas of Critical Environmental Concern**

| Area | Acreage | County | Relevant and Important Values |
|---|---|---|---|
| North Caineville Mesa ACEC | 2,200 | Wayne | Relict vegetation |
| South Caineville Mesa ACEC | 4,100 | Wayne | Relict vegetation |
| Gilbert Badlands Research Natural Area ACEC | 3,680 | Wayne | Natural systems or processes—badlands |
| Beaver Wash Canyon ACEC | 4,800 | Wayne | Natural processes, riparian |
| **Total Acreage:** | **14,780** | | |

**North Caineville Mesa ACEC (2,200 acres)**
The 1982 Henry Mountain MFP designated the North Caineville Mesa ACEC as an ACEC to protect the relict vegetation found on the top of the mesa. The ACEC is located north of Highway 24, about 12 miles west of Hanksville. Current management for this ACEC includes the following:

- Closed to OHV use
- Unavailable to livestock grazing
- Consider withdrawing from mineral entry

- Aquire inholdings within the ACEC
- Open to leasing for oil and gas with major constraints (NSO).

### South Caineville Mesa ACEC (4,100 acres)

The 1982 Henry Mountain MFP designated the South Caineville Mesa ACEC as an ACEC to protect the relict vegetation found on top of the mesa, as well as the historic resources that include a circa 1920 bilevel stone cabin associated with early area sheep and goat grazing. South Caineville Mesa is located south of Highway 24, about 12 miles west of Hanksville. Located entirely within the Mount Ellen/Blue Hills WSA, the South Caineville Mesa ACEC is subject to management under the IMP (BLM H-8550-1). Current management for this ACEC includes the following:

- Closed to OHV use
- Unavailable for livestock grazing
- Closed to leasing for oil and gas
- Consider withdrawing from mineral entry.

### Gilbert Badlands Research Natural Area ACEC (3,680 acres)

The Gilbert Badlands Research Natural Area (RNA) ACEC was designated in 1987 to protect the scientific and educational (research) values of the geomorphology found in the Gilbert Badlands. Located in Wayne County south of Highway 24, the Gilbert Badlands are about 15 miles west of Hanksville. Located entirely within the Mount Ellen/Blue Hills WSA, the Gilbert Badlands ACEC is subject to management under the IMP. Current management for this ACEC includes the following:

- Closed to OHV use
- Closed to leasing for oil and gas
- Consider withdrawing from mineral entry
- No surface disturbing activities
- Acquire inholdings within the ACEC boundary.

### Beaver Wash Canyon ACEC (4,800 acres)

Beaver Wash Canyon contains a unique area identified as a cold riparian ecosystem located in an otherwise desert environment. In 1982, it was noted of Beaver Wash Canyon that, "special management is needed to prevent irreparable damage to the ecological refugia (e.g., an isolated habitat that has preserved suitable environmental conditions for those species adapted to it and is unique in its ecological and geographical position in the region), which could be significantly impaired from certain surface disturbing activities" (BLM 1982). Beaver Wash Canyon is a tributary of the Dirty Devil River, east of Highway 95 and about 13 miles southeast of Hanksville. The majority of the Beaver Wash Canyon ACEC (99 percent) is located within the Dirty Devil WSA and is subject to management under the IMP. Current management for this ACEC includes the following:

- Closed to OHV use
- Unavailable for grazing in the majority of the ACEC
- Closed to oil and gas leasing
- Consider withdrawing from mineral entry
- Acquire inholdings within the ACEC boundary.

## 3.5.3.2 Potential Areas of Critical Environmental Concern

During scoping for the Richfield RMP, the public nominated 30 areas for designation as ACECs. Of these 30 areas, 4 were primarily within the Price FO (with small acreages within the RFO) and were evaluated for relevance and importance by the Price FO. The remaining 26 areas, totaling 1.6 million acres, were

evaluated for relevance and importance by the RFO staff as part of the planning process. Based on these evaluations, the RFO identified 16 areas totaling approximately 886,810 acres as potential ACECs (see Table 3-32 and Maps 2-43 and 2-44). Information concerning all 26 nominated areas, as well as their evaluations, is summarized in Appendix 1. More detailed information can be found in the *Evaluations of Areas of Critical Environmental Concern* report (2005), which is available for review in the RFO.

**Table 3-32. Potential Areas of Critical Environmental Concern**

| Area | Acreage | County(ies) |
|---|---|---|
| Badlands Potential ACEC | 88,900 | Wayne |
| Bull Creek Archaeological District Potential ACEC | 4,800 | Wayne |
| Dirty Devil/North Wash Potential ACEC | 205,300 | Wayne and Garfield |
| Fremont Gorge/Cockscomb Potential ACEC | 34,300 | Wayne |
| Henry Mountains Potential ACEC | 288,200 | Wayne and Garfield |
| Horseshoe Canyon Potential ACEC | 40,900 | Wayne |
| Kingston Canyon Potential ACEC | 22,100 | Piute |
| Little Rockies Potential ACEC | 49,200 | Garfield |
| Lower Muddy Creek Potential ACEC | 16,200 | Wayne |
| Old Woman Front RNA Potential ACEC | 330 | Sevier |
| Parker Mountain Potential ACEC | 107,900 | Wayne |
| Quitchupah Potential ACEC | 180 | Sevier |
| Rainbow Hills Potential ACEC | 4,000 | Sevier |
| Sevier Canyon Potential ACEC | 8,900 | Piute and Sevier |
| Thousand Lake Bench Potential ACEC | 500 | Wayne |
| Special Status Species Potential ACEC | 15,100 | Wayne, Garfield and Sevier |
| **Total Acreage:** | **886,810** | |

## Badlands Potential ACEC (Includes North and South Caineville Mesas and Gilbert Badlands Existing ACECs) (88,900 acres)

**Purpose:** The purpose of the Badlands Potential ACEC is to recognize and provide special management for relevant and important scenic, special status plant, natural processes (wind erosion), and riparian and relict vegetation values.

**Description:** The potential ACEC is located in central Wayne County, east of Capitol Reef National Park, north and south of State Highway 24. Notable geographic features include North Caineville Mesa, South Caineville Mesa, Factory Butte, and the surrounding Mancos Shale badlands. Portions of the Badlands potential ACEC are within the Mount Ellen/Blue Hills WSA and, as such, are subject to management under the IMP.

**Area:** The potential ACEC is defined by Class A Scenery, and the badlands formations and relict vegetation areas within the nominated and existing ACECs named above. The potential ACEC contains additional acreage beyond that of the existing ACECs and overlaps the northern portion of the Mount Ellen/Blue Hills WSA.

### Bull Creek Archaeological District Potential ACEC (4,800 acres)

**Purpose:** The purpose of the Bull Creek Archaeological District Potential ACEC is to recognize and protect the relevant and important archaeological values in the area.

**Description:** The Bull Creek Archaeological District is located along Bull Creek in the foothills of the Henry Mountains, directly south of Hanksville. It was listed on the NRHP in 1981.

**Area:** The potential ACEC boundary is coincident with the Bull Creek Archaeological District boundary for which the relevant and important cultural resource values were identified.

### Dirty Devil/North Wash Potential ACEC (includes existing Beaver Wash Canyon ACEC) (205,300 acres)

**Purpose:** The purpose of the Dirty Devil/North Wash Potential ACEC is to recognize and provide special management for relevant and important scenic, cultural, paleontological, wildlife, and SSS values.

**Description:** The Dirty Devil River and side canyons are located southeast of Hanksville in Wayne and Garfield counties.

**Area:** The potential ACEC is defined by Class A Scenery, Mexican spotted owl suitable habitat, and desert bighorn sheep crucial yearlong habitat within the nominated areas. The potential ACEC includes the existing Beaver Wash Canyon ACEC. The potential ACEC overlaps portions of the Dirty Devil, French Spring/Happy Canyon, and Fiddler Butte WSAs; thus management would be governed by the IMP for these areas. The Dirty Devil River and several of its side canyons were determined to be eligible as WSRs.

### Fremont Gorge/Cockscomb Potential ACEC (34,300 acres)

**Purpose:** The purpose of the Fremont Gorge/Cockscomb Potential ACEC is to recognize and provide special management for relevant and important cultural, scenic, riparian, plant, and wildlife resources. Relevant and important values were determined by evaluating the Fish Creek Cove/Cockscomb, Fremont Gorge/Miners Mountain, and Fremont Gateway nominated ACECs.

**Description:** The potential ACEC is located on public lands east of the Red Gate and west of Capitol Reef National Park in the Torrey-Teasdale-Grover area of central Wayne County.

**Area:** The potential ACEC is defined by mule deer crucial habitat within the boundary of the 3 nominated ACECs. The potential ACEC contains the entire Fremont Gorge WSA, which is subject to management under the IMP. The potential ACEC also contains the Fremont River in Fremont Gorge, identified by the BLM as an eligible WSR.

### Henry Mountains Potential ACEC (288,200 acres)

**Purpose:** The purpose of the Henry Mountains Potential ACEC is to recognize and provide special management for relevant and important scenic, wildlife (bison and deer), SSS (i.e., Townsend's big-eared bat, ferruginous hawk, burrowing owl, and hole-in-the-rock prairie clover), and ecological values. The No Man's Mesa portion of the ACEC would be designated as an RNA.

**Description:** Discovered by the Powell Expedition in the 1870s, the Henry Mountains, south of Hanksville, tower over the surrounding desert country.

**Area:** The potential ACEC is defined by crucial bison habitat, crucial mule deer habitat, and Class A Scenery. Other relevant and important values are included within this boundary. The potential ACEC includes portions of the following nominated ACECs: Bull Creek/Birch Creek, Bullfrog Creek, Granite

Creek, Mount Hillers, No Man's Mesa, Ragged Mountain/Slate Creek, and Upper Sweetwater/Tarantula Mesa. The potential ACEC also overlaps all or parts of 4 WSAs: Mount Hillers, Mount Pennell, Bull Mountain, and Mount Ellen/Blue Hills; management of these lands would be governed by the IMP.

### Horseshoe Canyon Potential ACEC (40,900 acres)

**Purpose:** The purpose of the Horseshoe Canyon Potential ACEC is to recognize and provide special management for relevant and important scenic and cultural values, notably Cowboy Cave. Other relevant and important values include riparian corridors and SSS (e.g. Townsend's big-eared bat).

**Description:** Horseshoe Canyon is a tributary of the Green River in northeastern Wayne County and is noted for its rock art. Part of the canyon is included within Canyonlands National Park.

**Area:** The Horseshoe Canyon Potential ACEC is defined by the Class A Scenery within the nominated area. Cultural, riparian, and SSS (e.g. Townsend's big-eared bat) values are included within this boundary. The potential ACEC overlaps portions of the Horseshoe Canyon North and Horseshoe Canyon South WSAs, which would be governed by the IMP.

### Kingston Canyon Potential ACEC (22,100 acres)

**Purpose:** The purpose of the Kingston Canyon potential ACEC is to recognize and provide special management for relevant and important riparian and mule deer habitat in the area.

**Description:** The potential ACEC encompasses the canyon north and south of the Sevier River between the towns of Kingston and Antimony in Sevier County.

**Area:** The potential ACEC is defined by the mule deer habitat within the nominated ACEC. The riparian area is included in the mule deer habitat boundary. (**Note:** The riparian area is largely in state and private ownership.)

### Little Rockies Potential ACEC (49,200 acres)

**Purpose:** The purpose of the Little Rockies Potential ACEC is to recognize and provide special management for scenic and wildlife values, notably desert bighorn sheep. Other relevant and important values within the ACEC include SSS (Townsend's big-eared bat and hole-in-the-rock prairie clover), and ecologic values.

**Description:** The potential ACEC is located in the southwest corner of Garfield County, north of Ticaboo. It overlaps the entire Little Rockies National Natural Landmark and most of the Little Rockies WSA, which would be governed by the IMP.

**Area:** Class A Scenery defines the ACEC boundary.

### Lower Muddy Creek Potential ACEC (16,200 acres)

**Purpose:** The purpose of the Lower Muddy Creek Potential ACEC is to recognize and provide special management for the relevant and important scenic, riparian, and special status plant values in the area.

**Description:** The potential ACEC is located along Lower Muddy Creek in north-central Wayne County and south-central Emery County.

**Area:** Class A Scenery defines the ACEC boundary.

### Old Woman Front RNA Potential ACEC (330 acres)

**Purpose:** The purpose of the Old Woman Front RNA Potential ACEC is to recognize and protect the relevant and important relict vegetation in the area. This RNA ACEC would complement the existing National Forest RNA.

**Description:** The potential ACEC is located in eastern Sevier County adjacent to the Fishlake National Forest.

**Area:** The potential ACEC is on public land adjacent to the USFS Old Woman Cove RNA in the Fishlake National Forest.

### Parker Mountain Potential ACEC (107,900 acres)

**Purpose:** The purpose of the Parker Mountain Potential ACEC is to recognize and provide special management for sagebrush-steppe habitat and wildlife values, notably Greater sage-grouse, Utah prairie dog, and pygmy rabbit.

**Description:** Parker Mountain, also known as the Awapa Plateau, is located in western Wayne County, southwest of the town of Loa.

**Area:** The potential ACEC includes all of the area that was nominated by the public.

### Quitchupah Potential ACEC (180 acres)

**Purpose:** The purpose of the Quitchupah Potential ACEC is to recognize and provide special management for relevant and important cultural resource and riparian values.

**Description:** Quitchupah Creek is located in eastern Sevier County. The creek flows off the Fishlake National Forest across public lands managed by the Richfield and Price BLM FOs.

**Area:** The potential ACEC boundary includes the riparian corridors and associated cultural resource sites and areas that have spiritual value to Native Americans.

### Rainbow Hills Potential ACEC (4,000 acres)

**Purpose:** The purpose of the Rainbow Hills Potential ACEC is to recognize and provide special management for relevant and important mule deer habitat, natural systems, and SSS values in the area.

**Description:** The Rainbow Hills are located just east of Richfield, in a colorful Arapien shale formation. The potential ACEC nomination includes the shale and other lands adjacent to it.

**Area:** The potential ACEC boundary is defined by the crucial mule deer range. Plant and natural system values are included within this boundary.

### Sevier Canyon Potential ACEC (8,900 acres)

**Purpose:** The purpose of the Sevier Canyon Potential ACEC is to recognize and provide special management for relevant and important mule deer habitat, riparian, and SSS values in the area.

**Description:** Sevier Canyon (also known as Marysvale Canyon) is a gorge bordering the Sevier River between the towns of Sevier and Marysvale. Big Rock Candy Mountain (privately owned) is located in the canyon.

**Area:** The potential ACEC boundary is defined by the mule deer habitat and the riparian corridor on public land along the Sevier River. (**Note:** The riparian area is largely in private ownership.)

### Thousand Lake Bench Potential ACEC (500 acres)

**Purpose:** The purpose of the Thousand Lake Bench Potential ACEC is to recognize and provide special management for relevant and important cultural resources, special status plants, and riparian areas.

**Description:** The potential ACEC is located in southeastern Sevier County, south of Interstate 70 and east of Thousand Lake Mountain.

**Area:** The potential ACEC is defined by riparian areas and the locations of cultural resources and special status plants.

### Special Status Species Potential ACEC (15,100 acres)

**Purpose:** The purpose of the Special Status Species Potential ACEC is to recognize and provide special management for isolated and scattered locations of specific plant and wildlife species identified in the evaluations of the various ACEC nominations as relevant and important and not included in other potential ACECs. Species include Winkler cactus, Wright fishhook cactus, last chance townsendia, rabbit valley gilia, Cronquist wild buckwheat, basalt milkvetch, hole-in-the-rock prairie clover, Psoralea globemallow, Jane's globemallow, Townsend's big-eared bat, Allen's big-eared bat, big free-tailed bat, fringed myotis, ferruginous hawk, bald eagle, burrowing owl, long-billed curlew, southwestern willow flycatcher, Greater sage-grouse, bluehead sucker, flannelmouth sucker, leatherside chub, and desert night lizard.

**Description:** See "Purpose" above.

**Area:** The Special Status and Endemic Species ACEC is represented by documented locations of the above-listed species. In contrast with the other potential ACECs, this ACEC is composed of many small, discrete areas rather than a large contiguous area.

## 3.5.4 Other Designations

### National Trails

National Historic Trails are "extended trails which follow as closely as possible and practicable the original route or routes of travel of national historical significance" (NPS 2001a). The purpose of the National Historic Trails is "the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment" (NPS 2001a).

The Old Spanish National Historic Trail, designated December 4, 2002, by the Old Spanish Trail Recognition Act of 2002, is a 2,700-mile trade route extending from Santa Fe, New Mexico, to Los Angeles, California, passing through the states of Colorado, Utah, Arizona, and Nevada. The trail splits into 2 routes before entering Utah and continues through the State of Utah within the planning area (Map 3-24). The trail corridor is defined topographically based on local land features because no actual trail tread or associated sites have been identified within the decision area.

The Northern Route of the Old Spanish National Historic Trail enters Utah near Moab, splits into two sections at Fremont Junction near I-70, and rejoins near the town of Circleville. From there, the Northern Route continues southwest along the Sevier River and U.S. Highway 89, through the Markagunt Plateau along SR 20 in the decision area, and into the Parowan Valley, where it heads southwest out of Utah to rejoin the Armijo Route south of St. George, Utah.

### National Scenic Byways

The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991 and reauthorized in 1998 under the Transportation Equity Act for the 21st

Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archeological, cultural, historic, natural, recreational, and scenic qualities. All-American Roads must exhibit multiple intrinsic qualities. For a highway to be considered for inclusion within the National Scenic Byways Program, it must provide safe passage for passenger cars year-round, it must be designated a State Scenic Byway, and it must have a current corridor management plan in place. Installation of offsite outdoor advertising (e.g., billboards) is not allowed along byways. There are two national scenic byways in the planning area.

**All American Road-Scenic Byway 12 (State Route 12).** Scenic Byway 12 takes the visitor to the heart of the American West. This exceptional 124-mile route negotiates an isolated landscape of canyons, plateaus, and valleys ranging from 4,000 to 9,000 feet above sea level. The visitor encounters archaeological, cultural, historical, natural, recreational, and scenic qualities while driving this exhilarating byway. The portion on the RFO is the descent from the forested slopes of Boulder Mountain past scenic views of Miners Mountain, the Cocks Comb ridge, and the Red Gate formation to the junction with Utah State Highway 24 at the town of Torrey (near Capitol Reef National Park).

**Trail of the Ancients (State Route 95).** This allows the visitor to explore the long and intriguing occupation of the Four Corners region by Native American peoples, traveling through the archaeological heartland of America while crossing the beautiful and diverse landscapes of the Colorado Plateau. The RFO portion begins at Hanksville. The Bicentennial Highway, which is a portion of the Trail of the Ancients, runs south with expansive views of the Burr Desert and the Henry Mountains. The Dirty Devil Scenic overlooks at Burr Point and west Angel Point are accessible from the Highway, as is the Bull Creek Pass Backcountry Byway, the Poison Springs road, and the Hog Springs Picnic area and hiking trail.

## Utah Scenic Byways

Highways that have been designated by official state declaration for their scenic, historic, recreational, cultural, archaeological, or natural qualities. The byways are paved roads that are generally safe year-round for passenger cars. Installation of offsite outdoor advertising (e.g., billboards) is not allowed along byways.

**Capitol Reef Country Scenic Byway.** Highway 24 is the only route through the heart of Capitol Reef National Park and leads to Fishlake National Forest, the sprawling San Rafael Swell, and the colorful Maze District of Canyonlands National Park.

**Fishlake Scenic Byway (U-25).** Fishlake Scenic Byway U-25 runs through the Fish Lake Basin, which is about 8,850 feet in elevation. In the basin lies a geological wonder, a 2,500 acre lake, formed by the shifting of the Earth‘s faults.

## BLM Back Country Byways

The Back Country Byway Program was developed by BLM to complement the National Scenic Byway Program. These byways highlight the spectacular nature of the western landscapes. Back Country Byways vary from narrow, graded roads that are passable only during a few months of the year to two-lane paved highways with year-round access. There is 1 BLM Back Country Byway in the planning area.

**Bull Creek Pass National Back Country Byway**. This Byway winds for 68 miles through Utah’s Henry Mountains. The view from the route includes colorful canyons, steep cliffs, vast badlands, and rugged alpine mountains. The Byway climbs nearly a mile as it loops through this colorful, vibrant mountain range set between Capitol Reef and Canyonlands National Parks.

## Utah Scenic Backways

State Scenic Backways are roads that do not generally meet federal safety standards for safe year-round travel by passenger cars and have been designated by official state declaration for their scenic, historic, and recreational qualities. Utah Scenic Backways often require use of four-wheel drive, and road conditions vary with factors such as season and weather. There are 7 Utah Scenic Backways within the planning area.

**Cathedral Valley Scenic Backway**. The road starts at I-70, runs south approximately 55 miles to Highway 24 one-half mile west of Caineville past the Limestone Cliffs, through the Red Desert, and the Last Chance Desert. There are striking views of the Mussentuchit badlands, and on the NPS lands, the Temple of the Moon and Sun formations are accessible. The road is a single-lane road with a dirt base. High clearance vehicles are recommended.

**Cove Mountain Road.** The Cove Mountain Road in the Fishlake National Forest extends from Koosharem on SR-62 north to Glenwood on SR-119. The route is particularly popular because of its spectacular autumn scenery and panoramic views of the Sevier and Koosharem Valleys.

**Gooseberry/Fremont Road.** Beginning 2 miles north of Fremont on SR-72, this Backway runs 40 miles through the Fishlake National Forest to its end at I-70 in Salina Canyon. The abundance of trees makes this road a popular fall color trek.

**Kimberly/Big John Road.** The route begins at the city of Junction on US-89. Turning onto SR-153, it continues past Puffer Lake and Elk Meadows. On Fishlake National Forest Road, the Backway turns north to Big John Flat and climbs over the Tushar Mountains. The route continues through the historic Kimberly mining district to the freeway interchange near Fremont Indian State Park at I-70.

**Notom Road and Burr Trail Backway**. Notom Road runs from Utah Highway 24 at the eastern boundary of Capitol Reef National Park to the junction of Burr Trail Road. The Burr Trail runs south to Bullfrog on Lake Powell. The Notom Road segment parallels the Waterpocket Fold and provides an excellent opportunity to view the magnitude of this colorful and desolate rock spine. East of the Backway are expansive views of the Henry Mountains and Mancos Mesa foothills. The Burr Trail road crosses softly rolling Mancos hills and then follows a deeply incised canyon to Lake Powell.

**Posey Lake Road Backway.** The Scenic Backway starts at the town of Bicknell and ends at the town of Escalante. The portion of the Scenic Backway managed by the RFO crosses the Awapa Plateau, also known as Parker Mountain. This road is primarily single-lane dirt with gravel in places. It is closed in winter. The lands are sagebrush steppe and home to pronghorn antelope, sage-grouse, pygmy rabbits, as well as prairie dogs.

**Thousand Lake Mountain Road.** From SR-72, 5 miles north of Fremont, this Backway travels southeast through the Fishlake National Forest to join the Cathedral Valley Scenic Backway. The route provides access to Elkhorn Campground in Fish Lake National Forest and continues back to its point of origin at SR-72.

## National Heritage Areas

A “national heritage area” is a place designated by Congress where natural, cultural, historic and recreational resources combine to form a cohesive, nationally distinctive landscape arising from patterns of human activity shaped by geography. These areas tell nationally important stories about the nation and are representative of the national experience through both the physical features that remain and the traditions that have evolved within them. There is 1 national heritage area in the planning area.

**National Mormon Pioneer Heritage Area.** The national designation recognizes the history, architecture, and culture along "the heritage highway," and includes U.S. Highway 89 from Fairview to Kanab, the Boulder Loop (state highways 12 and 24), the All American Road (Highway 12) and the 6 counties through which the route passes: Sanpete, Sevier, Piute, Wayne, Garfield, and Kane.

# 3.6 SOCIAL AND ECONOMIC CONDITIONS

The socioeconomic study area includes all of 4 counties (Piute, Sanpete, Sevier, and Wayne) and the eastern portion of Garfield County. (As stated previously, there are also 21,500 acres of Kane County within the RMP planning area. However, because those lands lie entirely within Glen Canyon NRA and no decisions within this RMP will affect those lands, Kane County is not included within the socioeconomic study area.) This section summarizes demographic and economic trend information, including descriptions of the key industries in the 5 county socioeconomic study area that could be affected by BLM management actions. Study area industries most affected by BLM land management policies and programs are (1) production agriculture, in particular cattle grazing and production, (2) mining and oil and gas production, and (3) travel, tourism, and recreation. BLM lands provide areas for activities such as hunting and fishing, hiking, camping or picnicking, traditional natural resource uses (e.g., firewood or pine-nut gathering), and sightseeing.

Although some resources managed by the RFO may be of regional or national interest, this Proposed RMP/Final EIS assumes that RFO management decisions primarily affect the economies of the counties and towns within the 5 counties encompassed by the planning area boundary. This section presents baseline information used to help analyze the socioeconomic impacts of the alternatives considered in this Proposed RMP/Final EIS. More detailed information is provided in the *Baseline Socioeconomic Profile* (BLM 2003b), and this section refers to numerous figures and tables from that document.

## 3.6.1 Social Background

The *Baseline Socioeconomic Profile* (BLM 2003b) discusses characteristics of the study area in some detail. The 5 counties in the study area are predominantly rural, with large land areas and dispersed populations. The number of persons per square mile ranges from 0.9 in Garfield County to 14.3 in Sanpete County, well below state and national averages.

At least half of the lands in each county within the socioeconomic study area are publicly owned and federally managed. As shown in Table 3-33, the socioeconomic study area comprises more than 80 percent federally managed land, with 12.5 percent in private ownership. Lands managed by the RFO total 2.1 million acres, about 39 percent of the planning area.

**Table 3-33. Land Ownership in the Socioeconomic Study Area**

| Area | Total Population (2000 Census) | Land Area (Sq. Miles) | Persons Per Square Mile | Federally Owned Land | Privately Owned Land |
|---|---|---|---|---|---|
| **Garfield County** | 4,735 | 5,176 | 0.9 | 90.0% | 5.1% |
| **Piute County** | 1,435 | 757 | 1.9 | 74.3% | 12.7% |
| **Sanpete County** | 22,763 | 1,598 | 14.2 | 51.7% | 42.5% |
| **Sevier County** | 18,842 | 1,910 | 9.9 | 76.0% | 19.1% |
| **Wayne County** | 2,509 | 2,464 | 1.0 | 85.6% | 3.5% |
| **Socioeconomic Study Area** | **50,284** | **11,905** | **4.2** | **80.7%** | **12.5%** |
| **Utah** | **2,193,000** | **84,583** | **25.9** | **63.9%** | **21.6%** |

Note: The Garfield County figures include all land in the socioeconomic study area, not just land in the field office study area.
Source: Utah Division of Travel Development 2004; U.S. Census Bureau 2004.

The socioeconomic study area has sustained human populations for thousands of years. The people of this region, dating back to the origins of the Ute, Paiute, Navajo, and Hopi tribes, and even earlier civilizations such as the Fremont and ancestral Puebloan peoples, maintained very close connections to the land. As these native people lived in or moved through the area, the area's plants and animals provided them with food, medicine, and clothing.

European settlement began in 1849 with the establishment of Manti in Sanpete County. Settlement expanded throughout the area over the next 30 years, with Hanksville in eastern Wayne County being settled in 1882. Settlers supported themselves by irrigating the valleys, running livestock on the rangelands, and, to a lesser extent, mining and lumbering. Settlements were closely tied to locations where water was available for farming and forage available for livestock. The Sevier-Sanpete Valley proved fertile land for farm production, whereas the areas around Parker Mountain and Monroe Mountain and extending through what is now Capitol Reef National Park into the Henry Mountains were used for grazing livestock. Some of the current livestock permittees are heirs of families who have grazed stock on the public land for generations.

As early pioneers labored to make a living with agricultural products, prospectors were exploring the mountains of the area in search of metals and minerals that could be sold for a profit. Specifically, what is now Piute County supported a rich mining boom in the late 1800s. With industrialization and mechanization of agriculture, many of the initial pioneer settlements in the region matured. Throughout the 20th century, the roots of the natural resource–related industries and the persons associated with them became well established in the area. Although today, few families earn their livelihoods solely from these basic industries, agriculture and, to a lesser extent, mining are still an integral part of the social structure of the area. Over time, the connection to public lands has changed from economic to social and traditional. The historical uses of public lands that continue today include hunting, wood gathering, pine-nut collecting, family picnics and other family gatherings, wildlife viewing, Christmas tree cutting, and other traditional activities. These uses provide opportunities for socialization within and between families and other social groups. Large population centers resulting from industrialization and urbanization have heightened social regard for areas without much human development. The socioeconomic study area provides several opportunities for such areas. Use of these areas for outdoor recreation activities has increased over the past 20 years. Major recreational resources in the area, such as the Paiute and Great Western Trails, hiking and canyoneering opportunities in the Dirty Devil region, and bison viewing and hunting in the Henry Mountains attract many people each year to the region. Hunting and fishing opportunities in the socioeconomic study area and in the nearby Fishlake and Manti-LaSal National Forests complement camping, wildlife viewing, and other recreational activities, as people look for a break from urban life. Residents in the socioeconomic study area understand and enjoy the lifestyle that comes with living in the area. The recreation component has created yet another connection to the public lands that is important not only to local residents but also to those who come from other areas in Utah, other states, and other countries to enjoy these natural resources.

A statewide social survey was conducted by Utah State University (USU) in 2007 to assess the ways in which Utah residents use and value public land resources and their views about public lands management. A complete analysis of the results had not been completed as of February 2008. "Public lands." as described in the study, consist of all federal and state managed lands, not just BLM lands. Surveys were mailed to a random sample of residents of all 29 Utah counties. According to the authors, the study and sample sizes are designed to produce results generalizable at the statewide level, with generalization increasingly risky as the sample area diminishes. For example, the data may lose much of their statistical validity at the individual county level. The areas sampled do not necessarily coincide with FO planning area boundaries—that was not the focus of the study. Nonetheless, the study provides current and interesting results not available elsewhere and shows the dependence of Utah residents on public lands for a variety of economic and recreational pursuits. Appendix 17 contains initial summary results for

Garfield, Piute, Sanpete, Sevier, and Wayne counties. Due to the considerations noted above, these results cannot be used as the basis for significant conclusions regarding the relationship of local residents to RFO lands. Thus, the preliminary USU results do not affect the formulation of alternatives in Chapter 2 or the analysis of impacts in Chapter 4.

USU also reviewed the socioeconomic analysis in the RFO DRMP/DEIS in a report under contract to the Six County Association of Governments, which includes Piute, Sanpete, Sevier, and Wayne counties. A section of the report contains summaries of two earlier social surveys, both also conducted by USU for (or included portions of) Wayne and Garfield counties in 2001 and 2004. These two studies show Wayne and Garfield County residents have similar dependence on public lands for a variety of economic and recreational pursuits as found in the results in the 2007 statewide social survey.

Another section of the report summarizes a large body of information on OHV users that provides additional insights into the social significance of OHV use in the socioeconomic study area. It cites several regional studies, not in the socioeconomic study area, that found that riders place great importance on the social and environmental aspects of the OHV experience, OHV activities tend to be more popular with rural residents than those from urban areas, and OHV management concerns vary on topics such as facility development, enforcement, and environmental items. The report also cites national studies that show there has been a large increase in OHV participants and riders over the past 20 years. This body of OHV-related research suggests OHV recreation has become an important way for local residents, and OHV recreationists worldwide, to connect to the public lands.

#### 3.6.1.1 County Perspectives

The following statements, taken from county plans, represent county perspectives on the management of public lands occurring in the 5 county area. County plans are summarized in Appendix 13.

**Garfield County:** "The county deems it critical that Resource Management Plans provide for range improvements, that current grazing on public lands be preserved, that county water rights be maintained, that public lands timber harvesting be continued, and that mining leases be considered and encouraged" (Garfield County 1998).

**Piute County:** "It is in the county's best interest that BLM and USFS lands be managed for multiple use and that access is maintained on public lands" (Piute County 1994).

**Sanpete County:** "The culture and sentiment of Sanpete County residents is such that they…will want input on the management and use of public lands in the county" (Sanpete County 1997).

**Sevier County:** "Multiple use activities on public lands in Sevier County should continue and should include uses such as agricultural grazing, fishing and hunting, mineral exploration and mining, recreation, wildlife habitat, and timber sales"(Sevier County 1998).

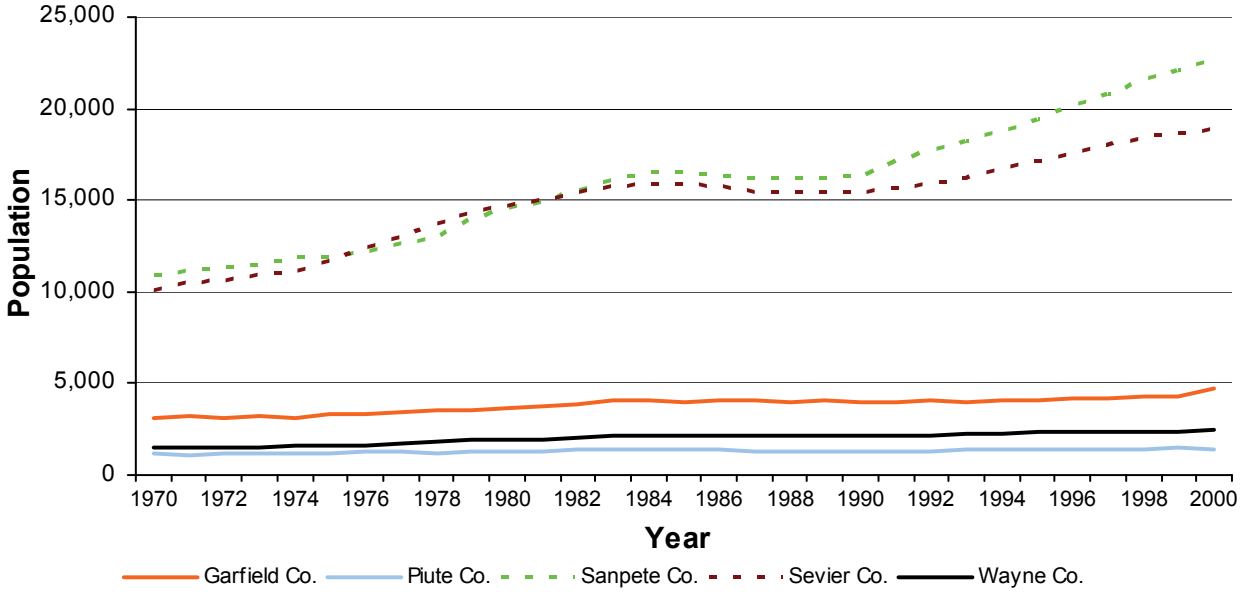
**Wayne County:** "It is the county's desire that each resource be managed for the optimal economic return, but in ways which do not sacrifice the county's natural aesthetic values" (Wayne County 1994).

#### 3.6.1.2 Population

Approximately 85 percent of the people residing in the socioeconomic study area live in Sanpete and Sevier counties. In contrast, the eastern portion of the socioeconomic study area is very sparsely populated because of its isolation, aridity, and ruggedness.

Population trends for the 5 counties are plotted in Figure 3-20. Population growth in the 5 counties is on an upward trend, although Garfield, Piute, and Wayne counties are growing at a very slow rate. The higher growth rates of Sanpete and Sevier counties have been sustained by increased business opportunities following the construction of I-70, construction of an annex of the Utah State Prison, and expansion of other business related to retail trade.

**Figure 3-20. Population Estimates, 1970–2000**




Source: BLM 2003b.

The population of the socioeconomic study area increased by almost 8 percent during the 1980s and grew by 24.9 percent in the 1990s. Population growth in the socioeconomic study area lagged significantly behind the state's population growth during the 1980s but outpaced the state's growth during the 1990s (BLM 2003b). The 1980s were marked by a 6.5-percent decline in net migration (i.e., the net result of persons moving in and out of the area). However, the 1990s showed a marked change in this trend. Net migration increased in the socioeconomic study area by nearly 16 percent. These trends are similar to the statewide pattern during both the 1980s and 1990s, with the socioeconomic study area doubling the statewide trends (BLM 2003b).

## 3.6.2 General Economic Characteristics

All of the counties within the socioeconomic study area, as well as the entire State, showed large increases in the civilian labor force throughout the 1990s. Only Sevier and Garfield counties had percentage increases lower than the State of Utah as a whole, and their increases were more than 20 percent and nearly 19 percent, respectively. The 9-year average annual increase in the civilian labor force for the socioeconomic study area was 2.53 percent, slightly higher than the State's 2.49 percent average. The increases varied within the socioeconomic study area, from a 2.1-percent annual increase in Garfield County to a 3.75-percent increase in Wayne County (BLM 2003b).

Total employment in the socioeconomic study area increased more than 50 percent over the last decade, from 17,202 jobs in 1990 to 25,876 jobs in 2000. This growth rate exceeded the national rate but lagged behind the Utah growth rate.

Throughout the 1990s, unemployment in the socioeconomic study area showed a downward though sometimes unsettled trend. Except for 1993, when the national and socioeconomic study area rates were the same, the unemployment rate for the socioeconomic study area was higher than the national and state rates. All trends show a reversal between 2000 and 2001, with marked increases in the unemployment rate. The yearly average unemployment rate for the years 1990–2001 was 7 percent for the socioeconomic study area, 5.5 percent for the nation, and 3.9 percent for the State of Utah (BLM 2003b).

Total personal income for the socioeconomic study area well exceeded $844 million for 2000, an increase of more than $254 million since 1990. This represents a total growth in real (inflation-adjusted) personal income of more than 43 percent in 10 years (BLM 2003b).

The socioeconomic study area has shown minor changes in how income is earned. Labor income (e.g., wages, salaries, and self-employment income) during 2000 was 63.6 percent of total personal income, whereas investment income was 17.1 percent. These numbers represent small decreases over the last two decades. During the same period, transfer payment income (largely derived from Social Security or other retirement benefits, Medicare and Medicaid benefits, and other income support and assistance) has absorbed the decreases in investment and labor income, growing from 14.6 percent of total personal income in 1980 to 17.5 percent in 1990 and 19.3 percent in 2000 (BLM 2003b). These trends are similar to state and national trends.

Per capita income (in 2002 dollars) in the socioeconomic study area has increased at a much slower rate than statewide per capita income, resulting in an increasingly large disparity between socioeconomic study area and state income levels. In 1990, socioeconomic study area per capita income was 79.3 percent of the per capita income throughout the state. That percentage decreased to 70 percent of state per capita income in 2000. In 2000, the socioeconomic study area per capita income was $16,793, significantly below the national figure ($30,150) and state figure ($23,977).

All 5 counties had a higher poverty rate (percentage of individuals living in households with an income below thresholds defined by the U.S. Census Bureau) than state or national rates in 1989, but in 1999, Sevier County and Garfield County each had a lower poverty rate than the United States. The percentage of individuals within the socioeconomic study area living below the poverty level declined from 17 percent in 1989 to 13 percent in 1999 (BLM 2003b).

### 3.6.2.1 Employment and Earnings by Industry

Rural areas like the socioeconomic study area are often more dependent on traditional natural resource-based industries, such as mining and agriculture. For example, the socioeconomic study area is more dependent on mining and agriculture jobs than the State of Utah as a whole. Mining and farm employment made up just over 2 percent of Utah's total employment in 2000, whereas those same industries provided for just over 11 percent of jobs in the socioeconomic study area. The mining and agriculture industries are also important as an economic base for the socioeconomic study area because they export their goods outside the region and in turn support ancillary industries such as retail trade, construction, and services (BLM 2003b).

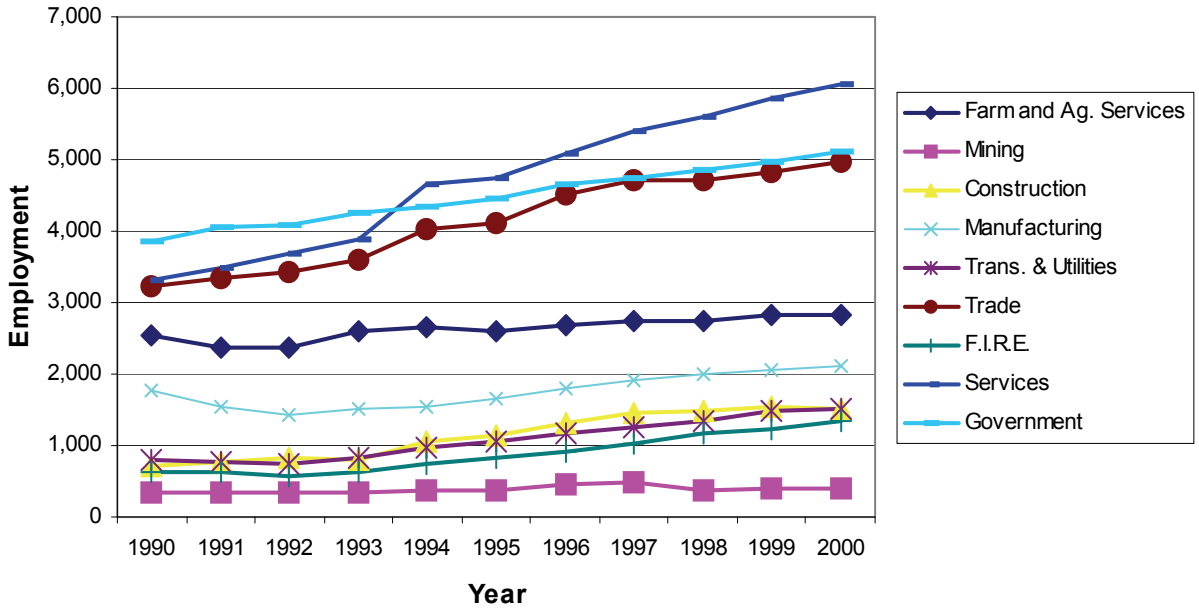
Services, government, and retail trade comprised more than 60 percent of employment in the socioeconomic study area in 2000 (BLM 2003b). Figure 3-21 shows the trends in employment by industry during the last decade. Industries showing the greatest numerical increase in employment from 1990 to 2000 included services (2,744 new jobs), trade (1,751 new jobs), government (1,253 new jobs), and construction (815 new jobs). Industries reporting the slowest growth in the socioeconomic study area included farm and agricultural services and mining, both increasing by 12 percent over the last decade.

Transportation and utilities; construction; and finance, insurance, and real estate (F.I.R.E.) showed significant growth but accounted for relatively small percentages of total employment.

Mineral development, transportation, and utilities continue to provide the highest-paying jobs in the socioeconomic study area, although both industries have experienced a decline in average real earnings per job over the last decade, as shown in Figure 3-22. The government and manufacturing sectors have shown growth in average real earnings per job and now provide the third and fourth highest paying jobs in the area. Farm and agricultural services, trade, and F.I.R.E. reported the lowest earnings per job throughout much of the latter part of the 1990s. Agriculture and mining showed the most volatility in average earnings per job over the course of the decade.

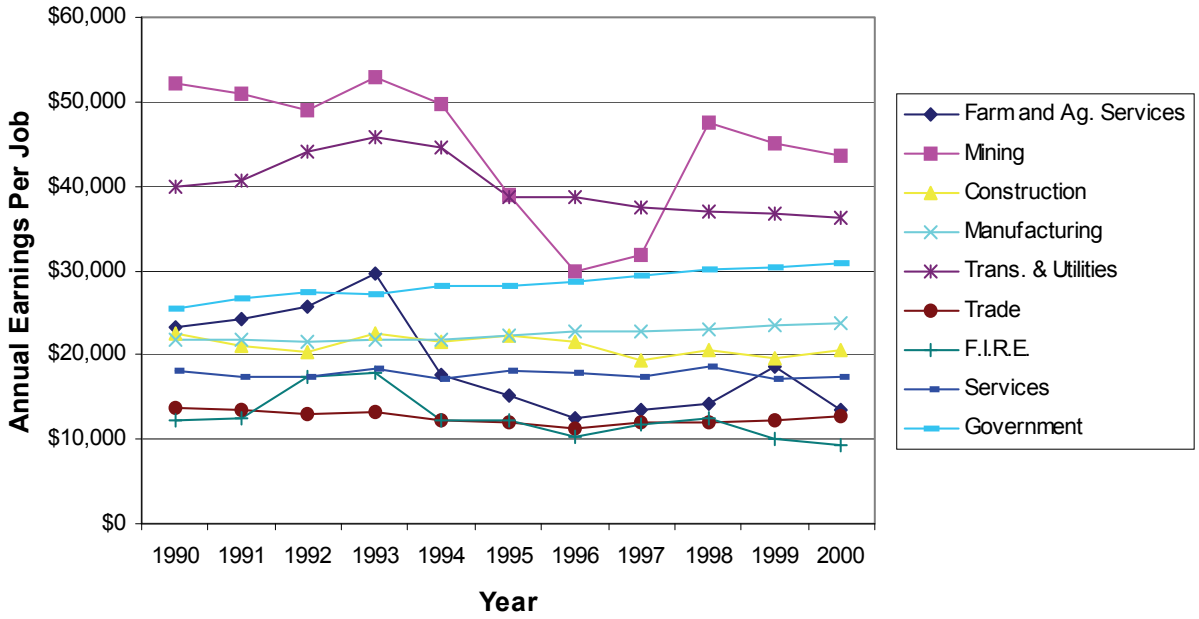
Gross real earnings for all socioeconomic study area industries grew by more than 40 percent from 1990 to 2000. Earnings from government jobs have consistently been higher than all other industries, totaling more than $157 million in 2000 and accounting for nearly 29 percent of all earnings. The service sector has become an integral part of the economy, growing from $59 million and 16 percent of total earnings in 1990 to $104 million and 21 percent of total earnings in 2000. After growing sharply (207 percent) in the 1980s, earnings from jobs in the farm sector dipped (by 36 percent) in the 1990s. The farm sector accounted for $38 million and 7.2 percent of total socioeconomic study area earnings in 2000. Mining also reported a decline in real earnings during the last decade, falling by 6 percent, from $18 million in 1990 to $17 million (3.1 percent of total earnings) in 2000 (BLM 2003b).

**Figure 3-21. Trends in Full-Time and Part-Time Employment by Industry, 1990–2000**




Source: BLM 2003b.

**Figure 3-22. Average Earnings Per Job (2002$)**




Source: BLM 2003b.

### 3.6.2.2 Government Revenue from Natural Resources

#### Revenues to the Federal Government

The Federal Government's Minerals Management Service (MMS) collects royalties and rents from leases of federal lands for production of coal, oil, gas, and other leasable minerals. For coal leases issued or readjusted after August 4, 1976, the royalty rate is 8 percent of the value of production for underground mines and 12.5 percent for surface mines. However, there are no surface coal mines in the planning area at this time. Coal leases are offered competitively with a bonus bid in either dollars-per-acre or cents-per-ton; the minimum bid is $100.00 per acre or its equivalent in cents-per-ton. Annual rents on a coal lease are $3.00 per acre. For oil and gas leases issued after December 22, 1987, royalties are 12.5 percent of the amount or value of production. Oil and gas leases are offered competitively with a minimum bonus bid of $2.00 per acre. The rents for an oil and gas lease are $1.50 per acre for the first 5 years and $2.00 per acre for subsequent years. Royalties, bid prices, and rents are collectively referred to as lease revenue. Leases for non-energy solid leasable minerals are also subject to royalties, competitive bidding as required by regulation, and rents, but at this time, there are no non-energy solid mineral leases in the planning area.

Revenues, collected as royalties, rents, and bonus bids on a federal lease, are distributed within the Federal Government and to the State of origin of the revenue. The Federal Government returns 50 percent of the lease revenues to the State of origin of the revenues, and the other 50 percent is variously distributed within the Federal Government, depending on the type of lease, which varies depending on when the lease was issued. In Utah, the revenues distributed to the State flow through the Utah Department of Community and Economic Development to various state funds and other state and local agencies.

The Federal Government also receives bonus bid revenue from minerals underlying former federal lands exchanged with the State of Utah's SITLA in accordance with the Utah School and Lands Exchange Act of 1998 (Public Law 105-335). Only two counties in the state, Carbon and Emery, produce significant mineral lease revenue from exchanged lands. In the socioeconomic study area, only Sevier County has produced any such revenue in FY 2000 through FY 2004—a total of $500.00 in FY 2000. Because this was lease revenue and not bonus bid revenue, all of this revenue went to SITLA (none to the Federal Government).

Table 3-34 provides figures by county for mineral revenue collections by MMS and subsequent disbursements to the State, over the time period FY 2001 through FY 2004.[1] These figures encompass all federal lands in the included counties. Tracing revenues and disbursements to BLM lands in particular was not feasible for this study. Most of the revenue in Table 3-34 is generated in Sevier County as a result of coal production.

The RFO collects fees and other revenues for a variety of uses on BLM lands. These revenue sources include ROW rents, recreation fees, mineral material and vegetative material permit fees, and grazing fees.
Table 3-35 provides figures for the most significant local BLM revenue sources for FY 2002 to FY 2004. The table also indicates how each type of revenue is distributed. Most revenue from sales of land and materials, along with ROW rents, leaves the RFO. Recreation fees are retained. Fifty percent of grazing fees go to the BLM Range Improvement Fund and are returned to the district of origin.

[1] *Revenue generated from oil production at the Covenant Field after FY 2004 is not included in the table.*

## Table 3-34. Mineral Lease and Bonus Revenues Collected and Disbursed by the Federal Government, State of Utah Fiscal Years 2001–2004

| State Fiscal Year and Collections/Disbursements | Garfield County | Piute County | Sanpete County | Sevier County | Wayne County | Study Area Total | State Total |
|---|---|---|---|---|---|---|---|
| **2001** | | | | | | | |
| Federal Mineral Lease Collections | $798,451 | $2,290 | $106,725 | $10,467,631 | $17,779 | $11,392,876 | $92,368,329 |
| Federal Mineral Bonus Collections | $0 | $0 | $0 | $3,203,946 | $0 | $3,203,946 | $6,723,764 |
| Total Federal Collections | $798,451 | $2,290 | $106,725 | $13,671,577 | $17,779 | $14,596,822 | $99,130,862 |
| Total Disbursed to State | $399,226 | $1,145 | $53,362 | $6,835,788 | $8,890 | $7,298,411 | $49,565,431 |
| **2002** | | | | | | | |
| Federal Mineral Lease Collections | $241,975 | $2,345 | $39,163 | $4,350,638 | $1,431 | $4,635,553 | $27,021,330 |
| Federal Mineral Bonus Collections | $0 | $0 | $0 | $3,203,946 | $0 | $3,203,946 | $3,526,947 |
| Total Federal Collections | $241,975 | $2,345 | $39,163 | $7,554,584 | $1,431 | $7,839,499 | $30,548,276 |
| Total Disbursed to State | $120,988 | $1,173 | $19,581 | $3,777,292 | $716 | $3,919,749 | $15,274,138 |
| **2003** | | | | | | | |
| Federal Mineral Lease Collections | $526,921 | $2,371 | $3,746 | $10,121,739 | $0 | $10,654,777 | $63,953,116 |
| Federal Mineral Bonus Collections | $111,054 | $0 | $163,070 | $3,447,920 | $1,431 | $3,723,475 | $15,767,107 |
| Total Federal Collections | $637,975 | $2,371 | $166,816 | $13,569,660 | $1,431 | $14,378,252 | $79,720,223 |
| Total Disbursed to State | $318,988 | $1,185 | $83,408 | $6,784,830 | $716 | $7,189,126 | $39,860,112 |
| **2004** | | | | | | | |
| Federal Mineral Lease Collections | $576,836 | $2,436 | $1,552 | $8,375,727 | $0 | $8,956,551 | $115,121,675 |
| Federal Mineral Bonus Collections | $27,845 | $0 | $297,448 | $3,621,065 | $1,908 | $3,948,266 | $19,310,291 |
| Total Federal Collections | $604,681 | $2,436 | $299,001 | $11,996,792 | $1,908 | $12,904,817 | $134,431,966 |
| Total Disbursed to State | $302,340 | $1,218 | $149,500 | $5,998,396 | $954 | $6,452,409 | $67,215,983 |

Note: All figures are rounded to the nearest dollar.
Source: Utah Division of Housing and Community Development (2004). State receipts data grossed-up to federal collections based on 50–50 state-federal split (U.S. Minerals Management Service 2004b).

## Table 3-35. Richfield Field Office Revenue Collections, Federal FY2002–FY2004, and Primary Distribution of Funds

| Type of Revenue | Data Source | 2002 | 2003 | 2004 | Distribution (3) |
|---|---|---|---|---|---|
| ROW and communication site annual rents | 1 | $71,693 | $71,203 | $61,648 | To national BLM account and Federal Treasury general fund |
| Commercial/group SRPs; campground fees | 2 | $207,394 | $99,964 | $109,833 | Retained by BLM (Recreation Fee Demo Program) |
| Little Sahara recreation site entrance fees | 1 | $5,089 | $0 | $0 | Retained by BLM (Recreation Fee Demo Program) |
| Mineral material permit fees (sand and gravel, stone, soil, and other) | 1 | $8,725 | $21,599 | $14,036 | 76% to U.S. Bureau of Reclamation's Reclamation Fund, 20% to Federal Treasury General Fund, 4% to state |
| Vegetative material permit fees (native seed collection, firewood, posts/poles, Christmas trees, and other) | 2 | $10,633 | $3,767 | $3,476 | 76% to U.S. Bureau of Reclamation's Reclamation Fund, 20% to Federal Treasury General Fund, 4% to state |
| Sale of public land | 1 | $0 | $167,440 | $0 | 76% to U.S. Bureau of Reclamation's Reclamation Fund, 20% to Federal Treasury General Fund, 4% to state |
| Grazing fees, related maintenance, and trespass fees | 1 | $87,826 | $41,360 | $68,019 | 50% to BLM Range Improvement Fund (returned to the district of origin), 37.5% to Federal Treasury General Fund, 12.5% to state |
| ROW (primarily monitoring fees) | 1 | $40,604 | $36,019 | $0 | Retained by BLM |
| Road maintenance (vegetative materials) | 1 | $6,323 | $1,566 | $1,397 | Retained by BLM |

Sources:
1 – Data provided by RFO accounting office, October 2004; figures are net collections taking into account reversals and transfers.
2 – Figures provided by RFO resource specialists, October/November 2004.
3 – BLM National Business Center, Collections and Billing Branch, interviews November 2004 and "Distribution of Receipts Synopsis."

## Revenues to State Government

As noted above, the Federal Government, through the MMS, pays the State of Utah 50 percent of the mineral lease and bonus revenues it collects from federal leases in the state. These disbursements are shown in Table 3-36. State exchange lands, as noted above, produce negligible revenue in the socioeconomic study area. Other lands in the socioeconomic study area administered by SITLA may produce mineral revenues, but because these lands are not managed by the BLM, these data were not collected for this study.

The State of Utah collects several taxes and fees that derive from natural resources on both private lands and public lands:

- **Mining Severance Tax.** The tax is 2.6 percent of the taxable value of all metals or metalliferous minerals sold or otherwise disposed of (Utah Code 2004). Every person or business engaged in mining metals or metalliferous minerals must file an annual report with the Utah State Tax Commission. However, the first $50,000 of value is exempt from the tax.
- **Oil and Gas Severance Tax.** The tax is 3 or 5 percent, depending on the value at the well per barrel of oil or per million cubic feet of gas, and 4 percent for natural gas liquids, minus certain credits and reductions (Utah Code 2004). Statewide severance tax revenue totaled $18,893,082 in FY 2002 and $26,745,279 in FY 2003 (Utah State Tax Commission 2003). The state does not report this revenue by county. However, production from the socioeconomic study area for FY 2000 to FY 2003 was limited to Garfield County, averaging about 1.5 percent of state production for oil, and considerably less than 0.001 percent for gas (UDOGM 2004). Thus, oil and gas severance tax revenue to the State from the socioeconomic study area had been negligible. However, in FY 2004, the Covenant Field was discovered in Sevier County, providing a second source of oil production in the socioeconomic study area and a new severance tax revenue stream to the State. Statewide severance tax revenue totaled $71,513,869 in FY 2006 and $65,429,873 in FY 2007 (Utah State Tax Commission 2008). The large increase in severance tax is mainly due to increases in prices of crude oil (Utah State Tax Commission 2008). While oil and gas production in Garfield County slightly declined over the time period FY 2004 to FY 2007 compared with its production levels in FY 2003, Covenant Fields oil production increased dramatically accounting for about 1.1 percent of state production in FY 2004 and reaching 9.3 percent in FY 2007 after peaking at 11.5 percent of state production in FY 2006 (UDOGM 2008). As a result, oil severance tax revenue to the State from the socioeconomic study area has been growing in recent years.
- **Coal Severance Tax.** Utah does not have a state severance tax on coal.
- **Oil and Gas Conservation Fee.** The fee is 0.2 percent of the value at the well (Utah Code 2004). Statewide conservation fee revenue totaled $1,710,219 in FY 2002 and $1,943,755 in FY 2003 (Utah State Tax Commission 2003). The State does not report this revenue by county. Conservation fee revenue to the State from the 5 county area has been negligible in recent years for the same reason noted for the severance tax.
- **Income Taxes.** State income tax rates vary depending on individual or corporate status, type of corporation, taxable income, and other factors. The state requires 5-percent withholding on most mineral production income (Utah Code 2004). The State does not report state income tax revenue derived from income on natural resources in the 5 county area by county, and total revenue from this source cannot be reliably estimated for this study.

## Revenues to Local Governments

Most of the federal and state mineral revenue is disbursed to local government. The major means for the disbursements are as follows:

- **UDOT.** Most of Utah's share of federal land mineral lease revenue is deposited in the state Mineral Lease Account. In addition, 39.5 percent of state exchange land mineral lease revenue (minus 3 percent taken by SITLA for administration) is deposited in the Mineral Lease Account. Forty percent of the funds in the Mineral Lease Account are returned to the county of origin through UDOT in proportion to the amount generated by that county.
- **Permanent Community Impact Fund.** A total of 32.5 percent of the revenue in the Mineral Lease Account (plus a remainder after other funds are paid, if available) goes to this special fund set up by the Utah Legislature to award grants and loans to state and local agencies that are socially or economically affected by mineral resource development. In addition, 12.16 percent of exchange lands bonus revenue goes into the Community Impact Fund. The funds are awarded competitively and can be used for planning, construction, and maintenance of public facilities, and provision of public services.
- **Special Service Districts.** Approximately 5 percent of the revenue in the Mineral Lease Account is distributed to 11 counties that are affected by mineral extraction but receive limited funds through UDOT or the Community Impact Fund. These counties include 4 of the 5 counties in the planning area—Garfield, Piute, Sanpete, and Wayne. Each county receives an equal base payment and a portion based on population.

Table 3-36 shows these distributions of mineral lease and bonus revenues by county for recent years.

## Table 3-36. Distribution of Mineral Revenues by County, State of Utah Fiscal Years 2001–2004

| Data Source | Revenue Source | Garfield County | Piute County | Sanpete County | Sevier County | Wayne County | Study Area Total | State Totals |
|---|---|---|---|---|---|---|---|---|
| **FY2001** | | | | | | | | |
| 1 | State Distribution to Counties—UDOT | $219,434 | $458 | $21,138 | $2,073,944 | $3,556 | $2,318,530 | $20,609,660 |
| 2 | State Distribution to Special Service Districts | $168,349 | $132,727 | $374,995 | $0 | $143,686 | $819,757 | $2,476,644 |
| 3 | State Distribution to Counties—Community Impact Fund | $127,000 | $176,000 | $4,450,000 | $4,160,000 | $100,000 | $9,013,000 | $34,274,472 |
| **Sum of Above Distributions*** | | **$514,783** | **$309,185** | **$4,846,133** | **$6,233,944** | **$247,242** | **$12,151,287** | **$57,360,776** |
| **FY2002** | | | | | | | | |
| 1 | State Distribution to Counties—UDOT | $138,518 | $0 | $13,797 | $1,779,957 | $902 | $1,933,174 | $11,120,386 |
| 2 | State Distribution to Special Service Districts | $99,391 | $76,910 | $222,204 | $0 | $84,227 | $482,732 | $1,476,957 |
| 3 | State Distribution to Counties—Community Impact Fund | $28,916 | $0 | $160,000 | $1,027,500 | $430,000 | $1,646,416 | $20,933,850 |
| **Sum of Above Distributions*** | | **$266,825** | **$76,910** | **$396,001** | **$2,807,457** | **$515,129** | **$4,062,322** | **$33,531,193** |
| **FY2003** | | | | | | | | |
| 1 | State Distribution to Counties—UDOT | $154,878 | $615 | $1,324 | $1,614,650 | $0 | $1,771,467 | $16,221,449 |
| 2 | State Distribution to Special Service Districts | $136,263 | $105,442 | $304,637 | $0 | $115,473 | $661,815 | $2,024,878 |
| 3 | State Distribution to Counties—Community Impact Fund | $697,700 | $0 | $918,000 | $8,992,961 | $207,000 | $10,815,661 | $38,410,192 |
| **Sum of Above Distributions*** | | **$988,841** | **$106,057** | **$1,223,961** | **$10,607,611** | **$322,473** | **$13,248,943** | **$56,656,519** |
| **FY2004** | | | | | | | | |
| 1 | State Distribution to Counties—UDOT | $148,853 | $486 | $309 | $1,672,796 | $0 | $1,822,444 | $25,564,750 |
| 2 | State Distribution to Special Service Districts | $216,541 | $167,563 | $484,112 | $0 | $183,503 | $1,051,719 | $3,217,821 |
| 3 | State Distribution to Counties—Community Impact Fund | $59,000 | $980,000 | $1,532,400 | $892,000 | $1,390,000 | $4,853,400 | $28,797,224 |
| **Sum of Above Distributions*** | | **$424,394** | **$1,148,049** | **$2,016,821** | **$2,564,796** | **$1,573,503** | **$7,727,563** | **$57,579,795** |

*Counties may benefit from additional mineral revenues distributed by other state funds/agencies.
Sources:
1. Spreadsheets provided November 2004 by Kevin Anderson, Financial Manager, UDOT. Also available at http://www.dot.utah.gov/index.php/m=c/tid=135 (accessed November 4).
2. Spreadsheets provided November 2004 by Arthur Peterson, HCD Accountant, Utah Department of Community and Economic Development.
3. Utah Department of Community and Economic Development, Division of Community Development. Legislative Report of the Permanent Community Impact Fund. Reports for FYs 2001–2004 used.

The State of Utah assesses the value of natural resource properties—specifically oil and gas wells, metal mines, coal mines, sand and gravel mines, and nonmetal mines. County treasurers then set and collect taxes from these properties. On public lands, the taxes are based on either—(a) the value of equipment on the site or (b) discounted cash flow from production if the well or mine is producing—whichever is greater. Table 3-37 shows the natural resource property tax amounts collected by the 5 counties in the planning area in 2003 for all lands. A breakdown for BLM lands only is not available. Natural resource properties are a significant source of tax revenue for local government, totaling $1.3 million in the 5 county area in 2003. This represents 5 percent of all property taxes collected by local government (i.e., real and personal property taxes, taxes on utility and natural resource properties, and motor vehicle fees in lieu of taxes). Of this amount, coal mines contributed 70 percent, with nearly $908,144 in taxes paid on coal mines in Sevier County, the third-highest coal-producing county in the State.

**Table 3-37. Property Taxes Charged Against Natural Resource Property, 2003**

| Area | Oil and Gas Extraction | Metal Mines | Coal Mines | Sand and Gravel | Non-Metal Mines | Total Natural Resource Taxes | Total as Percentage of Total Property Taxes |
|---|---|---|---|---|---|---|---|
| Garfield | $67,885 | $53,556 | $0 | $8,582 | $0 | $130,023 | 3.2% |
| Piute | $0 | $7,446 | $0 | $0 | $1,557 | $9,003 | 1.4% |
| Sanpete | $212 | $347 | $0 | $22,113 | $24,165 | $46,837 | 0.5% |
| Sevier | $0 | $477 | $908,144 | $21,429 | $186,229 | $1,116,279 | 11.0% |
| Wayne | $0 | $0 | $0 | $1,131 | $2,499 | $3,630 | 0.3% |
| **Total-Study Area** | **$68,097** | **$61,826** | **$908,144** | **$53,255** | **$214,450** | **$1,305,772** | **5.1%** |

Source: Utah State Tax Commission 2004

A source of local government revenue directly attributable to the public lands in each of the counties is Payments In Lieu of Taxes (PILT). PILT payments are made by the Federal Government to compensate counties for lost property tax revenue attributed to federal lands, which are not taxable. PILT payments are calculated using a complex formula that considers numerous factors, including acreage of eligible lands; population; and other federal transfers, such as mineral royalties. In FY 2004, PILT payments for all federal lands in the 5 county socioeconomic study area totaled nearly $2.5 million—$113,302 to Piute County, $240,126 to Wayne County, $428,693 to Garfield County, $724,561 to Sanpete County, and $951,083 to Sevier County (USDI 2004). These payments are from all federal lands and therefore cannot be readily attributed to BLM specifically.

## Mineral Economics

The mineral industries produce direct and indirect labor earnings that circulate throughout the socioeconomic study area. Mining is a cyclical industry; in the past, mineral development has played a smaller role in the economy of the socioeconomic study area than at the present time. Coal production is at record levels, and there is continuing activity in mining of aggregate, salt, and gypsum. Mining and mining-related employment makes a significant contribution to Sevier County. There are undeveloped mineral resources located throughout the socioeconomic study area. Development of these resources is dependent on economic and other factors within and outside the area.

The main mineral production in the socioeconomic study area is the coal resource within Sevier County. Sevier County is the third-highest producer of coal in Utah and contains the highest-producing coal mine in the State: the SUFCO Mine in Convulsion Canyon. Between 1984 and 2001, coal production rose and

fell from year to year, with a low production value of $67.1 million in 1992 and a high production value of $108.5 million in 2001 (BLM 2003b).

Oil production in the 5 county area (Sevier, Garfield, and Sanpete counties are the only producing counties) generated nearly $5 million in sales in 2001 (BLM 2003b). Gas production, which occurs only in Garfield and Sanpete counties, is associated with the production of oil and generated $33,764 in sales in 2001 (BLM 2003b). Production in Sanpete County is from 1 well that has minor production on an intermittent basis. Production in Garfield County is primarily oil at the Upper Valley field in the western part of the county, outside the planning area. The Covenant Field in the Sevier Valley is the newest discovery of oil in the State, increasing production of oil in the State by more than 11 percent in FY 2006 then slightly decreasing to about 9 percent in FY 2007 (UDOGM, 2008). The discovery of oil at the Covenant Field has increased interest in leasing and exploration in the western part of the planning area. It should be noted that Garfield County's oil and gas production occurs in the western part of the county, outside the planning area, and a large portion of the oil production in the Sevier Valley is located on lands not managed by BLM. Recent drilling in the Sevier Valley area could lead to increased exploration and development within the planning horizon. Increased leasing activity has occurred in the Sevier–Sanpete Valley.

## Grazing Economics

The farm sector, which includes grazing on public lands, provided 2,508 jobs in the 5 county area throughout 2000. Although this number is marginally higher than numbers for 1980 and 1990, total employment in the farm sector has dropped from nearly 16 percent in the area in 1980 to nearly 10 percent in 2000 (BLM 2003b). Total earnings in the farm sector were reported as approximately $38.6 million during 2000, or 7.2 percent of total earnings in the 5 county area (BLM 2003b). These figures result in an average yearly income of $15,385 for jobs in the farm sector. Total numbers of cattle in the 5 county area have remained mostly constant over the past 14 years, whereas the number of sheep has declined by more than 35 percent (BLM 2003b).

Within the RFO, the number of permitted AUMs available for livestock grazing has been constant at 109,951 to as far back as at least 1988. An AUM is a standardized measure of the amount of forage necessary for the sustenance of one cow unit or its equivalent (e.g., 5 sheep) for 1 month. Active use, as represented by the number of AUMs licensed (purchased) yearly, has increased from a low of nearly 38,000 in 1990 to a high of nearly 76,600 in 2001. The discrepancy between permitted AUMs and active AUMs can be attributed to the variability of range conditions year to year, fluctuations of prices in the livestock markets, individual permittees taking voluntary nonuse, or combinations of the 3. BLM grazing fees rose to their highest point ($1.98 per AUM) in the mid-1990s but quickly declined and have held steady at or near the base rate of $1.35 per AUM through 2004. The number of livestock operators using BLM lands managed by the RFO has increased steadily, from a low of 120 in 1990 to a high of 148 in 1999 (BLM 2003b).

Calculation of the value of livestock grazing within the RFO is based on the 10-year average of active AUMs (see the livestock grazing section of this chapter). Active AUMs in this period averaged 50,827 for cattle and 9,756 for sheep. The average value of production per AUM in 2003 dollars for the State of Utah is $41.22 for cattle AUMs and $22.93 for sheep AUMs, based on the methodology described in the *Socioeconomic Baseline Report*. Applying these values to the active AUM figures shows that the average value of production for livestock grazing within the RFO in recent years is about $2.1 million per year for cattle and $223,700 for sheep in 2003 dollars (Table 3-38). Combined with information on livestock production across the entire 5 county socioeconomic study area (BLM 2003b, USDA 2004; both updated to 2003 dollars), these data show that 1.5 percent of the $154.2 million 10-year annual average of cash receipts for livestock and livestock products can be attributed to grazing on BLM lands. However, this small figure may not reflect the full significance of grazing on BLM lands; for instance, this grazing could

be critical to certain operators at certain times of the year when other forage or feed is unavailable or expensive.

**Table 3-38. Value of Grazing Output on Richfield Field Office Public Lands**

| Stock Type | Active (Licensed) AUMs* | Estimated Value of Production per AUM (2003$)* | Value of Grazing Output (2003$) |
|---|---|---|---|
| Cattle | 50,827 | $41.22 | $2,095,100 |
| Sheep | 9,756 | $22.93 | $223,700 |
| **Total** | **60,583** | | **$2,318,800** |

Notes: 10-year Average 1994–2003
Source: USDA 2004.

## Recreation and Tourism Economics

Recreation visitation to the 5 county socioeconomic study area has declined in the past several years, mirroring trends for the state and nation. Figures from the Utah Division of Travel Development (2004) indicate visitation to most area state and national parks peaked in 1999 and in most cases has declined steadily through 2002 (Grand Staircase-Escalante National Monument—minus 41 percent, Yuba State Park—minus 22 percent since peak in 2000, Capitol Reef National Park—minus 19 percent, Glen Canyon NRA—minus 19 percent, Canyonlands National Park—minus 17 percent, Goblin Valley State Park—minus 13 percent, and Palisade State Park—minus 5 percent since peak in 2000). Visitation continued to decrease through 2007 with minus 17 percent in Capitol Reef National Park, 10 percent in Canyonlands National Park, and 26 percent in Glen Canyon NRA. Despite these declines, the recreation and tourism-related sectors have the greatest potential for growth among sectors that use public land resources. Long-term increases in recreation visits are likely a result of projected state and regional population growth and an aging population that will demand increased opportunities for leisure and recreation.

Employment and earnings provided by recreation and tourism are typically within the service and retail sectors, although not all employment and earnings from these sectors can be directly attributed to tourism and recreation. The Utah Division of Travel Development (2004) estimates that there were 2,979 travel and tourism-related jobs in the 5 county area in 2003. According to the Division, 44 percent of total employment in Garfield County in 2003 occurred in tourism-related jobs. Figures for this measure for other counties are as follows: Wayne County—26 percent; Piute County—17 percent; Sevier County—17 percent; and Sanpete County—7 percent. For all 5 counties, the *2007 Economic Report to the Governor* (Utah Governor's Office of Planning and Budget 2007) estimates that 15.4 percent of all jobs (in 2005) were in the leisure and hospitality industries; this is more than double the percentage for Utah as a whole (7.3 percent). The Division estimates that travelers spent a total of $92 million in the 5 county area in 2003, resulting in $1.9 million in tax revenues to local governments.

Recreation participation and visitor days (i.e., 12 hours of participation in any recreational activity) for the lands managed by the RFO for FY 2001 through FY 2004 are detailed in Table 3-23. For the FY ending September 30, 2004, the greatest number of recreationists participated in driving for pleasure (132,195), camping (105,128), picnicking (81,055), hiking/walking/running (66,189), and OHV/ATV use (63,834), whereas the greatest number of visitor days were spent camping (102,144), driving for pleasure (55,034), backpacking (51,610), hiking/walking/running (31,507), and using OHVs (cars/trucks/SUVs) (31,836).

## 3.6.3 Environmental Justice

"Environmental justice" refers to the fair and equitable treatment of individuals regardless of race ethnicity, or income level, in the development and implementation of environmental management policies and actions. In February 1994, President Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority and Low Income Populations. The objective of this EO is to require each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations" (EO 12898, 1994).

Where the impacts of a proposed federal action may involve such populations, an analysis of the potential for disproportionate impacts and meaningful community outreach and public involvement is required.

### 3.6.3.1 Minority Populations

BLM IM 2002-164, Guidance to Address Environmental Justice in Land Use Plans and Related NEPA Documents, provides policy and guidance for addressing environmental justice in BLM land use planning. IM 2002-164 defines minority persons as "Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut and other non-white persons." Further, IM 2002-164 indicates that an area should be considered to contain a minority population when either the minority population of the affected area exceeds 50 percent, or the percentage of minority population in the affected area is meaningfully greater than the percentage in the general population.

Populations of the 5 counties encompassed within the socioeconomic study area are predominately Caucasian and non-Hispanic. All 5 counties have a larger proportion of Caucasian residents than does the State. Table 3-39 summarizes the population by race and ethnicity in 2004.

**Table 3-39. Racial and Ethnic Groups for Richfield Planning Area Counties and Utah (Percentage of Population)**

| Race or Ethnicity | Garfield County | Piute County | Sevier County | Sanpete County | Wayne County | State of Utah |
|---|---|---|---|---|---|---|
| Caucasian persons | 97.4% | 98.4% | 97.0% | 96.6% | 99.0% | 93.8% |
| African American persons | 0.2% | 0.1% | 0.3% | 0.5% | 0.2% | 0.9% |
| American Indian/Alaska Native | 1.8% | 1.2% | 1.8% | 1.0% | 0.3% | 1.3% |
| Asian persons | 0.4% | 0.1% | 0.3% | 0.7% | 0.0% | 1.9% |
| Native Hawaiian, or Pacific Islander | 0.0% | 0.0% | 0.1% | 0.7% | 0.3% | 0.7% |
| Persons reporting two or more races | 0.2% | 0.1% | 0.5% | 7.6% | 0.2% | 1.3% |

| Race or Ethnicity | Garfield County | Piute County | Sevier County | Sanpete County | Wayne County | State of Utah |
|---|---|---|---|---|---|---|
| Persons of Hispanic or Latino origin | 3.3% | 5.0% | 2.8% | 7.6% | 2.6% | 10.6% |
| White persons, not Hispanic | 94.5% | 93.7% | 94.5% | 89.4% | 96.4% | 83.8% |

Source: U.S. Census Bureau, 2004.
Notes:
1—Detail may not add up to 100% due to rounding.
2—Hispanic breakout is separate because Hispanics can be of any race.
3—Figures for Garfield County represent the entire county, not just the portion within the planning area.

As Table 3-39 shows, the percentage of minority residents does not exceed 50 percent of the total population in any of the 5 counties in the socioeconomic study area. Thus, none of the 5 counties contain a minority population that is meaningfully greater than the general population.

### 3.6.3.2 Low-Income Populations

With respect to low-income populations, IM 2002-164 indicates that low income populations can be identified according to poverty thresholds published by the U.S. Census Bureau. In addition, the IM notes that "when considering these definitions, it is important to recognize that some low-income and minority populations may comprise transitory users of the public lands and thus not be associated with a particular geographic area."

As shown in Table 3-40, 10 percent of the persons living in Utah had incomes below the poverty level in 2003. Persons with incomes below the poverty level in the counties within the planning area ranged from 10 to 13.8 percent. For the purposes of this analysis, this range was not determined to represent a substantial concentration of persons living in poverty or to be meaningfully greater than the statewide percentage.

**Table 3-40. Persons Below the Poverty Level for Richfield Socioeconomic Study Area by County (Percentage of Population, 2003)**

| Income | Garfield County | Piute County | Sevier County | Sanpete County | Wayne County | State of Utah |
|---|---|---|---|---|---|---|
| Persons below poverty level | 10.0% | 13.8% | 11.8% | 13.5% | 11.5% | 10% |

# 3.7 HEALTH AND SAFETY

## 3.7.1 Introduction

A major priority in land management for the RFO is ensuring health and human safety on its public lands. The BLM's goals are to effectively manage hazardous materials and safety hazards on the public lands to protect the health and safety of public land users; protect the natural and environmental resources; minimize future hazardous materials and related risks, costs, and liabilities; and to mitigate physical hazards in compliance with all applicable laws, regulations, and policies. The BLM follows its national, state, and local contingency plans as they apply to emergency responses. These plans are also consistent with federal and state laws and regulations.

## 3.7.2 Hazardous Materials

Hazardous materials are generally defined as a usable product or substance that may cause harm to humans, natural resources, or the environment when spilled, released, or contacted. Hazardous materials are used in everyday activities and may be in the form of a solid, liquid, or gas. Regardless of their physical state, hazardous materials may be toxic, flammable, combustible, reactive, and/or corrosive. These can include, but are not limited to, discarded chemicals, chemical spills, and discarded wastes. Once hazardous materials are disposed of, spilled, or dumped, they are classified as "hazardous waste." Hazardous waste problems within the RFO can result from programs conducted by state and local governments, by local businesses and industries, and/or by illegal dumping of hazardous materials on lands administered by the BLM. In coordination with cooperating agencies, BLM-administered public land sites contaminated with hazardous wastes would be reported, secured, and cleaned up according to applicable federal and state regulations and contingency plans. Parties responsible for contamination would be liable for damage assessment, removal, and restoration costs as prescribed in federal and state regulations. Currently no hazardous waste sites listed on the National Priority List or Superfund Cleanup List exist within the RFO.

### 3.7.2.1 Potential Hazards

The various hazardous waste generators pose a potential threat to the health and safety of area residents, visitors, and to the physical environment itself. Both commercial and illegal activities can lead to the creation of hazardous waste sites. Spills, illegal dumping, and the discovery of abandoned hazardous materials are likely to occur within the RFO. Contaminants from these sites can pose an imminent threat to public safety and adversely impact the environment by affecting soils, ground water, air, and surface water quality. Potential hazardous waste generators within the RFO include the following: oil and gas drilling operations, natural gas pipelines, mining operations, uranium tailings, storage tanks, landfills, and illegal dumps.

### 3.7.2.2 Hazardous Materials Management

The RFO Hazardous Materials Program is responsible for hazardous materials handling, storage, transport, and emergency response. Several state and federal mandates, authorities, and handbooks provide the BLM with management guidelines, objectives, and actions pertaining to hazardous materials management. The federal and state prescribed mandates ensure the RFO's compliance with applicable laws and regulations.

## 3.7.3 Abandoned Mines

The early mining practices within the planning area were subject to minimal safety and environmental regulations. Prior to 1981, the BLM did not regulate surface disturbance related to mining operations and did not have regulations for public safety in association with mining operations. Prior to 1981, mine openings such as shafts, adits, and other access to mine workings, were left open in many cases when the mining operations ceased. These open, abandoned mine workings are a safety and/or health concern to the public because the workings can pose a risk of serious injury and/or toxic threat to humans. In addition, abandoned mines can contribute heavy metals and other contaminants to surface and ground water. This uncontrolled drainage can pose a health risk to humans and be a source of environmental degradation.

The BLM has conducted inventories of abandoned mine sites and some remediation, such as stabilizing sites, closing mine openings, and/or reclaiming mine-related land disturbances within the RFO. In the RFO, the areas most likely to have abandoned mine openings are near Marysvale and the Henry Mountains. In the 1990s, many abandoned mines around Marysvale were closed as part of Abandoned Mined Land projects completed by the State of Utah in cooperation with the BLM; however, many abandoned mine workings are still present. The BLM and the State will continue to inventory and close abandoned sites that are a safety and/or health concern for the public and an environmental concern.

### 3.7.3.1 Potential Hazards

Abandoned mine sites may pose hazards to human health, the environment, and physical safety. Threats to health and the environment include acid drainage, heavy metal contamination, metal-contaminated tailings impoundments, stored chemicals, and leaking containers. Changes in the chemical composition or soil loss near abandoned mine sites can result in alterations or loss of natural habitat for native wildlife. Abandoned mines may also affect surface and ground water. The impacts to water quality are generally the result of contaminated sediments or metal salts that can affect human health, fisheries, wildlife, and vegetation. Contaminants from tailings impoundments, waste rock piles near abandoned mill sites, and mine workings can become airborne or water transported and become a risk to public health. Releases of hazardous substances from waste piles and acid drainage can affect lands beyond abandoned mine sites.

Open, abandoned, underground mines are unstable; mine adits (horizontal openings at the surface) may collapse, internal supports for levels (passages within the mine) may fail, and mine shafts (vertical openings at the surface) and winzes or raises (vertical connections between mine levels) may be obstructed or unseen. Toxic or lethal air conditions may exist due to low concentration of oxygen or high concentrations of other gases. Exposure to radiation in the mine, particularly radon gas, can be a hazard, especially in abandoned uranium mines in southern Utah.

Abandoned, unreclaimed surface mines can include hazards related to physical safety. Such features could include abandoned unstable highwalls, waste dumps, and other slopes, and can also include equipment.

Water can be a hazard in flooded underground mines; the water may cover and conceal sharp or other hazardous objects and winzes or raises to a lower level. Water at surface mines can also be a hazard and safety risk by concealing objects or concealing abrupt changes in surface.

Hazardous wastes, such as explosive materials and chemicals could be present. Explosive materials can be a safety hazard and can be in a deteriorated, unstable condition. Containers of chemicals can be damaged, in a state of deterioration, or otherwise leaking. Tanks, holding or processing ponds, or other fluid containment structures may have lost integrity and may allow for leakage and seepage into soils,

transport by surface and ground water, or other contamination of the environment and threat to human health. Illegal dumping of hazardous wastes within abandoned mines is also a possibility.

### 3.7.3.2 Abandoned Mine Management/Reclamation Activities

The BLM has recently developed the Abandoned Mine Lands program (AML) that addresses the environmental and safety hazards associated with AML sites on public lands. Once the sites are identified, they are prioritized and appropriate actions are taken on those historic mine sites that pose health and safety risks. The BLM's priority for reclamation of environmentally contaminated sites is based on risk assessments that address threats to human health and the environment. For example, abandoned mine land sites that affect water quality are usually a greater concern and receive a higher priority for reclamation than those that do not affect water quality. See Chapter 2 for AML program priorities.